**Abstract ID:** 4 **Research Category:** Medical Education

**Title**: Impact of the COVID-19 Pandemic on Osteopathic Medical Students in the 2021-2022 NRMP Application Process

**Presenting Author**: Nicholas Lukish

**Presenting author affiliation**: KCU - Joplin

**Co-Authors and Affiliation**: Annamarie Lukish, KCU - KC, John Lukish, KCU - KC, Danielle Lukish, Liberty University College of Osteopathic Medicine (LUCOM), Linda Mintle, PhD LUCOM

**Location**: Joplin Campus

**Abstract**

The COVID-19 pandemic significantly changed the undergraduate medical education (UME) NRMP application process (NAP). Newly introduced changes included virtual interviews, the suspension or elimination of away rotations, elimination of COMLEX 2 PE/USMLE STEP 2 CS licensing exams, and increased online rotations. A 20 question survey was developed and distributed after the 2022 match via email and social media. 86 students from the Liberty University College of Osteopathic Medicine and the Kansas City University College of Osteopathic Medicine participated in the study. 97.59% matched in the 2021-2022 NAP. 94.81% matched in their first-choice specialty. The number of away rotations in matched specialties ranged from 1 to 9 (M=3.22, SD=1.82). Only 39.74% matched at an away rotation site. The average amount of money spent on the entire application process was (M=$3070, SD=$2274). On a scale of 1 to 10, overall impact felt by the pandemic on the 2021-2022 NAP was M=4.92, SD=1.92. 54.5% of students reported the suspension of the third board exam to have impacted their application process high to very highly. However, more students felt highly impacted by the availability of away rotations (61.2%) and the virtual interviewing format (71.6%). Approximately 45% of students rated both stress and anxiety as high impacts. 72.06% of participants sought feedback from students from the 2020-2021 NAP and 48.98% of participants found this feedback to be highly helpful. The impact of the availability of away rotations and stress were positively correlated ($r=0.266$, $p<0.005$). The suspension of PE/CS and sleep were negatively correlated ($r=-0.054$, $p<0.006$). Changes in the 2021-2022 NAP due to COVID-19 positively and negatively impacted students. Student comments indicated that virtual interviews opened up more opportunities to interview and save money. Students also commented that due to the strain of the pandemic, they had less time with their attending physicians and that this could have negatively impacted their letters of recommendation. Overall, cancellation of the PE and CS was viewed positively. Many students sought out feedback from applicants of the 2020-2021 NAP to be better prepared to face the challenges of the continued pandemic.

**Abstract ID:** 7 **Research Category:** Clinical Science

**Title**: Degree of uncertainty in reporting imaging findings for necrotizing enterocolitis: a secondary analysis from a pilot randomized diagnostic trial

**Presenting Author**: Disa Rathore

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**Location**: Kansas City Campus

**Abstract**

Background: Uncertainty in reporting of imaging findings for necrotizing enterocolitis (NEC) can be challenging for clinicians and result in ambiguity, miscommunication, and potential diagnostic errors. The degree to which uncertainty complicates diagnostic imaging for NEC has not been characterized.

Objective: To determine the degree of uncertainty in diagnostic imaging for NEC.

Methods: We conducted a retrospective study using data from a previously completed pilot diagnostic randomized clinical trial (RCT). The study population comprised of preterm infants with suspected NEC who were randomized to either standard imaging with abdominal radiographs (AXR) alone or experimental imaging with AXR + add-on bowel ultrasound (BUS). Level of uncertainty was determined using a 4-point Likert scale. Our primary outcome was uncertainty scores for pneumatosis, portal venous gas, and free air. Secondary outcomes included rates for complete reporting, use of standardized templates, and inclusion of diagnostic certainty scale.

Results: Sixteen preterm infants (mean gestational age 27.2 ± 2.2 weeks, mean birth weight 1020 ± 373 grams) with concern for NEC underwent 113 AXR and 24 BUS as part of a pilot diagnostic RCT. Overall, BUS had less uncertainty for reporting each of the three main NEC findings compared to AXR (Pneumatosis: 1 [1 – 1.75) vs 3 [2 – 3], P<0.0001; PVG: 1 [1 – 1] vs 1 [1 – 1], P=0.02; Free air: 1 [1 – 1] vs 2 [1 – 3], P<0.0001). BUS reports also had higher rate of complete reporting compared to AXR reports (96% versus 52%, P<0.001). Rates of standardized reporting template (88% vs 16%, P<0.001) and diagnostic certainty scales (96% vs 16%, P<0.001) were also higher in BUS reports compared to AXR reports.

Conclusion: Our results suggest that the superior technical accuracy of BUS allows radiologists to report important NEC findings with less uncertainty compared to AXR. The substantial decrease in uncertainty with BUS provides additional evidence to support the use of BUS as an adjunct to AXR for NEC diagnosis. Further studies are needed to determine whether improved certainty results in improved clinical outcomes.

**Abstract ID:** 8 **Research Category:** Case Reports

**Title**: Hepatocellular injury following Metoprolol overdose: Case report and literature review

**Presenting Author**: Victor LeClair

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Samuel Fischer-KCU
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**Location**: Joplin Campus

**Abstract**

Metoprolol is a cardioselective beta-blocker with antagonism against beta-1 adrenergic receptors and minimal effect against beta-2 receptors. Initial dosing typically ranges from 25 to 100 milligrams depending on the indication, rarely exceeding 400 milligrams daily. Metoprolol has been associated with elevated serum aminotransferase levels although these elevations are typically mild and transient. In this case, we discuss a patient with a history of depression, bipolar disorder and hypertension who presented to the emergency department after an intentional metoprolol overdose. She was initially stabilized and transferred to the psychiatry unit where she continued to be observed. After two and a half weeks she was noted to be confused and jaundiced. Hepatic enzymes were grossly elevated, consistent with drug induced hepatitis [3]. She was transferred back to the floor where additional causes were excluded including viral hepatitis, autoimmune hepatitis and acute drug toxicity. Imaging was negative for traumatic causes. Liver enzymes normalized within one week and she was ultimately discharged home.

**Abstract ID:** 10 **Research Category:** Clinical Science

**Title**: CHARACTERIZING JOINT LUBRICANTS AS DELIVERY METHODS FOR MULTIPOTENT STROMAL CELLS

**Presenting Author**: Kennedy Michele Davis

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Megan Hamilton- University of Kansas
Lisa Stehno-Bittel - University of Kansas , Likarda LLC
Douglas Bittel- Kansas City University

**Location**: Kansas City Campus

**Abstract**

Multipotent Stromal Cells (MSC) are utilized as therapeutic agents for addressing tissue regeneration for musculoskeletal conditions, including knee osteoarthritis (OA). Currently, cell therapies lack FDA-approval for injections to alleviate joint OA. To overcome this barrier, some clinicians are utilizing autologous stem cell transplants that are not regulated. However, the results are mixed with a majority of patients indicating little or no relief. Major challenges in the clinical application includes poor MSC viability after isolation, extreme shear stress of the injections, maintenance of the cells in the joint capsule, and the harsh inflammatory environment of knee OA. As hyaluronic acid (HA) is an innate polymer of synovial joints that maintains cartilage viscoelastic integrity, HA-based cell delivery systems are of interest. While MSCs could be delivered in these uncrosslinked gels, it is hypothesized that they will not trap the cells in the knee joint long enough to have an effect. The aims of this study were: 1) to determine whether a commercial HA joint lubricant (Monovisc) could maintain MSC viability under different conditions, and 2) to determine the ability of cells delivered in Monovisc to reverse knee joint degeneration in an OA rat model.

**Abstract ID:** 13 **Research Category:** Case Reports

**Title**: A case report of acute thyrotoxicosis: lost in the pandemic storm

**Presenting Author**: Megan Unrath

**Presenting author affiliation**: Kansas City University OMSII

**Co-Authors and Affiliation**: Dr. Robert Tyler, DO - Kansas City University Assistant Professor, Internal Medicine

**Location**: Kansas City Campus

**Abstract**

Acute thyrotoxicosis is a medical emergency characterized by excess thyroid hormones. Immediate medical attention is required to bring the patient's dysfunctional physiologic mechanisms under control. Most recommendations are to treat acute thyrotoxicosis in a critical care setting; however, during the SARS-CoV2 pandemic, our experience found that implausible for several reasons. We present a patient with acute thyrotoxicosis who was treated on a general medicine ward at a critical-access hospital without critical care capabilities. Perspective stemming from the COVID-19 pandemic related to patient care, appropriateness of healthcare access, and provider well-being as well as implications for future care are presented because of this case report.

**Abstract ID:** 14 **Research Category:** Quality Improvement

**Title**: Effects of Osteopathic Manipulative Treatment on Mental Health Disease: A Systematic Review

**Presenting Author**: Briana Saravanabavanandhan

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Rebecca Wong - MPH, OMSIII, KCU
Gerough Chou, DO - KCU OMM department

**Location**: Kansas City Campus

**Abstract**

Context: Low-cost, non-pharmacologic treatments for mental health disorders are rare. Osteopathic manipulative treatment (OMT) is known to be efficacious and cost-effective for physical conditions. The relationship between OMT and mental health has not been well explored.

Objective: Identify therapeutic effects of OMT on mental health disease via systematic review.

Data Sources: Articles without publication-date or language restriction were searched in Clinical Key, EBSCO, Google Scholar, JSTOR, Ovid, and PubMed in October 2021. Search terms included osteopathic manipulative medicine/treatment and mental health disease/disorder/illness. Relevant studies referenced in found articles which were not included in the original search were obtained and filtered for inclusion.
Study Selection: Inclusion and exclusion criteria were independently applied to original search results in three stages (titles, abstracts, and full text) by two reviewers with consensus required for progression. Studies remaining after the full text stage were included in the systematic review.
Inclusion/Exclusion Criteria: Studies must be peer-reviewed, written in English, prospective or retrospective in design, mention known osteopathic techniques (e.g., myofascial release (MFR)), have OMT delivered by providers trained in osteopathic medicine, and measure mental health conditions defined by the American Psychiatric Association (APA) or Diagnostic and Statistical Manual of Mental Disorders (DSM-V).
Results: Review of data resources identified 1104 studies of which seven met inclusion criteria (randomized control trials (n=3), non-randomized control study (n=1), prospective observational cohort study (n=1), retrospective medical record review (n=1), case report (n=1)). The 7 studies examined effects of OMT on anxiety (n=3), depression (n=2), anxiety and depression (n=1), and panic disorder (n=1). Across the 7 studies, a total of 20 OMT techniques were noted with fascial/MFR (n=4), cranial (n=3), and inhibition (n=3) being most common. All studies examining anxiety (n=4) and panic disorder (n=1) found OMT to statistically improve outcome measurements. Of the studies examining depression (n=3), one found statistically significant change in outcome measurements.
Conclusion: OMT has been shown to reduce the symptom burden of anxiety, depression, and panic disorder. Evidence on OMT as adjuvant or mainstay mental health treatment is limited in number and sample size. More research addressing these limitations is needed.

**Abstract ID:** 15 **Research Category:** Clinical Science

**Title**: A retrospective analysis of mortality rates among COVID-19 patients with comorbid pneumonia treated in a rural southwest Missouri healthcare system

**Presenting Author**: Tess Krage

**Presenting author affiliation**: Kansas City University College of Osteopathic Medicine-Joplin COM 2025

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**Location**: Joplin Campus

**Abstract**

Background: Over one million people in the United States have died from COVID-19 since the beginning of 2020. A myriad of risk factors and comorbidities have been determined to influence COVID-19 mortality rates, among these is pneumonia. Thus, treating pneumonia in COVID-19 patients is essential to the lowering of mortality rates. This study considers the morbidity rate among COVID-19 patients also suffering from pneumonia treated in a rural health care system. Such patients in a such a setting emerge as a vulnerable population.

Methods: A retrospective observational study was conducted using data collected from hospitals in the Freeman Health System located in Joplin and Neosho, Missouri. Data was collected between April 1, 2020 through December 31, 2021. Using International Classification of Disease (ICD-10) codes, the investigators identified five distinct patient populations: patients with COVID-19 and pneumonia due to COVID-19 (P1); patients with COVID-19 but without pneumonia due to COVID-19 (P2); patients with COVID-19 and any type of pneumonia (P3); patients with COVID-19 but without any type of pneumonia (P4); and patients without COVID-19 and with any type of pneumonia (P5). In order to understand the manner in which pneumonia influences COVID-19 outcomes, the investigators used a Wald's method to compare the mortality rates between these various populations.

Results: Population P3 and P1 showed the highest mortality rates, with P4 having the lowest mortality rate. The data revealed that having pneumonia combined with COVID-19 in any patient population led to a higher mortality rate than COVID-19 alone.

Conclusion: Mortality rates were higher among COVID-19 patients with pneumonia compared to COVID-19 patients without pneumonia. Additionally, pneumonia was found to have a higher mortality rate compared to COVID-19 alone as all patients who had pneumonia as a comorbidity, whether it was a complication due to COVID-19 or a standalone disease, had higher mortality rates.

**Abstract ID:** 17 **Research Category:** Health Service Psychology

**Title**: Exploring the benefits of using Narrative based intervention literary tools (NBILTs) amongst minority, high-functioning autistic adults

**Presenting Author**: Teja Fuller

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**:

**Location**: Kansas City Campus

**Abstract**

The aim of this study is to explore the benefits of narrative-based intervention literary tools (NBILTs) that include cultural sensitivity, amongst minority, high-functioning autistic adults. This study will explore reasons and experiences behind a delayed or missed diagnosis of autism within a minority population. It will specifically observe experiences amongst participants with diagnosis during early developmental stages, as well as an exploration of any beliefs and understandings of how culture may have become a barrier to receiving resources and an early diagnosis amongst providers, educator, and mental health clinicians. This study will be devised into a comparative, cross-sectional qualitative study where one group will receive a book that explains autism with cultural inclusions, while the other group will receive an informational packet that gives a general overview, without any cultural inferences. Regarding the NBILTs, a book will be used to determine if psychoeducation about an autism diagnosis amongst minority populations, assists in mitigating and coping with associated symptoms and behaviors. Further, the book will also be created to describe the associated symptoms and behaviors of autism that include culturally relevant influences that may result in an alternative presentation of typical symptoms. The informational packet will be a pre-established pamphlet from the CDC that does not include any cultural references in its explanation of what autism is and its related symptoms. Data will be collected through an eligibility autism quotient (AQ) screener, a life experiences questionnaire, utilization of the tree of life worksheet, and a qualitative focus group, as a means of establishing a baseline of understanding, in regard to observed changes after the selected intervention tool is introduced. Ultimately, this study will explore the impacts of NBILTs that include cultural influences on minority individuals diagnosed with autism, and if it assists in coping with or addressing behaviors and symptoms associated with autism, in order to achieve successful living as a high-functioning, autistic adult.

**Abstract ID:** 20 **Research Category:** Quality Improvement

**Title**: The quality and readability of online patient information on positional head shape conditions

**Presenting Author**: Kristof Gutowski

**Presenting author affiliation**: Division of Plastic Surgery, Ann & Robert H. Lurie Children's Hospital, Chicago, IL; Kansas City University College of Osteopathic Medicine, Kansas City, MO

**Co-Authors and Affiliation**: Sarah A. Applebaum, MD1,2; Ben L. Thomae, BA2; Karlee C. Knight, BS1; Emily S. Chwa, BA2; Arun K. Gosain, MD1,2

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2. Division of Plastic and Reconstructive Surgery, Northwestern University Feinberg School of Medicine, Chicago, IL

**Location**: Kansas City Campus

**Abstract**

Introduction: Families increasingly use online resources to acquire medical information about their child's disorders with little understanding of the legitimacy of the source of information or of the information itself. We evaluate the quality and readability of online information related to positional head shape conditions and identify unmet needs for plastic surgeons to improve online patient education.

Methods: The search terms "flat head baby," "brachycephaly," and "plagiocephaly" were queried on Google and the first 20 websites for each were reviewed. Included websites were evaluated for quality using the DISCERN Instrument and readability using the Flesch-Kincaid Reading Grade Level (FKGL) and Flesch Reading Ease Score (FRES). Websites were categorized by upload source and results were compared using one-way ANOVA.

Results: 38 websites met inclusion criteria. There was no significant correlation between DISCERN score and Google search rank between the three search terms. Professional organizations provided websites with the highest mean DISCERN score (56.25) and commercial websites with the lowest score (36.64, $p = 0.003$), indicating "good" and "poor" quality content, respectively. Readability assessments showed an overall average FKGL of 9.92 and FRES of 54.4, suggesting "fairly difficult". Overall, hospitals provide the most website results and tend to publish lower quality information, yet are the most readable.

Conclusions: High quality websites written at an appropriate reading level for the general public are lacking. A review of online resources for positional head shape conditions can be used to derive recommendations to improve the content of online patient education for pediatric healthcare.

**Abstract ID:** 23 **Research Category:** Clinical Science

**Title**: Effects of tobacco and alcohol on post-operative spinal surgery complications

**Presenting Author**: Eric Khurana, Jordan Konstanty

**Presenting author affiliation**: KCU, KCU

**Co-Authors and Affiliation**: Matthew Sterling -KCU
Quinn Bohn - KCU
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**Location**: Kansas City Campus

**Abstract**

Tobacco and Alcohol misuse are pervasive problems in today's society and have been shown to significantly impact the success of surgeries. Because spinal surgeries are invasive, their success and the perioperative complication rate are significantly impacted by tobacco and alcohol usage. Since studies on patient satisfaction after a spinal fusion shows significantly large numbers of unhappy patients, it is essential to fully understand the implications of tobacco and alcohol use in relation to these operations in order to give patients accurate expectations for recovery and outcomes. Also, physicians should ask themselves, should some patients with tobacco or alcohol misuse should be turned away as a candidate for spinal surgery with the higher complication rates associated with this behavior. The purpose of this study was to look at a multitude of studies in order to create a better understanding of the impact of tobacco and alcohol use on spinal surgery success. This is a literature review in which data was analyzed for perioperative complications, postoperative complications, development of secondary disease, and surgery failure and readmission. We found that multiple papers demonstrated a higher chance of complications, postoperative complications, and risks of reoperation. Cessations of smoking for a 6-month period seemed to yield much better recovery results compared to smokers. Alcohol drinkers were shown to have higher rates of reoperation as well compared to patients who did not smoke or drink.

**Abstract ID:** 26 **Research Category:** Case Reports

**Title**: Teenager with earache and headache; a case report of mastoiditis with trans-tegmen tympani intracranial spread

**Presenting Author**: Maxine Derrick

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Harris Leach - Kansas City University
Hannah Reuther - Georgia State University

**Location**: Kansas City Campus

**Abstract**

Authors/Co-authors: Maxine Derrick (KCU OMSIII), Harris Leach (KCU OMSIII), Hannah Reuther (GSU B.S. Biology)
Otitis media (OM), or inflammation of the middle ear, is a common diagnosis within the pediatric population with various presentations including acute otitis media (AOM), otitis media with effusion, and chronic otitis media (COM). Despite AOM commonly resolving without complications, if not diagnosed and treated acutely and appropriately, complications may ensue. In older patients, OM can be overlooked or misdiagnosed leading to complications including infection of mastoid air cells (mastoiditis) with progressive hearing loss and even further progression into an epidural abscess, as in the case we will be presenting. As computed tomography (CT) and magnetic resonance imaging (MRI) are among the most used imaging modalities in an emergency room setting, we believe it is pertinent to use these modalities for patients presenting with symptoms relating to the sequelae of complications of undiagnosed or misdiagnosed severe, chronic otitis media. We present a pictorial review of CT and MRI scans that depict the progression of mastoiditis into an epidural abscess in an eighteen-year-old patient over a 3-month period.

**Abstract ID:** 27 **Research Category:** Case Reports

**Title**: Rectal Foreign Bodies; A Radiological Pictorial Review

**Presenting Author**: Harris Leach

**Presenting author affiliation**: OMS III - Kansas City University

**Co-Authors and Affiliation**: Maxine Derrick - Kansas City University, OMS III
Hannah Riga - Kansas City University , OMS III

**Location**: Kansas City Campus

**Abstract**

Authors: Harris Leach OMS III, Maxine Derrick OMS III, Hannah Riga, OMS III, Kansas City University Introduction:
The presence of a foreign body is a common complaint that patients present to the emergency department with. Foreign bodies can be defined as any object that is present in the human body that was placed there unnaturally. The density of these foreign bodies can play a crucial role in determining their composition and possible clinical implications. Hounsfield Units (HU) are a standard scale used in medical imaging to determine the density of different tissues and materials, including foreign bodies. HU values range from air (-1000 HU) to solid bone (+1000 HU). The measurement of HU foreign bodies can help differentiate between different types of material such as metals and plastics, and aid in determining their composition and possible consequences. Organic foreign bodies are more difficult to evaluate on imaging because the HU are similar to that of the human body. We present a pictorial review of various foreign bodies identified in the Emergency Department in one of Florida's most populous hospitals. We believe that this pictorial review is important for the practicing clinician to understand the limitations of imaging modalities for assessing foreign bodies.
Methods:
We present a pictorial review of rectal foreign bodies which illustrate the properties and limitations of computed tomography (CT) in evaluating various foreign bodies based on the molecular structure of the material. Analysis of CT abdomen and pelvis scans without contrast are included in this report.
Conclusion: This pictorial review focuses on foreign bodies and the limitations of imaging modalities in appreciating cellulose based foreign bodies due to the similarity between the HU of human tissue and organic material.

**Abstract ID:** 28 **Research Category:** Medical Education

**Title**: Readability analysis of AAOS and ASSH shoulder and elbow patient education online content: a 9-year follow-up study

**Presenting Author**: Connor Parry

**Presenting author affiliation**: Kansas City University College of Osteopathic Medicine, Kansas City, MO

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**Location**: Kansas City Campus

**Abstract**

Given the progressive spread of medical misinformation, access to understandable educational content from trusted sources has become increasingly more crucial for patients. Online patient education materials, particularly from specialty organizations, have been criticized for being too complex for the average reader. It is advised that this information be at or below the sixth grade reading level. The present study is a nine-year follow-up to an analysis conducted in 2013(1) which evaluated the overall readability of educational articles from the American Academy of Orthopaedic Surgeons (AAOS) and American Society for Surgery of the Hand (ASSH) websites related to shoulder and elbow conditions. In the current investigation, 74 shoulder and elbow articles were assessed utilizing the same methodology, which included analyzing the number of years since their last update, word count, percentage of passive sentences, Flesch Reading Ease score, Flesch-Kincaid grade level, Simple Measure of Gobbledygook (SMOG) grade, and New Dale-Chall grade level. No articles from either site were at or below the recommended sixth grade reading level. Those from the AAOS were longer than those from the ASSH ($p < 0.001$). The articles had a mean Flesch Reading Ease score of 53.8 versus 58 ($p = 0.01$), Flesch-Kincaid grade level of 9.6 versus 9.4, SMOG grade of 8.9 versus 8.6, and New Dale-Chall grade of 10.5 versus 10.1 for the AAOS and ASSH sites, respectively. While no significant differences in the readability measures were noted between the 2013 and current AAOS articles, the current ASSH content had a significantly higher Flesch Reading Ease score ($p = 0.01$), and significantly lower Flesch-Kincaid ($p = 0.04$), SMOG ($p = 0.03$), and New Dale-Chall ($p = 0.03$) grade levels, than their 2013 counterparts. Although improvements have been made in the shoulder and elbow articles from the ASSH, there remains a need to further improve the readability of AAOS and ASSH online materials to better ensure adequate patient education.

Reference(s)

1. Beutel BG, Danna NR, Melamed E, Capo JT. Comparative readability of shoulder and elbow patient education materials within orthopaedic websites. Bull Hosp Jt Dis. 2015;73(4):249-56.

**Abstract ID:** 30 **Research Category:** Basic Science

**Title**: Investigating the impact of the APOE genotypes on the acquisition of a senescent phenotype on pericytes of the blood brain barrier

**Presenting Author**: Sabrina Kazem

**Presenting author affiliation**: Buck Institute of Aging, UCSF

**Co-Authors and Affiliation**: Sabrina Kazem1,2 Cristian Geronimo-Olvera2 Carlos Galicia Aguirre2 Lisa Ellerby2

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**Location**: Kansas City Campus

**Abstract**

Blood brain barrier leakiness is correlated with neurodegenerative diseases such as Alzheimer's disease. Of the many cell types of the blood brain barrier, there have been limited studies focusing on induced pluripotent stem cell (iPSC) differentiated pericytes and their association with cellular senescence. Specifically, determining whether pericytes with different isoforms of the APOE genotypes have increased or decreased susceptibility to cellular senescence remains to be accomplished, which can potentially pioneer a path for therapeutic targets. In this study, pericytes were differentiated from iPSC's and seeded into 4-96 well plates. The pericytes were treated with doxorubicin, a chemotherapy drug inducing senescence. Controls included untreated (DMSO drug carrier) and a low nutrient quiescent group. Immunocytochemistry of the pericytes were used to compare the altered expression of several senescent markers in the different APOE isoforms. The dose of doxorubicin utilized was selected based on a titration curve and provides a mixed population of normal and senescent cells. Morphological changes consistent with senescence were evident in the DOXO treated groups relative to the DMSO control groups when staining for lamin-B1 and H2AX proteins, as demonstrated by the increased nuclear size and mean intensities. This was more evident in the E4 isoforms compared to E2, and intense staining was also seen for H3K9me3, p16 and p21 proteins but not sufficient to make significant conclusions. The results obtained show promising data that senescence does play an important role in blood brain barrier integrity. Although some of the markers did not behave as strongly as expected at this dose of doxorubicin, we have characterized the senescent pericytes at higher doses with significant changes in the relevant markers.

**Abstract ID:** 31 **Research Category:** Bioethics

**Title**: Impact of Rural Geography on Sexual Identity

**Presenting Author**: Ronald Holt, DO, MPA, MA, DLFAPA

**Presenting author affiliation**: KCU Adjunct Assistant Professor of Psychiatry

**Co-Authors and Affiliation**: n/a

**Location**: Kansas City Campus

**Abstract**

Queer people are historically at higher risk for health disparities due to many factors. Coming out as an LGBTQ+ person can be a positive factor to help mitigate some of these negative health outcomes. The question arises whether queer individuals originally from rural areas may have less access to essential information and support needed to facilitate the healthy integration of their identity. This research therefore explored constituent aspects of information and support that influence the coming out process for rural young adults originating from the Midwest. An anonymous online survey was administered, with 45 completed surveys collected from students among the campuses of Wayne State College in Nebraska and Kansas City University in Missouri. Quantitative and qualitative data were collected. The survey found that participants' outness and coming out experiences were negatively influenced by a lack of support and negative religious experiences, which correlated with the size of their hometown. The study found that most participants depended upon and received crucial support from their institution's PRIDE or SAFEE student group regardless of their hometown geography, and being from a larger hometown population was protective against some of these negative coming out influences. Survey results indicated that among students who worked, those with parental support were much more likely to be out at work regardless of geography. This workplace finding adds new knowledge to current literature and academia. Further research should focus on how academic institutions can help support their queer students and those who do not yet openly self-identify as members of the queer community but who may be struggling in the early phases of self-recognition and acceptance. Future research should also explore in more detail how queer youth are impacted by the cultural effects which emanate from religious institutions.

**Abstract ID:** 32 **Research Category:** Case Reports

**Title**: Motor Trephined Syndrome/Sunken Flap Syndrome: A Case Report

**Presenting Author**: Angad Salh

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Dr. Julia Carp D.O. - Reunion Rehabilitation Hospital Denver

**Location**: Kansas City Campus

**Abstract**

This case report highlights the features and rehabilitation progress of Motor Trephined Syndrome (MTS) also known as Sunken Flap Syndrome. MTS is a rare disease complication that often occurs after craniectomy and can present during postoperative rehabilitation. This case report describes the rare condition, symptom presentation, treatment modalities, and the acute inpatient rehabilitation progress of MTS in a 72-year-old female patient who sustained a traumatic brain injury in a bicycle accident. The patient originally underwent a right hemicraniectomy with cranioplasty, patient was recovering well shortly after the procedure but began experiencing adverse effects which led to multiple revision cranioplasties due to flap infections that did not respond to treatment. The patient's clinical course and rehabilitation at Reunion Rehabilitation Hospital are described, highlighting the patients progress in acute inpatient rehabilitation.

**Abstract ID:** 38 **Research Category:** Medical Education

**Title**: Title: The diagnosis of malaria in nonendemic areas: Giemsa-stained thick and thin blood smear versus rapid diagnostic tests (RDTs) - A Case Report Author(s): Presenting student: Erin Igwacho*, research mentor(s): Dr. Mary Jo Martin and Dr. Anthonio Ade

**Presenting Author**: Erin Igwacho

**Presenting author affiliation**: COM 2025

**Co-Authors and Affiliation**: Dr. Mary Jo Martin (KCU COM), Dr. Adefuye ( KCU Dental School)

**Location**: Joplin Campus

**Abstract**

Malaria is a disease caused by a plasmodium parasite, which spreads from person to person via bite transfer of infected mosquitoes. According to the CDC, malaria should be considered a potential medical emergency and treated as such, especially in nonendemic areas where the prevalence and knowledge of the disease are lower. Malaria can be suspected based on a patient's travel history, clinical symptoms, and physical findings on examination. Early and accurate parasite diagnosis is crucial for managing and controlling disease progression effectively. According to the World Health Organization (WHO), Global Malaria Programme, prompt malaria diagnosis either by Giemsa-stained thick and thin blood smear microscopy or rapid diagnostic tests (RDTs) is recommended for all patients who present in nonendemic areas with signs and symptoms or recent travel to malaria-endemic areas. In Johannesburg, South Africa (a nonendemic malaria region), an otherwise healthy male patient who appeared very ill and febrile presented to the ER with severe malaise, headache, and arthralgia. After physician consultation, an RDT and COVID test was administered, and the results returned negative. Based on negative COVID and RDTs tests, the patient was treated for flu symptoms. It was not until the intervention of a family physician with extensive experience and expertise with malaria, who argued against the negative RDT results and prescribed antimalaria drugs that the patient's condition started to stabilize and return to good health.

The patient in this case report was primarily based in a non-endemic malaria region, traveled to a malaria endemic region, and returned with an acute presentation of fever, malaise, and arthralgia. In non-endemic areas, healthcare providers may not be familiar with the gold standard Giemsa-stained thick and thin blood smear microscopy diagnosis of malaria. They may order an improper diagnostic test or forget to have malaria on their differential diagnosis and attribute the presenting symptoms to influenza or COVID-19. Per WHO, Giemsa-stained microscopy allows for diagnosing different strains and stages of the plasmodium parasite, whereas RDTs limit the diagnosis only to mature P. falciparum. As with this patient, a false negative RDT result can be shown when using RDTs to diagnose acute presenting malaria in nonendemic areas, which led the patient to be improperly treated for influenza. RDTs offer a helpful alternative to diagnosing when reliable microscopic interpretation is not available. Nonetheless, proper education and awareness of malaria and its gold standard measure of diagnosis should be given to healthcare providers in non-endemic areas to avoid missing crucial life-threatening diagnoses.

**Abstract ID:** 42 **Research Category:** Basic Science

**Title**: Endothelial-to-mesenchymal reprogramming by doxorubicin is mediated by the TGF-beta pathway in cultured human endothelial cells

**Presenting Author**: Ria Singh

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Dr. Shixin Tao - PhD, Kansas City University
Melissa Cobb - MA, Kansas City University
Dr. Eugene Konorev - MD, PhD, Kansas City University

**Location**: Kansas City Campus

**Abstract**

Cancer survivors represent a growing group of patients at risk of premature cardiovascular disease due to complications of chemotherapeutic drugs, including doxorubicin (Dox) induced dilated cardiomyopathy. The mechanisms of Dox cardiomyopathy are likely multifactorial and presently not well defined. Endothelial cells have emerged as an important target of Dox in the heart and contribute to development of cardiomyopathy. Furthermore, increased systemic levels of transforming growth factor-beta (TGF-beta) in cancer patients treated with chemotherapeutic drugs correlate with the risk of developing post-treatment complications. Previous studies by the lab have established that the TGF-beta pathway plays a role in endothelial dysfunction mediated by Dox; however, the underlying mechanisms of TGF-beta mediated damage have not been examined. We hypothesized that Dox causes partial endothelial-to-mesenchymal transition (EndMT) with subsequent functional deterioration in cultured endothelial cells via the TGF-beta dependent mechanism. We examined mRNA and protein levels of multiple mesenchymal and endothelial genes in human endothelial cells that were cultured in growth factor free media. We found that Dox triggered mesenchymal activation and suppressed endothelial marker genes in cultured human endothelial cells. These effects of Dox were abrogated by SB431542, a selective inhibitor of the TGF-beta canonical pathway. In addition, we detected increased endothelial monolayer permeability and suppressed formation of vessel-like structures in Dox treated endothelial cultures. Likewise, the Dox induced deteriorated endothelial function was also improved by SB431542 indicating that Dox induced changes are TGF-beta pathway dependent. The results of the study suggest that inhibition of the TGF-beta pathway using small molecular weight inhibitors can be a novel clinical approach to prevent cardiomyopathy in Dox treated cancer patients, ultimately improving their quality of life.

**Abstract ID:** 43 **Research Category:** Medical Education

**Title**: Testing Medical Students Application of Trauma Informed Care in Simulated Human Trafficking Patient Encounters

**Presenting Author**: Lauren McCroskie

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**Location**: Joplin Campus

**Abstract**

The principles of trauma-informed care (TIC) are a framework for physicians to interact with all trauma victims (2). Communication via TIC methodology is an advanced-level skill not taught in most undergraduate medical education (UME) curricula. Recent studies correlated the deliberate practice of TIC skills during medical school led to an increase in students' confidence to deliver TIC to patients in clinical settings prior to graduation (3).

OMSI (n=16), OMSII (n=7), and OMSIII (n=3) volunteers consented to the study with no exclusions. Anonymous pre-survey and post-survey were completed via Survey Monkey. Participants viewed Human Trafficking Module 6: Screening for Adults by the Missouri Hospital Association. Volunteers participated in two simulated patient (SP) encounters designed to challenge observation and history-taking skills, eliciting the differences in identifying the abused versus non-abused patient. Surveys included 11 self-reporting confidence items along a 5-point Likert scale with additional opportunities for comments. Both surveys were compared quantitatively and qualitatively. Spearman rank correlation (df=24) and analytical statistical analysis were performed for Likert items via Excel. Keyword analysis of the free text response(s) was coded into thematic categories.

Five of the 26 (19%) participants had previous knowledge of basic TIC tenants and four (15%) had previous opportunities to practice TIC. Confidence in recognizing signs such as lack of eye contact (n=10/26) and multiple bruises (n=10/26) increased. Pre-post survey results reflected 65% (n=17) of participants stating physicians need to be adaptable when it comes to approaching abuse history with a victim. Students had more confidence in recognizing challenging patient situation(s) (r (24) =.46), but lacked the ability to determine the next steps and resources (r (24) = .38). Comments were very positive and the majority of participants said it was "eye-opening" experience. Study limitations include a low participant number (n=26).

This study provided an opportunity to practice TIC skills in a safe, controlled environment. Participants felt more confident in their ability to recognize and provide holistic care for trauma patient(s). Offering TIC simulation training early in UME may lead to increased confidence in acquiring information in sensitive situations, and create well-rounded osteopathic students prior to clinical clerkship(s).

**Abstract ID:** 44 **Research Category:** Basic Science

**Title**: Targeting lipolysis in pancreatic cancer microenvironment induces lipid peroxidation and suppresses cancer cells growth.

**Presenting Author**: Katiana Hebbert

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**Co-Authors and Affiliation**: Abby Wojtas - Kansas City University
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**Location**: Kansas City Campus

**Abstract**

Human pancreatic ductal adenocarcinoma (PDAC) has one of the lowest cancer survival rates, at 11% suggesting that PDAC cells may be resistant to standard of care therapies. Previously, we have shown that stromal fibroblasts produce lipid metabolites that contribute to PDAC progression and therapy resistance. Here, we examined free fatty acid (FFA) levels in various cell types found in the PDAC microenvironment. Data showed fibroblasts and cancer associated fibroblasts have higher levels of FFA (4-8 fold) compared to stellate cells, suggesting fibroblasts can be a major source of metabolic supplements providing mitogenic signals within the PDAC microenvironment. We investigated if targeting FFA metabolism in the PDAC microenvironment can suppress PDAC progression. We used hypolipidemic agents (lipolysis inhibitors): Acipimox (Olbetam-Pfizer) and Atglistatin to down-regulate FFA levels in PDAC cells co-cultured with or without fibroblasts. Fluorescent Ubiquitination-based Cell Cycle Indicator (FUCCI) expressing PDAC cells and real-time live cell imaging was used to measure cell proliferation and cell cycle progression. Results showed 2-3 fold decrease in the proliferation index in both PDAC alone and co-cultured with fibroblasts. The decrease in proliferation index was accompanied by an increase in G1 fraction in treated vs control cells. Next, we examined if the hypolipidemic agents induced growth inhibition were results of metabolic oxidative stress due to FFA deprivation in PDAC cells. Using lipid peroxides sensor BODIPY C11 to measure the ratio of oxidized vs neutral lipids in control and treated cells, data showed a 2-fold increase in the ratio of oxidized lipids vs neutral lipids in treated PDAC cells compared to controls. These results suggest targeting FFA metabolism in the PDAC microenvironment can suppress cancer cell progression through the activation of a metabolic G1 checkpoint. Repurposing hyperlipidemic agents for adjuvant therapy to the current standard of care may potentially enhance outcomes for PDAC patients.

**Abstract ID:** 45 **Research Category:** Clinical Science

**Title**: COVID-19 return to sport: fall sports collegiate athletics injury prevalence analysis, Institutions: College of Osteopathic Medicine, Kansas City University, University of Kansas School of Medicine, Department of Osteopathic Manipulative Medicine, Kansas

**Presenting Author**: Tejas PAtel

**Presenting author affiliation**: Kansas City University

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Joshua Schafer- University of Kansas School of Medicine

**Location**: Kansas City Campus

**Abstract**

Introduction

The COVID-19 pandemic rapidly affected the world and way of life due to the initiation of public health regulations and precautionary measures. Many athletes, at various levels of play, experienced disruptions in their competitive seasons and training opportunities to reduce the spread of COVID-19. At the professional level, an increase in the prevalence of sports-related injuries following the COVID-19 pandemic was depicted in a previous study. Research has yet to examine the effects of COVID-19 on injury epidemiology at the collegiate level. Sports-related injuries can be detrimental to the careers of student-athletes who have a short window of opportunity. The objective of this research is to examine the effects of COVID-19 on injury epidemiology in collegiate fall sports.

Methods

A Midwest small-college collegiate athletic conference involving the states of Kansas, Missouri, Nebraska, and Oklahoma, was selected for the study. De-identified injury data for the 2018-2019, 2019-2020, and 2020-2021 fall sports seasons was obtained from the collegiate sports medicine staff. All schools and sports were originally included; however, exclusions were taken due to data disruptions or no response. The injury data was tallied for each season, sport, and anatomical region. An unpaired t-test was used to compare the conference mean number of injuries per season for each sport. An unpaired t-test was also used to compare the conference mean number of injuries per anatomical region.

Results

There was no statistically significant difference (P>.05) in injuries per season in this college fall sport (Football, Women's Volleyball, Men's Soccer, Women's Soccer) population. There was also no statistically significant difference (P>.05) in injuries to anatomical region for any fall sport.

Conclusions

There may be several factors attributing to the results of this study. We conclude that these might include increased time between competition, decreased travel, practice regulations, and decreased injury reporting due to fear of going to medical facilities and acquiring COVID-19 infection. Injury epidemiology and data is limited for small college fall sports and women's sports. This study provides the first insight into small college fall sports and women's sports injury epidemiology after COVID-19.

**Abstract ID:** 48 **Research Category:** Medical Education

**Title**: DO representation in plastic surgery: how far have we come after the single GME accreditation system?

**Presenting Author**: Kristof S Gutowski

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**Location**: Kansas City Campus

**Abstract**

Background:
In 2020, former residency programs of the American Osteopathic Association merged with the Accreditation Council for Graduate Medical Education (ACGME) to create a single residency match program. This study was performed to identify trends in DO applicants to plastic surgery and current DO trainees within the field. The number of DO graduates matching into plastic surgery was compared to those matching into other surgical subspecialties.
Methods:
All integrated and independent plastic surgery training programs were identified from the ACGME. Trainees' medical education was obtained via program websites and online public profiles. Match data for DO applicants in surgical subspecialties was obtained from National Resident Matching Program's annual Main Residency Match Results and Data report. Descriptive statistics were performed to identify trends and significant differences ($p < 0.05$) in match rates among surgical subspecialties.
Results:
1245 plastic surgery trainees were included in the analysis, consisting of 1071 residents in integrated programs and 174 fellows in independent programs. DO graduates account for 1.2% of current PGY 1-5 residents; however, there are no DO graduates in PGY 6 or research year positions. There is greater DO representation in independent programs, accounting for 7.5% of all independent plastic surgery fellows. Compared to other surgical subspecialties between 2020-2022, the proportion of DO applicants who matched was significantly lower in plastic surgery (4.7%) than neurological surgery (32.1%, $p < 0.001$), orthopedic surgery (59.6%, $p < 0.0001$), otolaryngology (48.6%, $p < 0.0001$), and vascular surgery (39.4%, $p < 0.001$). There was no significant difference in the proportion of DO applicants who matched into plastic surgery and thoracic surgery (16.7%, $p = 0.22$).
Conclusion:
Plastic surgery remains one of the most competitive specialties for DO students to match into. DO graduates represent a minority of plastic surgery trainees. Independent programs may offer better opportunities for DO students.

**Abstract ID:** 49 **Research Category:** Clinical Science

**Title**: Diabetes and COVID-19 Outcomes: A Retrospective Analysis of Freeman Health System Patients

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**Location**: Kansas City Campus

**Abstract**

Background

Diabetes continues to increase in prevalence worldwide. The Centers for Disease Control and Prevention analysis indicated that patients with diabetes represent 39.5% of COVID-19 deaths in America, and 49.6% of COVID-19 deaths in those under 65. As COVID-19 continues to affect millions of people around the world, it has become integral to understand how diabetes affects the health outcomes of these patients.

Methods

COVID-19 and diabetes diagnosis data via electronic medical records from Freeman Health System, a major health system in Southwest Missouri, was collected between April 1, 2020 through December 31 2021. Diagnoses were obtained through use of standard International Classification of Disease, 10th edition (ICD-10) codes. Patients with and without a diagnosis of COVID-19, with and without a diagnosis of type I/type II diabetes, and those with both a diagnosis of COVID-19 and diabetes were included in the study design.

Results

Mortality was significantly elevated in patients admitted with both diabetes and COVID-19 (P1, mortality 19.94% with 95% confidence interval [CI] 16.95%-22.93%) versus those with COVID-19 without diabetes (P2, 16.03% with 95% CI 13.80%-18.25%, overall difference of 3.91% (CI 0.019%-7.64%). Diabetic patients admitted without COVID-19 (P5) have much lower mortality rates, at 5.98% with a 95% CI of 5.26%-6.70%. The combination of both COVID-19 and diabetes together leads to higher mortality than either of the two separately. Mortality rate was also elevated in patients with both type II diabetes and COVID-19 (P4, mortality rate of 20.21% with 95% CI 17.15%-23.27%) versus those with COVID-19 without diabetes (P2, 16.03% with 95% CI 13.80%-18.25%), overall difference of 4.18% (95% CI 0.4%-7.94%). The subset of patients with type I diabetes with COVID-19 (P3) and type I diabetes without COVID-19 (P6) were too small to accurately power individual analysis. The group of patients with diabetes and without COVID-19 (P5) had the lowest mortality rate of any group studied.

Conclusions

Diabetes is a significant risk factor for mortality in admitted COVID-19 patients. COVID-19 significantly increased mortality of all groups analyzed. Those with type II diabetes and COVID-19 (P4) had the highest overall mortality of any subset studied.

**Abstract ID:** 50 **Research Category:** Case Reports

**Title**: Pediatric golf cart injuries: It’s not just a golf cart

**Presenting Author**: Taher Sapatwalla

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**Location**: Kansas City Campus

**Abstract**

Recreational vehicles are increasing in popularity and are associated with a high risk of injury to the pediatric population. According to a recent nationwide study, golf carts are responsible for upwards of 63,000 injuries in children and adolescents over the past decade, with over half of those injuries reported in children ages 12 and younger. Most of the injury patterns reported in the literature are superficial musculoskeletal injuries, long bone and skull fractures, joint dislocations and neurological insults. Major abdominal injuries are infrequently reported. We herein present a case of a golf-cart-related abdominal injury in a 12-year-old male. He presented to a level 1 pediatric trauma center in hemorrhagic shock which was responsive to packed red blood cell infusion. Cross-sectional imaging revealed an AAST grade 5 duodenal injury (massive disruption of D2 and D3), grade 5 pancreatic injury and complete transection of the gastroduodenal artery. Figure 1. Emergent exploratory laparotomy was performed for hemorrhage control and contamination limitation. He required a pylorus-preserving pancreaticoduodenectomy in 2 stages. This case seeks to raise awareness of the dangers of recreational vehicle use in children and highlight the evolving mechanisms and patterns of injury. Golf carts remain an underappreciated source of injury compared to All-terrain-vehicles due to their presumed improved safety profile. Many states allow children as young as 14 years old to operate golf carts with minimal oversight. Continued efforts are warranted in the safety evaluation of recreational vehicles and driver competency to protect the youngest members of our society.

**Abstract ID:** 51 **Research Category:** Clinical Science

**Title**: Retrospective analysis on hyperlipidemia and COVID-19 outcomes investigated in a rural midwestern population

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**Location**: Joplin Campus

**Abstract**

Background: COVID-19 is a respiratory disease caused by SARS-CoV-2, a coronavirus discovered in 2019 (6). Its impact on the world continues to be observed and studied due to the significant death toll of the disease. As the COVID-19 pandemic remains ongoing, examining COVID-19's association with comorbidities and the resulting mortality is necessary. This study focuses on population health outcomes with COVID-19 infection and hyperlipidemia (total cholesterol greater than or equal to 200 mg/dL) as a comorbidity, including potential associations with age and sex.
Methods: As a retrospective observational study, patients were divided into three populations based on COVID-19 and/or hyperlipidemia dependent on International Classification of Disease, 10th Revision (ICD-10) codes reported in the electronic medical record system (EMR) at Freeman Health System in Southwest Missouri from April 1, 2020 through December 31, 2021. Wald's methods and two sample proportion summary hypotheses with confidence intervals were used for population comparison. The populations were subdivided and analyzed for age and sex differences.
Results: Patients with both COVID-19 and hyperlipidemia had a higher mortality rate than patients with COVID-19 and without hyperlipidemia, and patients with hyperlipidemia and without COVID-19; patients with COVID-19 and without hyperlipidemia had a higher mortality rate than patients with hyperlipidemia and without COVID-19. All comparisons across these populations were statistically significant (p-value $<0.05$). While increased age was associated with increased mortality in all groups, sex was not predictive in this regard.
Conclusion: Our study provides insights into variables affecting COVID-19 outcomes in a rural Midwestern population by showing that the comorbidity of hyperlipidemia contributes to increased mortality.

**Abstract ID:** 52 **Research Category:** Clinical Science

**Title**: COVID-19 and kidney disease, a retrospective investigation in a rural Midwestern patient population

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**Location**: Joplin Campus

**Abstract**

Studies have linked pre-existing kidney disease to higher rates of mortality from coronavirus disease 2019 (COVID-19) infection. In the rural Midwest, where kidney disease (KD) is prevalent, the impact of COVID-19 has been significant in a population which includes many patients on Medicare or Medicaid. A retrospective cohort study was performed assessing patients with acute kidney injury (AKI), chronic kidney disease (CKD) and end stage renal disease (ESRD), with and without COVID-19. International Classification of Diseases 10th (ICD-10) Revision codes were submitted by physicians into Freeman Health System's Electronic Medical Records and gathered from April 2020 to January 2021. The data was analyzed and compared to determine whether mortality rate in patients with varying stages of KD and COVID-19 were higher than the mortality rate in patients with KD alone, excluding variables such as sex and age. COVID-19 with any degree of KD had a mortality rate between 30.21% to 37.63% with a 95% confidence interval, encompassing both AKI and CKD, which was significantly higher than the mortality of COVID-19 infection or KD alone. Within those with COVID-19 and KD, the highest rate of mortality was in patients with AKI (38.13% and 49.02%). There was not sufficient statistical support in our sample to assert that COVID-19 increased mortality in ESRD patients. Specific to our sample, patients with AKI and CKD with the diagnosis of COVID-19 are at a higher risk of mortality with AKI playing the most prominent role. Further studies are warranted into individual comorbidities affecting KD patient outcomes with COVID-19.

**Abstract ID:** 53 **Research Category:** Clinical Science

**Title**: Impact of stroke and COVID-19 on mortality of hospitalized patients

**Presenting Author**: Austin Anfinson, Elaine Ong, Jennifer Song

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**Location**: Joplin Campus

**Abstract**

Several studies have been done to look at the role of comorbid conditions on outcomes in patients infected with COVID-19. In this study, we considered the effect of stroke as a comorbidity on mortality rates in patients hospitalized with COVID-19. Using International Classification of Disease, Tenth Revision (ICD-10) codes, patients admitted to the Freeman Health System in Joplin and Neosho, Missouri from April 1, 2020 to Dec 31, 2021 were identified for having the diagnosis of COVID-19 and/or stroke. These patients were then separated into three groups: those with COVID-19 and stroke (P1), those with COVID-19 without stroke (P2), and those with a stroke without COVID-19 (P3). Mortality rate was assessed in each population and compared using two-sample proportion testing. Our results showed that P1 was the deadliest combination with 50% mortality rate. This mortality rate differed significantly from the P2 and P3 groups (17.01% and 12.86% respectively). These results provide insight into risk-stratifying COVID-19 and stroke patients, and encourage enhanced management of secondary stroke risk factors and infection prevention in these hospitalized patients in order to reduce patient mortality.

**Abstract ID:** 55 **Research Category:** Basic Science

**Title**: Expression of senescence, inflammatory, and endothelial markers in doxorubicin-treated mouse hearts: effect of the canonical TGF-beta pathway inhibition

**Presenting Author**: Katelyn Eisendrath, MS

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Shixin Tao, PhD - Kansas City University
Melissa Cobb, MA - Kansas City University
Eugene Konorev, MD, PhD - Kansas City University

**Location**: Kansas City Campus

**Abstract**

Cardiovascular disease and cancer are the leading causes of death in the United States, and these two diseases can be interrelated. Due to the improved cancer diagnostic and treatment approaches that have developed over the years, the survival rate of cancer patients has significantly increased. However, mortality due to heart disease now poses an even larger risk to cancer survivors, as the long-term side effects of their chemotherapy treatments can include heart disease. Specifically, doxorubicin, an anthracycline chemotherapy drug, can cause heart failure and cardiotoxicity, even years after chemotherapy treatment has stopped. Doxorubicin targets endothelial cells in the heart, but the mechanisms of endothelial damage by this drug have not yet been elucidated. Based on prior research by the lab, it has been shown that doxorubicin upregulates the transforming growth factor-beta (TGF-beta) pathway in endothelial cells. Therefore, it was hypothesized that an inhibitor of the TGF-beta pathway, SB431542, will ameliorate markers of endothelial reprogramming in doxorubicin-treated mouse hearts. Using four different treatment groups, it was shown that doxorubicin increased the senescence marker Cdkn1a expression and that SB431542 decreased mRNA expression of both senescence and senescence-associated secretory phenotype markers. Furthermore, concurrent administration of SB431542 and doxorubicin increased expression of both endothelial nitric oxide synthase (eNOS) and vascular endothelial growth factor receptor 2 (VEGFR2) proteins in cardiac endothelial cells of doxorubicin-treated mice. Thus, the results of the study suggest that inhibition of the TGF-beta pathway using small molecular weight inhibitors may become a novel clinical approach to prevent cardiomyopathy, ultimately improving quality of life of cancer patients treated with doxorubicin.

**Abstract ID:** 56 **Research Category:** Clinical Science

**Title**: COVID-19 return to sport: collegiate baseball injury prevalence analysis, Troy B Puga1, Josh Schafer2, Grace Thiel1, Laura Ramaker1, Tejas Patel1, Kevin Treffer3, College of Osteopathic Medicine, Kansas City University,School of Medicine, University of Ka

**Presenting Author**: Tejas Patel

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Troy B Puga, Grace Thiel, Laura Ramaker, Kevin Treffer- KCU
Josh Schafer- University of Kansas School of Medicine

**Location**: Kansas City Campus

**Abstract**

Introduction

In the spring of 2020, the COVID-19 pandemic rapidly brought college baseball to a halt, with the suspension of all play across the United States to help mitigate the spread of COVID-19. Most college baseball players saw disruption of their training and development due to interruptions of their spring, summer, and fall seasons. Professional athletes, who were also impacted, have shown a rise in injury prevalence due to the COVID-19 pandemic. Research has yet to examine the effects of the COVID-19 pandemic on collegiate baseball injury epidemiology. Due to the serious effects that sports injuries can have on an athlete's career, this research looks to examine the effects of the COVID-19 pandemic on collegiate baseball injury epidemiology.

Methods

Data was tallied for the overall conference injuries per year as well as by overall injuries per anatomic region (head and neck, torso, upper extremity, and lower extremity). An unpaired t-test was conducted upon the overall conference mean injuries per year and on each anatomic region for the mean injuries per region per year.

Results

Results demonstrated that there was no statistically significant difference between the mean injuries per season ($P>.05$). Findings also suggested that there was no statistically significant difference in the mean injuries per anatomic region per year for upper extremity ($P>.05$), lower extremity ($P>.05$), head and neck ($P>.05$), and torso ($P>.05$).

Conclusions

This study showed that small school collegiate baseball had no significant difference in injury prevalence or injury prevalence by anatomic region after the COVID-19 pandemic and shutdowns began. This information differs from research at the professional level, but we believe it adds crucial data for understanding injury epidemiology. We believe there may be several explanations for the difference seen compared to the professional level, however, these ideas must be further investigated.

**Abstract ID:** 57 **Research Category:** Clinical Science

**Title**: COVID-19 return to sport: fall sports collegiate athletics injury prevalence analysis Troy B Puga1, Joshua Schafer2, Grace Thiel1, Tiffany Ruan1, Tejas Patel1, Andres Toledo1, Laura Ramaker1, Elisa Chaparro1, Kevin Treffer3, College of Osteopathic Medicin

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Josh Schafer-University of Kansas School of Medicine

**Location**: Kansas City Campus

**Abstract**

Introduction

The COVID-19 pandemic rapidly affected the world and way of life due to the initiation of public health regulations and precautionary measures. Many athletes, at various levels of play, experienced disruptions in their competitive seasons and training opportunities to reduce the spread of COVID-19. At the professional level, an increase in the prevalence of sports-related injuries following the COVID-19 pandemic was depicted in a previous study. Research has yet to examine the effects of COVID-19 on injury epidemiology at the collegiate level. Sports-related injuries can be detrimental to the careers of student-athletes who have a short window of opportunity. The objective of this research is to examine the effects of COVID-19 on injury epidemiology in collegiate fall sports.

Methods

A Midwest small-college collegiate athletic conference involving the states of Kansas, Missouri, Nebraska, and Oklahoma, was selected for the study. De-identified injury data for the 2018-2019, 2019-2020, and 2020-2021 fall sports seasons was obtained from the collegiate sports medicine staff. All schools and sports were originally included; however, exclusions were taken due to data disruptions or no response. The injury data was tallied for each season, sport, and anatomical region. An unpaired t-test was used to compare the conference mean number of injuries per season for each sport. An unpaired t-test was also used to compare the conference mean number of injuries per anatomical region.

Results

There was no statistically significant difference ($P>.05$) in injuries per season in this college fall sport (Football, Women's Volleyball, Men's Soccer, Women's Soccer) population. There was also no statistically significant difference ($P>.05$) in injuries to anatomical region for any fall sport.

Conclusions

There may be several factors attributing to the results of this study. We conclude that these might include increased time between competition, decreased travel, practice regulations, and decreased injury reporting due to fear of going to medical facilities and acquiring COVID-19 infection. Injury epidemiology and data is limited for small college fall sports and women's sports. This study provides the first insight into small college fall sports and women's sports injury epidemiology after COVID-19.

**Abstract ID:** 58 **Research Category:** Clinical Science

**Title**: Cognitive, Behavioral, and Emotional Outcomes of Severe Cannabis Use in Adolescents

**Presenting Author**: Ozge Ceren Amuk Williams

**Presenting author affiliation**: Ozark Center

**Co-Authors and Affiliation**: Kara Reed, M.D. -Kansas City University
Nauman Ashraf, M.D.- Kansas City University

**Location**: Joplin Campus

**Abstract**

Background: Cannabis, following tobacco, is the second most commonly used substance in the United States among adolescents, with use extending from occasional recreational use to abuse. There is a gap in comprehensive assessments of cognitive, behavioral, and emotional deficits, along with predictors that may be linked to the severity of cannabis use in high school-aged adolescents.

Objectives: We aim to assess the relationship between the severity of cannabis use and outcomes in cognitive, behavioral, and emotional domains among a population-based sample of US high school adolescents. We aim to define the demographic predictors and risk factors that contribute to the psychiatric outcomes of severe cannabis use.

Methods: We conducted a cross-sectional study by using the 2019 Youth Risk Behavior Survey (YRBS) data with 8,996 participants who are a representative sample of US high school students. We performed descriptive statistical analysis to evaluate the impact of demographics on cognition, risk-taking behavior, and substance use. The linear-to-linear association test is used to compare the differences between non-users and severe cannabis users. The odds ratio was generated by a logistic regression model and was adjusted for age, gender, race, and psychiatric comorbidities.

Results: The + 17-year age group had the highest proportion of severe cannabis use (38.1%). Males (OR 2.03; 95% CI 1.50 –2.74) and blacks (OR 2.06; 95% CI 1.31–4.22) had higher odds for severe cannabis use. Severe cannabis use was significantly associated with adverse cognitive, emotional, and behavioral outcomes; difficulty concentrating (52.9%), depressive symptoms (53.1%), sleep problems (77.8%), suicide plan (29%), and injury from a suicide attempt (8%). Risk-taking behaviors (physical fighting at school (17.3%) were higher in severe cannabis users, with higher lifetime stimulant (11%), inhalant (11.9%,), and heroin use (1.5%). Severe cannabis users had a higher likelihood of having poor grades (OR 2.74), using illegal drugs at school (OR 2.33), and comorbid substance use (cigarette (+10 days/month ) (OR 8.72), alcohol (1-9 days/month) (OR 3.18), and electronic vapor product (OR 15.72).

Conclusion: Early identification of predictors of severe cannabis use among adolescents would have a significant impact on mitigating suicidality and cognitive dysfunction.

**Abstract ID:** 59 **Research Category:** Clinical Science

**Title**: Predictors of Cannabis Use Associated with Serious Psychological Distress in Adolescents

**Presenting Author**: Ozge Ceren Amuk Williams, M.D.

**Presenting author affiliation**: Ozark Center, Department of Psychiatry

**Co-Authors and Affiliation**: Nauman Ashraf, M.D.- Kansas City University
Modaser Shah, M.D.- Kansas City University
Veronica Amey-Perrin, M.D.- Ozark Center

**Location**: Joplin Campus

**Abstract**

Background: Cannabis is the most commonly reported illicit substance in the United States among adolescents seeking substance use treatment. There is a gap in a comprehensive assessment of the association between serious psychological distress and demographic predictors that may be linked to cannabis use in adolescents.

Objective: We aim to determine the demographic characteristics of serious psychological distress and the association between cannabis use in the U.S. adolescent population.

Methods: We conducted a cross-sectional study by analyzing the National Survey on Drug Use and Health (NSDUH) data from 2020, including 9375 adolescents. The classification of SPD was based on the Kessler-6 screening scale and was further subdivided into three groups: past month SPD, past year SPD, and no SPD. The demographic characteristics of the participants and the use of cannabis were tabulated after descriptive statistics. Pearson Chi-Square test was applied for the group comparison. Logistic regression tests were used to calculate adjusted odds ratios to assess the link between cannabis use and SPD. The odds ratio was generated by a logistic regression model and adjusted for the covariates of age, gender, race, sexual identity, household income, and the highest level of education.

Results: The majority of our sample population was 18–21 years of age (39%), female (50.5%), and white (55.8%). Adolescents with past-month and past-year SPD were 82% (AOR=1.82) and 53% (AOR=1.53) more likely to be users of cannabis, respectively. Females had nearly 2 times higher risk (AOR=1.92) of having past year SPD associated with cannabis use. Native Americans had the highest prevalence of past-month SPD (30.4%). Adolescents with more than one race and native Americans were 68% and 25% more likely to use cannabis respectively. Lesbian or gay adolescents had 5.6 times higher odds for past-month SPD, and bisexuals had a 2.95-fold higher risk (AOR = 2.95) of having past-month SPD associated with cannabis use. Adolescents with household income < $20,000 had a 1.38 times higher risk of having past-month SPD compared to those having household income > $75,000.

Conclusion: Our results could promote implementing early intervention strategies tailored to racial and sexual orientation predictors of cannabis use for at-risk groups to address serious psychological distress.

**Abstract ID:** 61 **Research Category:** Case Reports

**Title**: Battery Ingestion with Colonic Perforation after Colostomy Closure in a Toddler

**Presenting Author**: Annamarie C Lukish, M.S.

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**Location**: Kansas City Campus

**Abstract**

Disc and button battery ingestion in children is common. In fact, data reports a dramatic increase in battery ingestion during the coronavirus disease 2019 pandemic likely as a result of increased household population density and electronic product utilization. These batteries often remain lodged in the esophagus causing potentially devastating complications if they are not removed urgently. Batteries that are passed beyond the esophagus usually do not cause any complications. We present the case of a 15-month-old male who underwent a colostomy takedown 2 months following a posterior sagittal anorectoplasty for imperforate anus. He recovered quickly, was advanced on his diet, and was discharged to home on postoperative day 3. On postoperative day 5 following the stoma closure, he presented with an acute abdomen, pneumoperitoneum and an abdominal X-ray that revealed a 21 mm disc battery in the left lower quadrant. He underwent exploration and the battery was found perforating the anastomosis. There was significant fibropurulent exudate and inflammation. The battery was removed, the anastomosis was excised, and a colostomy with Hartman's pouch was performed. The toddler recovered uneventfully. This case offers an opportunity to discuss the concerns of battery ingestion and postoperative care following intestinal surgery in children. We could find no other similar reports in the world's literature of a disrupted colonic anastomosis due to battery ingestion.

**Abstract ID:** 64 **Research Category:** Health Service Psychology

**Title**: Variables contributing to the length of competency restoration.

**Presenting Author**: Hannah Hicks

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**:

**Location**: Kansas City Campus

**Abstract**

In the United States, waitlists for individuals opined Incompetent to Stand Trial have become problematic. Many individuals wait up to one year to receive mental health treatment and the waiting period can involve harsh treatment while incarcerated. While factors such as lack of resources have contributed to this ongoing problem, research has looked into other factors that might be contributing. Although inconsistent, previous research has linked certain demographic variables with longer lengths of competency restoration. Furthermore, current literature suggests individuals diagnosed with psychotic disorders take longer to restore to competency when compared to individuals diagnosed with affective disorders. However, the existing literature has yet to compare specific symptomology within psychotic diagnoses that may extend lengths of competency restoration. The current, proposed study will compare specific symptomology within psychiatric diagnoses and determine which are associated with longer lengths of competency restoration. A retrospective research design will be utilized and archival data from a psychiatric rehabilitation center will be analyzed to compare lengths of competency restoration based on several variables including gender, race, age, diagnosis, and types of delusions and hallucinations. It is hypothesized that specific demographics such as being an older adult, male, and a racial minority will predict longer lengths of competency restoration. Additionally, it is hypothesized that individuals diagnosed with a psychotic disorder will have longer restoration periods when compared to individuals diagnosed with an affective disorder. When considering specific symptomology, it is hypothesized that individuals experiencing delusions will have longer lengths of restoration compared to individuals experiencing hallucinations.

**Abstract ID:** 67 **Research Category:** Clinical Science

**Title**: PER-ORAL MYOTOMY VS. LAPAROSCOPIC PYLOROPLASTY IN GASTROPARESIS: EQUALLY EFFECTIVE PALLIATION

**Presenting Author**: Tamara Stojilkovc

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Kelsey Staudinger- Swedish Medical Center, Ahmed Zihni- Swedish Medical Center, Ashwin Kurian- Swedish Medical Center

**Location**: Kansas City Campus

**Abstract**

Introduction: Gastroparesis is a chronic and debilitating gastrointestinal disorder with few medical treatment options. Traditional surgical management has involved laparoscopic vs. open pyloromyotomy or gastric stimulation. In recent years, gastric peroral endoscopic myotomy (GPOEM) has become an attractive, less invasive option for patients with refractory gastroparesis. The Gastroparesis Cardinal Symptom Index (GCSI) is a 6-point Likert scale questionnaire that assesses improvement in gastroparesis. In this study, we seek to compare the clinical outcomes of laparoscopic pyloroplasty (LP) and the per-oral endoscopic pyloromyotomy (POP) for medically refractory gastroparesis.

Methods: Retrospective review of 234 patients who underwent LP or POP from January 2019 to February 2022 by two fellowship-trained foregut surgeons. Pre and postoperative symptom scores were compared for nausea, vomiting, fullness, early satiety, bloating, distension, heartburn, and regurgitation. P-values $<0.05$ were considered significant.

Results: Age, gender, and etiology of gastroparesis (diabetic, idiopathic, surgical) were comparable between the groups. All symptom categories showed a decrease in symptom severity postoperatively in both the pyloroplasty and POP groups. No difference was encountered when comparing outcomes in the two groups ($p = 0.99$). Two patients returned to the operating room for a leak after LP and recovered without any major morbidity. There was no major morbidity in the POP group. The median length of stay was higher in LP (2 days) vs same-day discharge in POP.

Conclusion: LP and POP offer equivalent palliation for medically refractory gastroparesis. POP could be preferable due to its minimally invasive nature.

**Abstract ID:** 68 **Research Category:** Clinical Science

**Title**: Zoster vaccine reduces stroke and heart attack risk in chronic disease regardless of age

**Presenting Author**: Peter A. Khoury

**Presenting author affiliation**: OMS I, KCU-Joplin

**Co-Authors and Affiliation**: Galen T. Foulke, MD - Penn State University, Department of Dermatology
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**Location**: Joplin Campus

**Abstract**

Purpose: Herpes Zoster increases stroke and myocardial infarction (MI) risk. The objective of this study is to evaluate the impact of zoster vaccination on stroke and MI risk in patients at-risk for zoster.
Methods: Retrospective case-control study utilizing continuous de-identified claims data from the IBM MarketScan® Commercial Claims and Encounters Database (2005-2018) containing data for 200 million commercially insured Americans. Participants included 27,093 adults vaccinated against zoster with at least 5 years continuous enrollment, age and sex-matched 1:5 with unvaccinated controls. Odds ratios, risk difference, and number needed to treat (NNT) evaluated the effect of vaccination on stroke and MI while controlling for relevant comorbidities. Actual costs of vaccination and reported cost of care following stroke and MI were compared to NNT to evaluate potential cost effectiveness.
Results: Unadjusted rates of MI (1.29% vs 1.82%; $p<0.05$) and stroke (1.61% vs. 2.20%; $p<0.05$) were lower in vaccinated versus unvaccinated individuals (respectively), regardless of age, with greatest benefit for diabetics (stroke OR [95% Confidence Limits] 0.64 [0.58, 0.71], MI 0.63 [0.57, 0.71]). Although hypertension and chronic obstructive pulmonary disease (COPD) had highest odds of stroke and MI, vaccination still provided significant risk-reduction (Hypertension: stroke 0.75 [0.68, 0.83], MI 0.73 [0.65, 0.81]; COPD: stroke 0.75 [0.68, 0.83], MI 0.74 [0.66, 0.83]). For diabetics (NNT=139), estimated cost to prevent one stroke was $24,044.22.
Conclusions: Zoster vaccination reduces stroke and MI in adults with at-risk comorbidities, regardless of age. Vaccination may provide cardiovascular benefits and cost-effectiveness beyond zoster prevention.

**Abstract ID:** 69 **Research Category:** Case Reports

**Title**: Isolated asymptomatic colonic plasmacytoma presenting as a polyp at screening colonoscopy

**Presenting Author**: Christian Nassif

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Matthew Crabtree- David Geffen School of Medicine at University of California Los Angeles
Sheeja T. Pullarkat - David Geffen School of Medicine at University of California Los Angeles

**Location**: Kansas City Campus

**Abstract**

Isolated extramedullary plasmacytomas (IEMP) are rare. Extramedullary plasmacytomas (EMP) are uncommon, and mostly occur in the nasopharynx or upper respiratory tract. EMP involvement of the gastrointestinal tract occurs in approximately 10% of cases, more often in the small bowel than the colon. Less than 40 cases of colonic IEMP have been reported. Asymptomatic colonic IEMP are extremely rare with few reported cases. We present a 57 year old asymptomatic male with a colonic IEMP found during screening colonoscopy. A sigmoid colon polyp was removed and diagnosed as a plasmacytoma. Further investigation revealed it to be an isolated lesion.

**Abstract ID:** 70 **Research Category:** Clinical Science

**Title**: Patient age as a risk factor for mortality due to COVID-19

**Presenting Author**: Justin yeung

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Maxine Derrick; May Li; James Hearn, D. Bioethics; Greg Stahl; Nova Beyersdorfer; Kerry Johnson, EdD; Scott Goade, PharmD; Robert Arnce, MD - Kansas City University

**Location**: Kansas City Campus

**Abstract**

This study aims to determine if there is any correlation between age and COVID-19 mortality. Due to the high mortality rate from COVID-19 (5.6% in China and 15.2% outside of China as of 2020), we believe that determining the risk factors for COVID-19 mortality such as age will help in determining patient prognosis and reduce death rates by creating triage protocols and treatment schemes aimed at treating those patients most at-risk.
This study considered the patient populations cared for at Freeman Health System in Joplin and Neosho, Missouri. Our study population was divided into four groups: patients aged 65 or older with COVID-19; patients aged 65 or older without COVID-19; patients who were younger than 65 with COVID-19; and patients who were younger than 65 without COVID-19. Our results were generally consistent with what was expected, with older patients showing a higher mortality rate than younger patients and patients with COVID-19 having a higher mortality rate than those without, as older people have weaker immune systems and those with COVID-19 have a higher chance of death since their immune system has been compromised. Patients over 65 with COVID-19 had the highest mortality rate of the groups, which makes sense since these patients possess a combination of two risk factors for mortality. One unexpected result, however, was that younger patients with COVID-19 had a higher mortality rate than older patients without COVID-19, suggesting that COVID-19 is a larger contributor to mortality than age. This emphasizes the danger of COVID-19, as it shows that even younger people who generally have stronger immune systems than the elderly are still at risk. Furthermore, our findings emphasize the importance of preventing the spread of COVID-19 in patient populations in order to decrease mortality rates. This strongly suggests the need for further studies on transmission of COVID-19.

**Abstract ID:** 71 **Research Category:** Case Reports

**Title**: Tarlov Cyst Case Report: Symptomatic Relief After Osteopathic Manipulative Treatment and Nonsurgical Spinal Decompression Therapy

**Presenting Author**: Samantha Danto

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Jay Danto, D.O. - Danto Osteopathic Clinic

**Location**: Kansas City Campus

**Abstract**

Introduction: The global prevalence of perineural (Tarlov) cyst is 4.27%, most commonly occurring at S2. Most are asymptomatic and found incidentally on MRI, with only 15.59% of cysts being symptomatic and associated with neurological deficits and pain. Current treatment of symptomatic perineural cysts includes invasive nonsurgical and surgical options. This case is unique because there is symptomatic relief of perineural cyst with non-invasive spinal decompression.

Case: A 55-year-old man presented to the clinic with complaints of left-sided back, hip, and leg pain starting two months ago while training for a long-distance endurance race. The pain first occurred after a training session, when he bent forward to pick up leaves. He described the pain as deep and accompanied by numbness in the anterior-medial lower leg, consistent with the L4 dermatome. He reported the severity to be an 8 on a 10-point scale with 10 being the worst pain that he ever experienced.

Conservative treatment with osteopathic manipulative treatment (OMT) was initiated along with nonsurgical spinal decompression therapy (SDT). After the initial and only OMT along with nonsurgical SDT he immediately reported his severity decreasing to a 4/10. Immediately after his third nonsurgical SDT his severity decreased to a 1/10. Due to the neurologic symptoms and severity present upon his initial examination, as well as the lability of symptoms when challenged by exacerbating factors he followed through on obtaining MRI imaging. MRI identified an ovoid perineural cyst compressing the L4 nerve root, measuring 5x11x8 mm. Additional MRI findings included mild facet and ligamentum flavum hypertrophy at L4-5, and L4 pedicle stress reaction, greater on the left than the right.

Results: After 14 sessions of nonsurgical SDT focused at the L4-5 disc level, the severity was maintaining a 1/10 with complete symptomatic relief of numbness and pain in his back, hip, and leg on his left side.

Discussion: Current management of symptomatic perineural cysts consists of mostly invasive measures with varying degrees of success. This case shows that non-invasive techniques like OMT and nonsurgical SDT may provide a conservative management pathway for patients presenting with a perineural cyst presenting without severe spinal stenosis.

**Abstract ID:** 73 **Research Category:** Case Reports

**Title**: Giant cell arteritis of the superior mesenteric artery presenting with Wernicke's encephalopathy from thiamine deficiency

**Presenting Author**: Sarah Shapiro

**Presenting author affiliation**: Kansas City University College of Osteopathic Medicine

**Co-Authors and Affiliation**: David Roman Renner, MD - Department of Neurology, University of Utah, Salt Lake City UT, USA

**Location**: Kansas City Campus

**Abstract**

Background:
Giant cell arteritis (GCA) is one of the most common systemic vasculitides in adults over the age of 50, with incidence ranging from 15 to 35 per 100,000 individuals. The disorder is commonly included in the differential diagnosis of maladies producing atypical facial pain / headache, visual loss / amaurosis fugax, jaw pain, elevated inflammatory markers, and anemia. The disorder is known to affect cranial arteries with typical physical exam findings that include tenderness of palpation to the temporal arteries and cranial neuropathies. Clinical diagnosis is supported by new headache, temporal artery abnormality, elevated ESR (≥50 mm/h), and abnormal artery biopsy.
Results:
A 68-year-old female with a history of primary generalized seizures presented to clinic with a 6-week history of paroxysms of acute confusional episodes, the inability to arise from a seated position due to bilateral lower extremity weakness, alterations of consciousness without loss of consciousness, severe anorexia, and weight loss. MRI with contrast including Axial FLAIR/T2/Diffusion revealed bilateral pan-lobar cortical and subcortical atrophy, with ex-vacuo ventriculomegaly and mild leukoaraiosis in the subcortical white matter tracts. PET-CT body revealed linear uptake involving the aortic root, extending into bilateral subclavian arteries, with segmental involvement of proximal common carotids, and extending inferiorly to the level of the common iliac arteries and the mesenteric arteries. Temporal artery biopsy revealed the presence of granulomas with multinucleated giant cells. Serology panel revealed pan hypovitaminoses in Vitamins A, B1, B6, B12, and D.
Conclusions:
Typical GCA workup initially resulted inconclusive for the patient, whose condition deteriorated as the patient's altered mental status and dizziness spells continued unremittingly. This case highlights the link between large vessel vasculitis and malabsorption syndromes. The concept of parsimony links this patient's arteritis with hypovitaminoses. The superior mesenteric artery (SMA) is classified as a medium vessel with its involvement in GCA unrecognized.

**Abstract ID:** 76 **Research Category:** Case Reports

**Title**: Lower extremity necrotizing fasciitis from an ovarian mass - a case report.

**Presenting Author**: Kelsey Johnson

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Freeman Health Systems

**Location**: Joplin Campus

**Abstract**

In this case report I will discuss the presentation and surgical management of a rare presentation of bilateral lower extremity necrotizing fasciitis that was later found to be caused by an ovarian mass.

**Abstract ID:** 77 **Research Category:** Clinical Science

**Title**: Use of extracorporeal membrane oxygenation (ECMO) for COVID: comparison of outcomes of The University of Kansas Health System (TUKHS) and international experience from the ELSO database

**Presenting Author**: Annalise McCurdy

**Presenting author affiliation**: OMS-II, Kansas City University

**Co-Authors and Affiliation**: Brigid Flynn, MD - University of Kansas Health System, Kansas City, KS
Johnny, Wei, MD - University of Kansas Health System, Kansas City, KS

**Location**: Kansas City Campus

**Abstract**

Extracorporeal membrane oxygenation (ECMO) has been used for decades to treat critically ill patients who need artificial support of lungs and/or heart. Patients with severe forms of COVID can have profound pulmonary disease with severely reduced compliance that does not allow adequate oxygenation for survival. During the pandemic, ECMO was repurposed to treat COVID patients throughout the world, including TUKHS. We evaluated our outcomes with an international registry. This quality review project used the electronic medical record to obtain data for patients who underwent ECMO for COVID from October 2020 to January 2022. Comparison data for international COVID ECMO experience was obtained from the Extracorporeal Life Support Organization (ELSO) public domain. Summary statistics and probability analyses were applied. In the TUKHS cohort (n=16), major outcomes were similar in terms of mortality, discharge location, stroke and need for tracheostomy compared with the ELSO international database. TUKHS patients had lower likelihood of hypertension and variance in race, with a higher likelihood of immunocompromization, recent pregnancy and use of VA-ECMO. Table 1 summarizes all findings. Similar to H1N1 influenza of 2009, COVID brought a new indication for ECMO use. While mortality rates remain high for COVID patients requiring ECMO, these rates are likely superior to optimal medical management. Overall, TUKHS had similar characteristics and outcomes compared to international ECMO use for COVID.

**Abstract ID:** 78 **Research Category:** Clinical Science

**Title**: COVID-19 and sepsis with or without septic shock: a retrospective study of outcomes from rural hospitals in southwestern Missouri

**Presenting Author**: Sarah Ahmad

**Presenting author affiliation**: College of Medicine, Kansas City University, Kansas City, MO, USA

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Robert Arnce - College of Medicine, Kansas City University, Joplin, MO, Freeman Health System, Joplin, MO, USA

**Location**: Kansas City Campus

**Abstract**

Authors: Sarah Ahmad(1), Logan Horn(2), Marissa Tassone(2), Nova Beyersdorfer(2), Kerry Johnson(3), Greg Stahl(4), Scott Goade(2,4), Robert Arnce(2,4)

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Abstract

In the United States, sepsis is the leading cause of death in hospitalized patients claiming 220,000 lives annually. The estimated mortality rate for sepsis is between 20 and 25%. Additionally, sepsis is the single most expensive disease to treat in the hospital with cost of approximately 20 billion dollars annually [1]. Although significant progress is being made, the underlying pathophysiology leading up to sepsis and septic shock is not completely understood, making treatment an ongoing challenge. Sepsis and/or septic shock may be avoidable in some cases if underlying etiologies are identified and treated early in the disease process. The purpose of this study is to compare mortality rates of patients admitted to the hospital who were diagnosed with COVID-19 and/or sepsis. This retrospective observational study was performed utilizing data collected from the electronic medical records (EMR) of patients hospitalized at Freeman Health System (FHS) in Southwest Missouri. We found that patients admitted to the hospital with a diagnosis of COVID-19 who also had the diagnosis of any degree of sepsis had significantly higher mortality rates than those admitted to the hospital with COVID-19 without sepsis.

References

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**Abstract ID:** 79 **Research Category:** Clinical Science

**Title**: Epidemiological and Demographic Characteristics Related to Social Determinants of Health in Patients with Anti-NMDAR Encephalitis

**Presenting Author**: Sarah Shapiro

**Presenting author affiliation**: Kansas City University College of Osteopathic Medicine

**Co-Authors and Affiliation**: Melissa Wright MD - Department of Neurology, University of Utah, Salt Lake City UT, USA
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**Location**: Kansas City Campus

**Abstract**

OBJECTIVE: To identify and describe the epidemiological and demographic characteristics related to social determinants of health of patients diagnosed with anti-NMDAR encephalitis in a single center cohort.

BACKGROUND: Anti-NMDAR encephalitis is a rare neurologic disorder primarily affecting young patients. However, the impact of social determinants of health in anti-NMDA receptor encephalitis are not well-described in the medical literature.

DESIGN/METHODS: A retrospective chart review identified anti-NMDAR encephalitis patients within the University of Utah health system by utilizing the ICD-10 code G04.81 for Other encephalitis and encephalomyelitis or keyword search of “NMDA” between January 2012-August 2022. Of the 212 patients pulled from above, 24 NMDAR encephalitis patients were identified through positive NMDAR IgG antibody assays.

RESULTS: We describe the epidemiological and socioeconomic characteristics of patients with anti-NMDAR encephalitis, including age of onset, presence of antecedent infections or triggers, race and ethnicity, sex, zip code, Gini index, Health Professional Shortage Area (HPSA) designations, duration from symptom onset to diagnosis, insurance type, primary language, and outcome by modified Rankin Score (mRS). We will conduct sensitive analysis on identifying any socioeconomic variables as covariance with the severity of anti-NMDAR encephalitis.

CONCLUSIONS: In this cohort, anti-NMDAR encephalitis outcomes were encouraging in the majority of patients. Recognition of specific epidemiologic and demographic related to social determinants of health variables placing anti-NMDAR encephalitis patients at risk for delays in diagnosis and/or underutilization of medical care will benefit this patient population.

**Abstract ID:** 80 **Research Category:** Case Reports

**Title**: Symptomatic relief of perineural cyst after Osteopathic Manipulative Treatment and Nonsurgical Spinal Decompression Therapy

**Presenting Author**: Samantha Danto

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Jay Danto, D.O. - Danto Osteopathic Clinic

**Location**: Kansas City Campus

**Abstract**

Introduction: The global prevalence of perineural (Tarlov) cyst is 4.27%, most commonly occurring at S2. Most are asymptomatic and found incidentally on MRI, with only 15.59% of cysts being symptomatic and associated with neurological deficits and pain. Current treatment of symptomatic perineural cysts includes invasive nonsurgical and surgical options. This case is unique because there is symptomatic relief of perineural cyst with non-invasive spinal decompression.

Case: A 55-year-old man presented to the clinic with complaints of left-sided back, hip, and leg pain starting two months ago while training for a long-distance endurance race. The pain first occurred after a training session, when he bent forward to pick up leaves. He described the pain as deep and accompanied by numbness in the anterior-medial lower leg, consistent with the L4 dermatome. He reported the severity to be an 8 on a 10-point scale, with 10 being the worst pain that he ever experienced.

Conservative treatment with osteopathic manipulative treatment (OMT) was initiated along with nonsurgical spinal decompression therapy (SDT). After the initial and only OMT along with nonsurgical SDT he immediately reported his severity decreasing to a 4/10. Immediately after his third nonsurgical SDT his severity decreased to a 1/10. Due to the neurologic symptoms and severity present upon his initial examination, MRI imaging was obtained. MRI identified an ovoid perineural cyst compressing the L4 nerve root, measuring 5x11x8 mm. Additional MRI findings included mild facet and ligamentum flavum hypertrophy at L4-5, and L4 pedicle stress reaction.

After 14 sessions of nonsurgical SDT focused at the L4-5 disc level, the severity was maintaining a 1/10 with complete symptomatic relief of numbness and pain in his back, hip, and leg on his left side.

Discussion: Current management of symptomatic perineural cysts consists of mostly invasive measures with varying degrees of success. This case shows that non-invasive techniques like OMT and nonsurgical SDT may provide conservative management pathways for patients presenting with a perineural cyst presenting without severe spinal stenosis.

Conclusion: Since there is no standard treatment approach to symptomatic perineural cysts, non-invasive techniques can be explored alongside other options.

**Abstract ID:** 81 **Research Category:** Basic Science

**Title**: Sustained mesenchymal marker expression in doxorubicin treated endothelial cells

**Presenting Author**: Kass Sjostrom

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Shixin Tao, Melissa Cobb, Eugene Konorev - Kansas City University

**Location**: Kansas City Campus

**Abstract**

The number of cancer survivors have increased substantially over the past decades due to both population aging and advances in early detection and treatment, and cardiovascular complications these patients experience after treatment is an area of growing concern. Multiple chemotherapeutic drugs, including doxorubicin (Dox), are highly cardiotoxic. Importantly, clinical presentation of cardiomyopathy in Dox treated patients often occurs after completion of therapy. While the mechanisms associated with cardiotoxicity are not well understood there has been growing interest in understanding how endothelial cells are affected by Dox. We have recently reported increased activity of the canonical TGF-β pathway in endothelial cells exposed to Dox. In this study, we detected enhanced endothelial Smad3 phosphorylation response after Dox washout as well. The canonical TGF-β pathway is known to induce a mesenchymal transcriptional program in several cell types. Given the long-term cardiotoxic effects of Dox, we proposed a hypothesis that mesenchymal reprogramming will persist after completion of Dox treatment and will be mediated by the canonical TGF-β pathway. Expression of mesenchymal markers increased during Dox treatment of human endothelial cells and, surprisingly, was further elevated upon removal of the drug from culture media (Dox washout period). The role of the canonical TGF-β pathway in mesenchymal activation was probed using SB431542 (SB), a selective inhibitor of the pathway. Enhanced by Dox, expression of mesenchymal markers, including Tagln and Cnn1, was reduced by SB that was present during either treatment with Dox or the Dox washout period only. Thus, these results suggest that 1) Dox induced endothelial-to-mesenchymal remodeling may be mediated by the canonical TGF-beta pathway; and 2) inhibition of the pathway may become a novel approach to alleviate endothelial damage by Dox and ensuing cardiomyopathy.

**Abstract ID:** 82 **Research Category:** Clinical Science

**Title**: A retrospective analysis of nicotine use and its impact on COVID-19 mortality

**Presenting Author**: Nathan Salts

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**Location**: Joplin Campus

**Abstract**

Background

The Coronavirus Disease 2019 (COVID-19) pandemic continues to have a profound global impact. Understanding how certain comorbidities affect COVID-19 mortality represents an area of ongoing research that is vital to bettering clinical management of COVID-19. In our study, we investigated nicotine dependence through retrospective analysis of electronic medical records supplied from two hospitals in southwest Missouri. The goal of this study is to establish the risk associated with nicotine and COVID-19 infection, which can aid in clinical understanding of COVID-19 mortality risks.

Methods

Data was collected from April 1, 2020 through December 31, 2021. International Classification of Disease, 10th Revision (ICD-10) codes were used to create initial populations of patients to study. Using ICD-10 codes, we identified patients who were diagnosed with COVID-19, no history of COVID-19, history of nicotine dependence, and current nicotine dependence, and these patients were grouped into three populations and four subsets of those populations.

Results

Our data showed that patients with COVID-19 had higher mortality rates than those without COVID-19. It was noted that in patients with COVID-19 there was no significant mortality difference between those with a history of or current nicotine dependence when compared to those without a history of or current nicotine dependence. However, both subset groups of COVID-19 and non-COVID-19 patients that had a documented personal history of nicotine had a higher rate of mortality than those subset groups currently using nicotine.

Discussion

When comparing COVID-19 groups with any nicotine dependence to the COVID-19 group without nicotine dependence, there was not enough evidence to establish an association between documented nicotine use and mortality in hospitalized patients. Though our data showing higher mortality of the subset groups with documented personal history of nicotine use versus current nicotine use may be suggestive that current nicotine use may be protective in preventing mortality in patients, this conclusion cannot be inferred and must be evaluated with caution. Limitations included limited patient population, retrospective nature of the study, and possible coexisting comorbidities not taken into account.

**Abstract ID:** 83 **Research Category:** Health Service Psychology

**Title**: The Role of Juror Mental Health Experience in Not Guilty by Reason of Insanity Verdicts

**Presenting Author**: Madison Albracht

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**:

**Location**: Kansas City Campus

**Abstract**

When a defendant in the United States pleads Not Guilty by Reason of Insanity (NGRI), they are claiming that they are not criminally liable for the act they have committed. Ultimately, twelve jury members determine whether that plea is substantiated. Although jurors are instructed to consider only the evidence presented during a trial, much of the literature on the subject demonstrates that there is an abundance of extraneous variables that have the ability to influence individual juror decision-making. However, minimal literature has analyzed whether a juror's experience with mental illness is a potential variable of interest. To address this vacancy, researchers distributed a voluntary response survey to undergraduate and graduate students at Iowa State University. Participants indicated whether they have been diagnosed with a mental disorder and if so, identified which diagnostic category the diagnosis falls into. Serving as mock jurors, participants then read a fact pattern derived from an NGRI case and were asked to answer questions that assessed their perception of the defendant's legal culpability. Analysis of this data revealed that individuals who have personal experience with psychiatric disorders were 58% more likely to find the defendant NGRI, as opposed to guilty. To build upon these findings, the current, proposed study aims to identify whether the diagnostic category of a mock jurors' psychiatric diagnosis is predictive of an NGRI verdict. This archival research study will analyze the same dataset using a weighted logistic regression. It is hypothesized that mock jurors that have personal experience with schizophrenia-spectrum and autism-spectrum disorders will find the defendant NGRI at a higher rate than individuals with experience in other psychiatric disorder categories.

**Abstract ID:** 84 **Research Category:** Basic Science

**Title**: Production of platelet derived growth factor-BB (PDGF-BB) in doxorubicin treated mouse hearts

**Presenting Author**: Aarifah Bandealy

**Presenting author affiliation**: Konorev Lab KCU

**Co-Authors and Affiliation**: Dr. Shixin Tao, Phd; Dr. Eugene Konorev MD, PhD

**Location**: Kansas City Campus

**Abstract**

Doxorubicin is an effective anticancer drug known to cause cardiomyopathy in treated cancer patients. The mechanisms of cardiomyopathy are currently not well understood and multiple factors are likely involved in pathogenesis of this debilitating condition. Doxorubicin is known to target microvascular endothelial cells in the heart to increase microvascular permeability, reduce collagen type IV deposition and cause abnormal dilation of microvessels. These manifestations are indicative of microvascular remodeling and suggest impaired endothelial secretome. Specifically, our earlier studies detected increased production of PDGF-BB by cultured human endothelial cells exposed to doxorubicin. This has led us to hypothesize that PDGF-BB production is also enhanced in doxorubicin treated mouse hearts. This study examines expression of PDGF-BB protein in cardiac tissues of saline or doxorubicin treated male and female mice using immunohistochemical assay. Specifically, cardiac tissue sections are stained using anti-PDGF-BB antibody 3 and 7 days after a single injection of doxorubicin (5 mg/kg i.v.) or 9 weeks after a series of four weekly injections of the drug (5 mg/kg each, for a total dose of 20 mg/kg). We anticipate that this approach will provide insight into the mechanism of microvascular remodeling by doxorubicin in male and female hearts and help identify novel drug targets for prevention of cardiovascular complications of chemotherapy.

**Abstract ID:** 85 **Research Category:** Quality Improvement

**Title**: Ready or Not, Here are the Results

**Presenting Author**: Ibrahim Khan, MD

**Presenting author affiliation**: Reid Health

**Co-Authors and Affiliation**: Dustin Cundiff, DO; Tanner Everhart, DO; Nicholas Hinkle, DO

**Location**: Kansas City Campus

**Abstract**

Introduction: In the US, opioids were involved in most deaths related to drug overdose with this number reaching 49,860. Data from 2019 showed that fewer than 35% of patients with opioid use disorder were receiving treatment. One study from 2018 showing a higher self reported abstinence rate (75.3% vs 24.1%) for patients receiving treatment for 1 year vs 2 months or less of therapy. This emphasized the importance of receiving treatment for opioid use disorder, so we hoped to be able to improve patient compliance with this treatment in our clinic.

Project Aim: Our QI project asked the question if a patient is more ready to abstain from opioids, will they be more successful on Suboxone therapy. Study goal was to determine if making efforts to improve patient readiness scores would lead to improved outcomes with further interventions to be considered in the future.

Study: Assessment of willingness was done using a questionnaire to assess the patient's readiness to abstain from opioids (on a scale of 0-10). We defined success as patient not missing appointments, not having unexplained positive urine drug screens, and not violating the terms of their pain medication contract. Data from all patients previously started on Suboxone who were not screened for readiness was compared with new patients following initiation of the study who were screened for readiness that had a readiness score of 7/10 or higher. Data was collected from the first 3 month span after being started on Suboxone for both groups to look for red flags and loss to follow up.

Data: There were 13 patients previously prescribed Suboxone with 3 being lost to follow up and 3 of the 10 remaining having red flags. There were 4 new patients enrolled during the study with readiness scores of 7/10 or greater. One was lost to follow up and the other 3 had no red flags.

Conclusion: Due to sample size, results were not significant, but this study method may have merit if it would be expanded to a clinic with a larger population of Suboxone patients.

**Abstract ID:** 86 **Research Category:** Case Reports

**Title**: A Case Review of Adult Herpes Simplex Viral Encephalitis: A Radiologic Perspective

**Presenting Author**: Yunus Ahmed

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Furquaan Isa MD, RMSK

**Location**: Kansas City Campus

**Abstract**

Yunus Ahmed MS3
Furquaan Isa MD, RMSK
Patient: Male, 51
Symptoms: Severe headache, fatigue, and progressive speech difficulty with slurring
Differential Diagnosis: Stroke, subarachnoid hemorrhage, brain abscess
Final Diagnosis: Herpes Simplex Viral Encephalitis
Speciality: Diagnostic Radiology
Objective: Appreciating the value of follow-up MRI in cases of stroke-like symptoms
Background: Non-contrast computed tomography (CT) plays an essential role in the diagnosis of acute brain pathology, and in most cases, can be equivocal. Herpes simplex virus type 1 (HSV-1) encephalitis (HSVE) is an uncommon but instructive example of a condition in which imaging, if appropriately ordered, can facilitate rapid diagnosis and treatment. The most conclusive test for HSVE is the lumbar puncture (LP), however, it is invasive and can be uncomfortable for the patient. It can also be deferred or avoided entirely if more imaging studies are performed, which can provide integral information. Specifically, the importance of ordering magnetic resonance imaging (MRI) after an equivocal CT is a classic scenario.
Case Report: A 51-year-old left-handed man with a past medical history of hypertension, hyperlipidemia, and coronary artery disease presented with worsening headache, fatigue, and rapidly progressive speech difficulty. A diagnosis of HSVE was concluded based on MRI findings which showed unilateral enhancement of the frontotemporal region with hippocampal limbic system involvement. Further analysis of cerebrospinal fluid (CSF) confirmed the diagnosis. Acyclovir treatment was initiated, and the patient survived the lethal infection but developed encephalomalacia.
Conclusions: The physical findings obtained in this case presented a resemblance to a stroke, which is compatible with the patient's past medical history. However, the final diagnosis proved to be inconsistent with this apparent impression. Failure to promptly diagnose and treat HSVE due to an oversight in follow-up imaging can result in severe morbidity or even mortality for the affected individual.

**Abstract ID:** 87 **Research Category:** Clinical Science

**Title**: Serum Proteomic Analysis Identifies Complement Factor H as a Biomarker for Antepartum Preeclampsia

**Presenting Author**: Mahima Rajan

**Presenting author affiliation**: KCU COM 24 Student

**Co-Authors and Affiliation**: Gustavo Vilchez, MD - UMKC School of Medicine Department of Obstetrics and Gynecology

**Location**: Kansas City Campus

**Abstract**

Objective: To identify novel biomarkers for preeclampsia involved in its etiology, pathophysiology, and prediction.
Methods: Blood serum was obtained from pregnant women with antepartum preeclampsia and matched healthy controls. Samples were MARS-14 immunodepleted, TCEP reduced, and TMT labeled before nanoLC-tandem M.S. analysis on a QExactive Plus mass spectrometer. Protein identification and quantitative analysis were conducted using the Mascot and MaxQuant search engines. Relative abundance data were represented and analyzed using gene ontology functional enrichment analysis, as well as interaction pathway and network analysis using the DAVID bioinformatics database 6.8 and the PANTHER classification system 14.1. A p-value and a false discovery rate (FDR) of less than 0.05 were used to indicate statistical significance.
Results: Sixteen antepartum preeclampsia and 16 healthy matched-controls were selected. No significant differences were identified in main demographics and baseline obstetric data among studied groups. From 1,821 identified proteins in antepartum preeclampsia, 85(4.2%) were significantly upregulated (abundance ratio > 1.5, $p < 0.05$), and 69 (3.7%) were significantly downregulated (ratio < 0.5, $p < 0.05$). Pathways enrichment analysis showed that complement activation was the functional pathway more significantly associated with antepartum preeclampsia. Complement factor H was the identified protein with the most significant abundance relative difference in antepartum preeclampsia.
Conclusion: An iTRAQ technique used on proteomic biomarker research showed that the complement activation pathway was significantly dysregulated in antepartum preeclampsia. Complement factor H appears to be a potential novel biomarker significantly upregulated in preeclampsia. Further research in these specific protein subfamilies is warranted.

**Abstract ID:** 89 **Research Category:** Clinical Science

**Title**: Human platelet derived mitochondrial OPA-1 isoforms and its interaction with TDP-43 in neurodegenerative diseases

**Presenting Author**: Suhan Lee, Duyen Pham

**Presenting author affiliation**: Dr. Abdulbaki Agbas' lab, Kansas City University

**Co-Authors and Affiliation**: PI - Dr. Abdulbaki Agbas
Co-presenter - Duyen Pham

**Location**: Kansas City Campus

**Abstract**

Alzheimer's Disease is the most common cause of dementia in the United States. An estimated 6.2 million people in the United States over the age of 65 are currently living with Alzheimer's Disease. As this number could grow to 13.8 million by 2060, it is crucial to discover an early intervention of Alzheimer's Disease to slow the progress or cure the disease. Our lab had identified platelet TAR DNA-binding protein (TDP-43) as a potential blood-based biomarker. We have observed the presence of approximately 25 kDa truncated TDP-43 in mitochondria-enriched pellet obtained from human platelets. We studied the interaction between mitochondrial Optic Atrophy-1 (OPA-1) and TDP-43. OPA-1 is involved in many functions such as oxidative phosphorylation and mitochondrial DNA maintenance. In Alzheimer's Disease, TDP-43 is mislocalized from the nucleus and accumulates in the cytosol and perhaps in mitochondria. Our hypothesis is that TDP-43 may physically interact with OPA-1 in platelets obtained from Alzheimer's disease patients, which will interfere with OPA-1 homeostasis and mitochondrial integrity. Our preliminary data obtained from SDS-PAGE and High-Performance Immunoprecipitation indicate that there are not only multiple OPA-1 isoforms, but also a potential interaction between TDP-43 and OPA-1 in healthy human platelet cytosols. OPA-1 and TDP-43 are both related to the mitochondria and are affected in patients with Alzheimer's Disease. Thus, studying the interaction between them will allow us to have a better understanding of the biology of TDP-43 in progression of Alzheimer's disease.

**Abstract ID:** 90 **Research Category:** Basic Science

**Title**: Smad3 knock-out human cardiac microvascular endothelial cells alters lncRNAs involved in cell invasion, migration, and proliferation

**Presenting Author**: Kass Sjostrom

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**:

**Location**: Kansas City Campus

**Abstract**

The TGF (Transforming Growth Factor)-β pathway is important for regulating cell identity. Smad3 is phosphorylated by the TGF-β Receptor I (TβRI) using its MH1 DNA binding domain which allows it to participate in transcription regulation. Although Smad3 associates with other cofactors in the canonical TGF-β pathway it is central to the intracellular response, making a Smad3 knock-out cell line a useful tool with which to probe the canonical TGF-β pathway. In addition, the TGF-β pathway has been shown to regulate several Long non-coding RNAs (lncRNAs). LncRNAs are implicated in regulating transcription, RNA processing, and translational and post-translational gene regulation. Furthermore, growing evidence suggests that lncRNAs directly influence the TGF-β pathway's regulatory processes. We analyzed a dataset of human cardiac microvascular cell cultures with a stable Smad3 knockout (KO) downloaded from the Gene Expression Omnibus. We found 158 significant changes in lncRNA expression between Smad3 KO and control samples. Transcripts of interest found during this analysis include Antisense lncRNAs, and RNA transcripts implicated in cell proliferation, migration, invasion, and metastasis. These changes in lncRNA expression in Smad3 KO cells suggest new targets for further investigation in the lncRNAs associated with Smad3 regulation.

**Abstract ID:** 91 **Research Category:** Quality Improvement

**Title**: Impact of Project FreshStep on Unhoused Patient Foot Health

**Presenting Author**: Nicolette Duong

**Presenting author affiliation**: Kansas City University College of Osteopathic Medicine

**Co-Authors and Affiliation**: Areesha Shahab1; Ruwaydah Sideek1; Bina Ranjit1; Melissa Carlson1; Alex Phu1; Andrea Nguyen1; Tiffany Ruan1; Chase Labiste1; Ray Newman, MD1
(1) Kansas City University College of Osteopathic Medicine

**Location**: Kansas City Campus

**Abstract**

FreshStep is a research project that aims to improve foot health concerns in the unhoused patient population in Kansas City. Unhoused patients are more likely to suffer from higher rates of morbidity and mortality due to foot concerns; however, they are less likely to see medical attention for their feet. FreshStep is a primary prevention program which works in collaboration with the KC CARE Health Clinic to empower unhoused patients to maintain their foot health. The program begins with 1-on-1 teaching sessions, “Happy Feet” bootcamp, which aims at normalizing conversations about foot health and education about maintaining foot hygiene. Enrolled patients receive an initial new pair of shoes, 14 pairs of socks, and a cleaning kit. The infrastructure put in place through the Kansas City University College of Osteopathic Medicine (KCU-COM) creates a first of its kind sock exchange program and weekly supplies to allow for daily cleaning of their feet. Unhoused patients return every other week to exchange their used socks for 14 pairs of socks in a watertight bag. During these visits, data about the program is gathered through surveys and focus group sessions to provide real-time improvement to the project. The data gathered from this project would be utilized to further improve the structure of the program and a method for similar unhoused patient organizations to follow. FreshStep is a 15 patient pilot with plans to service over 300 unhoused patients in the KC CARE Health Clinic and could serve as a model to other organizations.

**Abstract ID:** 92 **Research Category:** Clinical Science

**Title**: Heart Failure and COVID-19: A Retrospective Study of Outcomes

**Presenting Author**: Monica Aspra Rubi, Taylor Calicchia, Amber McCormick, Daniella Rivera

**Presenting author affiliation**: KCU

**Co-Authors and Affiliation**:

**Location**: Joplin Campus

**Abstract**

Coronavirus-19 (COVID-19) is an infectious respiratory disease responsible for significant hospitalizations, mortality, and associated health expenses. COVID-19 has been known to exacerbate other underlying conditions, such as heart failure. The purpose of this study is to evaluate if a correlation exist between heart failure and COVID-19 mortality rates. Understanding the prognostic correlation that may exist can provide patients with improved management. The data in this study was collected from the Freeman Health System in Joplin and Neosho, Missouri. Three groups were assessed to determine if a correlation existed. The mortality rates were found to be statistically significant in those infected with COVID-19 with a heart failure diagnosis.

**Abstract ID:** 93 **Research Category:** Health Service Psychology

**Title**: Understanding the Training Needs of Parents Whose Child Has Been Diagnosed with Autism Spectrum Disorder

**Presenting Author**: Kayla Gallagher

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**:

**Location**: Kansas City Campus

**Abstract**

Autism Spectrum Disorder (ASD) is a pervasive, developmental disorder that is diagnosed in 1 in 44 children. It is characterized by a deficit in language, social communication, and sensory/repetitive behaviors. The only evidence-based therapy for working with individuals on the spectrum is known as Applied Behavioral Analysis. While this intervention has shown effectiveness in helping children gain better emotional, social, and physical skills, some families have difficulties building these skills outside of a therapy context. One of the hardest skills to generalize is adaptive behaviors. Adaptive behaviors are conceptual, social, and practical skills that individuals need to function. This includes skills such as interpersonal skills, problem solving abilities, self-care skills, and tolerating unexpected changes. Parents are in need of more comprehensive training in order to help them learn how to implement the child's adaptive behavior skills in the natural environment. The current proposed study will work to understand the training needs of parents whose child has been diagnosed with autism spectrum disorder, specific to using adaptive behavior skills outside a therapeutic context. An explanatory research design will be utilized, and qualitative data will be analyzed in the form of open-ended surveys. This will be utilized in order to get in-depth information about parental needs when trying to implement adaptive behaviors. The aim of the current study is to understand the adaptive behavior-based training needs of parents who have children in an applied behavioral analysis program. It is hypothesized the current study will find that parents need more realistic and comprehensive training that is more applicable to a natural environments.

**Abstract ID:** 94 **Research Category:** Basic Science

**Title**: Isolation of functional mitochondria from frozen human platelets.

**Presenting Author**: Mahan Hadjian

**Presenting author affiliation**: KC - College of Medicine, Kansas City University

**Co-Authors and Affiliation**: Abdulbaki Agbas, Department of Basic Sciences, Kansas City University

**Location**: Kansas City Campus

**Abstract**

Mitochondrial dysfunction is a common hallmark of many neurodegenerative diseases such as Alzheimer's, Parkinson's, and Multiple Sclerosis. This has led to a growing field within translational research focused on the elucidation of mitochondrial-based biomarkers in the pathogenesis of neurodegenerative disorders. Platelets have been proposed as a viable peripheral system for studying such changes in mitochondrial function, thanks to ease of access as well as being biochemically representative of neuronal changes, as per recent literature. The feasibility of isolating functional mitochondria from previously frozen platelets would enhance the convenience and throughput of these studies. Mitochondria were isolated from both fresh and previously frozen platelets and purified via a discontinuous 0-15% Percoll gradient . Functionality of the frozen sample was first assessed utilizing flow cytometry. Following this, the respiration profiles of the two mitochondrial populations were measured via coupling assay on a Seahorse XF24 analyzer. Flow cytometry showed that functional mitochondria were successfully isolated from the previously frozen platelets. The respirometry results have thus far been inconsistent, with fluctuating oxygen consumption rates regardless of fresh or frozen status. One suggested explanation is that there is poor adhesion of the mitochondria to the well plates—secondary to the removal of extracellular matrix—an idea supported by the functional respiration profile of mitochondria-enriched tissue from previously-frozen mouse liver. Further investigations are warranted for increasing the adhesion of purified mitochondria to well plates. Based on preliminary results, however, functional mitochondria can indeed be salvaged from previously frozen tissue.

**Abstract ID:** 95 **Research Category:** Clinical Science

**Title**: The Unmet Challenge of Diagnosing and Treating Photophobia in Children

**Presenting Author**: Sarah Shapiro

**Presenting author affiliation**: Kansas City University College of Osteopathic Medicine

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**Location**: Kansas City Campus

**Abstract**

Introduction:
Photophobia, an abnormal sensitivity to light, is associated with a number of ophthalmic and neurologic conditions. Because photophobia is often perceived as an “eye problem,” patients with photophobia may first present to an optometrist or ophthalmologist for care. We’ve previously found that nearly 70% of pediatric patients presenting to a tertiary eye care facility with a chief complaint of photophobia leave their evaluation without a diagnosis. The purpose of this study was to determine the most common causes of photophobia in the pediatric population in order to address this knowledge gap.

Methods:
This study was approved by the University of Utah IRB. We identified patients aged less than 18 years who presented with a chief complaint of photophobia, but who had left the visit without a diagnosis. The families were then contacted and the patients were brought back to the Eye Center to be evaluated by a neuro-ophthalmologist with expertise in the diagnosis and treatment of photophobia.

Results:
We identified 47 children for inclusion in the study. Twenty-six families did not respond to our invitation. Nine families reported that their child’s photophobia had spontaneously resolved and declined to participate further. Four children were diagnosed by our team with migraine, one child was diagnosed with blepharitis with migraine component, one child was diagnosed with dry eye syndrome, and one child was diagnosed with misuse of atropine drops. An additional 5 children have not yet been evaluated.

Conclusion:
Photophobia is associated with several ophthalmic conditions, but in the pediatric population, photophobia can be caused by undiagnosed migraine. Our long-term goal is to better educate eye care professionals about the causes of photophobia in the pediatric population. We are developing a curriculum to address this knowledge gap, with a special emphasis on teaching eye care professionals how to identify undiagnosed migraine.

**Abstract ID:** 96 **Research Category:** Clinical Science

**Title**: Retrospective analysis on thrombosis and covid-19 mortality in rural midwestern population

**Presenting Author**: John Dunton

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Kaitlin Bierman- Kansas City University College of Medicine, Joplin Campus
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Kerry Johnson- Missouri Southern State University, Department of Mathematics
Greg Stahl - Freeman Health System, Department of Quality Improvement
Robert Arnce- Kansas City University College of Medicine, Joplin Campus; Freeman Health System, Department of Emergency Services

**Location**: Kansas City Campus

**Abstract**

This retrospective observational study compared mortality rates in patients admitted to the hospital with the diagnosis of COVID-19 without thrombosis, and the additional diagnosis of thrombosis with patients admitted to the hospital with the diagnosis of COVID-19, and those diagnosed with only thrombosis.

The diagnoses were verified using International Classification of Diseases (ICD-10) codes, a standard among electronic medical records (EMR). The data was taken from the EMR at Freeman Health System in Joplin and Neosho, Missouri from April 2020 to December 2021. The ICD-10 codes were used to separate the patient population into three main groups: COVID-19 without thrombosis, thrombosis without COVID-19, and COVID-19 and thrombosis diagnosed together. These three categories were then subdivided by age and biological sex. Sample proportions were completed using Wald's method, and the two-sample proportion summary hypothesis test with confidence intervals was used for the proportion difference.

A total of 3,094 patients were included in the study population. Excluded from the study were patients who were previously admitted to a hospital for COVID-19 and duplicate admissions. The mortality rate was highest (0.4714) in patients concurrently diagnosed with COVID-19 and thrombosis (P1), followed by patients diagnosed with COVID-19 without thrombosis (P2, 0.1187) and patients diagnosed with thrombosis without COVID-19 (P3, 0.1216). Two sample proportion hypothesis tests determined confidence intervals (CI) for mortality risk comparing P3 to P1 (95% CI, 0.2888-0.4108, $p < 0.0001$), and P2 to P1 (95% CI, 0.2919-0.4135, $p < 0.0001$).

In this rural, Midwestern population, patients admitted to the hospital with the diagnosis COVID-19 and thrombosis had significantly increased the mortality rates compared to those patients admitted with the diagnosis of COVID-19 or thrombosis alone. Our data indicated that those diagnosed with COVID-19 and thrombosis had a higher likelihood of mortality when compared to populations diagnosed with COVID-19, without thrombosis and thrombosis, without COVID-19. There were no differences detected in mortality based on biological sex, or age (individuals greater than or equal to 65 and those younger than 65), in patients admitted with the diagnoses of COVID-19 and thrombosis.

**Abstract ID:** 97 **Research Category:** Clinical Science

**Title**: COVID-19 and Respiratory Failure: a Retrospective Observational Study from a Rural Midwest Hospital

**Presenting Author**: Alex Kneller

**Presenting author affiliation**: Kansas City University College of Osteopathic Medicine

**Co-Authors and Affiliation**: Cyril Abadir - Kansas City University College of Osteopathic Medicine
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**Location**: Joplin Campus

**Abstract**

Infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) produces the wellknown coronavirus disease of 2019 (COVID-19), presenting with respiratory symptoms, including cough, shortness of breath, chest pain, etc2. Respiratory failure (RF) can clinically present very similarly, so it is important to compare them and relate the mortality rates to improve patient outcomes. RF and COVID-19 data was collected via the electronic medical records system at Freeman Health System from April 2020 through December 2021. Patients included in the study are the following: hospitalized patients diagnosed with COVID-19 (with or without RF), and hospitalized patients diagnosed with RF (with or without COVID-19). There was a significant increase in mortality (17.28%) for patients with COVID-19 and RF (P1) compared to patients with COVID-19 without RF (P2). When looking at age, there was no significant difference between mortality (p-value=0.1449) for patients with COVID-19 and a diagnosis of RF under the age of 65 (P5) and patients with RF that did not have COVID-19 (P9). When comparing patient populations, patients with COVID-19 and RF had similar mortality rates as those with RF without COVID-19, while patients with COVID-19 without RF had a markedly reduced mortality rate, relatively. When considering patient age, there was a significant increase in mortality in patients aged ≥65 with both RF and COVID-19 compared to patients under 65. Future studies can investigate alternate treatment plans for patients aged ≥ 65 who are at higher risk of mortality with COVID-19 and RF.

**Abstract ID:** 98 **Research Category:** Case Reports

**Title**: Oxidized zirconium bearing surface failure in a total knee arthroplasty

**Presenting Author**: Cyril Abadir

**Presenting author affiliation**: Kansas City University College of Osteopathic Medicine

**Co-Authors and Affiliation**: Osaheni Amadasu - Kansas City University College of Osteopathic Medicine
Matias Matias - Kansas City University College of Osteopathic Medicine
Naem Mufarreh, DO - Kettering Health Network- Grandview
Sarkis Bedikian, DO - MidAmerica Orthopaedics

**Location**: Joplin Campus

**Abstract**

Osaheni Amadasu1, Cyril Abadir1, Matias Matias1, Naem A. Mufarreh, DO2, Sarkis Bedikian, DO3
Kansas City University1, Kettering Health Network- Grandview2, MidAmerica Orthopaedics3
Oxidized Zirconium (OXINIUM™) is a metal alloy with a ceramic surface, utilized to increase longevity of knee and hip implantations, and reduce polyethylene wear 1, therefore understanding catastrophic failure is imperative. Herein, we present a unique case of atraumatic OXINIUM™ wear in a middle-aged female after uneventful primary total knee arthroplasty. A 51-year-old female underwent a total knee arthroplasty with a Smith and Nephew OXINIUM™ coated knee, which resulted in worsening symptoms two-years post operatively and an exploratory surgery. It was noted that periprosthetic tissue was impregnated with metal coating, and black synovial fluid had extensive soft tissue involvement. The primary components were replaced and there was complete resolution of symptoms. The findings indicate that the polyethylene spacer locking mechanism may be the underlying cause. Future consideration should be given to enhanced screenings and early surgical intervention in patients who present with persistent symptoms–of unknown etiology–after primary total knee arthroplasty.

**Abstract ID:** 99 **Research Category:** Basic Science

**Title**: COVID-19 NFL Injury Follow-Up Study

**Presenting Author**: Andres Toledo

**Presenting author affiliation**: KCU

**Co-Authors and Affiliation**: Troy B Puga, Josh Schafer, Grace Thiel, Nicholas Scigliano, Tiffany Ruan, Prince N Agbedanu, Kevin Treffer

**Location**: Kansas City Campus

**Abstract**

In 2020, COVID-19 spread across the world and brought the world to a halt, causing the shutdown of nearly everything in order to prevent its spread. The NFL, like most of the world, faced shutdowns leaving athletes unable to train in some of the most advanced facilities with many of the best trainers in the world. Through a previous study, COVID-19 Return to Sport Injury Prevalence Analysis, it was determined that there was increased injury prevalence during the 2020 season likely due to decreased physiological adaptations within athletes' bodies that resulted from facility shutdowns. Understanding injury epidemiology is vital in the prevention of injuries and the development of return-to-play protocols.

**Abstract ID:** 100 **Research Category:** Medical Education

**Title**: Comparing PubMed-Index Publications of Successful Urology Applicants in the 2021 and 2022 Cycle

**Presenting Author**: Sahaam Mirza

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Tatum Williamson - Beth Israel Deaconess Medical Center
Moben Mirza - University of Kansas Medical Center
Robert Arnce - Kansas City University

**Location**: Joplin Campus

**Abstract**

Objective: To evaluate the number of PubMed-indexed research projects of US senior medical students who successfully matched into top 50 urology residency programs in the 2021 and 2022 match cycle. We also evaluated medical school, and gender of these applicants.

Methods: Doximity Residency Navigator was used to generate the top 50 residency programs when sorted by reputation. Newly matched residents were found using program Twitter accounts. PubMed was queried for peer-reviewed publications of incoming interns as of March 2021 and March 2022.

Results: The average number of publications across all incoming interns in both years was 4.05. The average urology-specific publications were 2.04 and first-author urology publications was 1.13. The median number of total publications for matched applicants was 2, and applicants with 5 total publications were at the 75th percentile for research productivity.

Conclusion: The average successful applicant had at least two PubMed-indexed urology papers and also had an urology-specific first-author paper.

**Abstract ID:** 101 **Research Category:** Clinical Science

**Title**: Challenges of Diagnosing an Atrial Myxoma, A Case Study

**Presenting Author**: Sahaam Mirza

**Presenting author affiliation**: Kansas City University COM Class of 2024

**Co-Authors and Affiliation**: Tori Tyler, COM Class of 2024

**Location**: Joplin Campus

**Abstract**

Atrial myxomas are benign cardiac tumors that have a vast array of symptomatology that can make diagnosis challenging. Most of the common symptoms that occur with an atrial myxoma are vague leading to increased risk of misdiagnosis which can increase morbidity and mortality for patients. This case study reviews the case of a 54-year-old female who presented to the Emergency Department complaining of back pain and shortness of breath. The patient had been seen at an outside facility about a week prior to her arrival to the Emergency Department and received a diagnosis of pneumonia which she was being treated for without improvement of her symptoms. Upon Emergency Department diagnostic work up, she was found to have a left atrial myxoma that required surgical excision via median sternotomy. For most atrial myxomas the surgical excision has a high rate of curative success but making the diagnosis can pose problems for physicians and prolong the symptoms for the patients. Increasing clinical understanding of cases like the one outlined in this poster can help to guide physicians to the correct diagnoses and improve patient care.

**Abstract ID:** 102 **Research Category:** Case Reports

**Title**: Carotid stump syndrome: a rare condition involving recurrent ipsilateral strokes

**Presenting Author**: Preetpal Chatha

**Presenting author affiliation**: Kansas City University, College of Osteopathic Medicine, Joplin, MO, USA

**Co-Authors and Affiliation**: Ayesha Khan - Kansas City University, College of Osteopathic Medicine, Joplin, MO, USA
Symantha Stevens - Freeman Health System, Joplin, MO, USA
Gulshan Uppal - Freeman Health System, Joplin, MO, USA

**Location**: Joplin Campus

**Abstract**

Carotid stump syndrome is a rare condition involving the complete occlusion of the internal carotid artery that can present with recurrent ipsilateral cerebrovascular accidents. Retrograde blood flow can carry microemboli produced from the “stump” of the occluded artery to the cerebral arteries via collateral circulation, where they may produce ischemic symptoms. Treatment involves a combination of medical management with antiplatelet and statin therapy, and surgical intervention to exclude the stump or ligate the occluded artery. Here, we discuss the case of an elderly male with a history of two strokes in the previous few months that presented with aphasia and right-sided weakness. Diagnostic imaging studies confirmed an infarct of the left middle cerebral artery territory and demonstrated complete occlusion of the left internal carotid artery. A diagnosis of carotid stump syndrome was made and the patient was managed medically in accordance with his preferences. He remained free of any additional strokes in the three-month follow-up period. Here, we discuss further details of this case.

**Abstract ID:** 103 **Research Category:** Health Service Psychology

**Title**: Young infants' detection of emotion from facial expressions

**Presenting Author**: Nicki Zieber

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Kandace Fleming, University of Kansas
Luc Alvarado, University of Kansas
John Colombo, University of Kansas

**Location**: Kansas City Campus

**Abstract**

Emotion detection (i.e., the ability to perceive the presence of an emotion in faces or other physical mannerisms) occurs very rapidly in adults and is thought to occur outside of an one's conscious awareness. Research on the detection of emotion in infants has used event-related potentials (ERPs), skin conductance responses (SCRs), and pupillary responses; we sought to determine whether emotion detection could be demonstrated with behavioral measures in 7.5-month-old infants. In a preferential looking procedure, an actor's emotional expression (happiness, fear, or anger) was paired with the same actor's neutral expression. Faces were presented for either 167, 367, 567, or 767 ms in Experiment 1 and for 67, 167, 567, or 767 milliseconds (ms) in Experiment 2. We sought to determine what level of exposure was necessary for infants to detect emotion, as indicated by systematic differences in looking to the paired stimuli. Experiment 1 was conducted online and found that, across all 4 durations, fearful faces were detected, regardless of orientation of the faces. There was also a significant preference to look to the face on the left side of the screen, regardless of other factors. Experiment 2 was conducted in the lab and also found a significant bias to look to the left side of the screen that interfered with infants' detection of angry and happy faces. Mixed models found a significant amount of variability across infants. Findings are discussed in terms of factors that may have contributed to these unexpected findings and design recommendations for future work.

**Abstract ID:** 104 **Research Category:** Case Reports

**Title**: Atypical presentation of pancolitis caused by Campylobacter infection

**Presenting Author**: Jonathan Dzielski, OMS-III – Kansas City University College of Osteopathic Medicine

**Presenting author affiliation**: Co-Author

**Co-Authors and Affiliation**: Timmi Maxmillian, DO PGY-1 – AdventHealth East Orlando Family Medicine Residency
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**Location**: Kansas City Campus

**Abstract**

Introduction:
Campylobacter species is one of the leading causes of gastrointestinal illness in humans. It is a gram-negative bacteria and is transmitted through consuming raw or undercooked poultry. Typical symptoms include nausea, abdominal pain, and bloody diarrhea. Inflammation usually occurs in the small bowel and rarely progresses to colon. Here we present a case in which campylobacter infection caused pancolitis and non-bloody diarrhea.
Case description:
A 36-year-old female presented to the ED with complaints of constant, achy generalized abdominal pain for the past 4 days. Associated symptoms included nausea, non-bilious non-bloody vomiting, and multiple episodes of non-bloody diarrhea. At this visit, the patient was afebrile and hemodynamically stable. On physical exam, the patient was found to have a soft, non-distended abdomen with mild right-sided and epigastric tenderness. Subsequent imaging and blood work were ordered, revealing hypokalemia at 3.4 but otherwise unremarkable. CT abdomen pelvis WO IV contrast revealed pan-colonic colitis most severely affecting the ascending and transverse colon. The patient was admitted under the medicine service for further management and treatment. Upon admission, GI was consulted, and the patient received 1L NS x1, famotidine, ondansetron,
ketorolac for pain, and IV Ceftriaxone/Metronidazole. Home omeprazole and famotidine PRN were continued along with a low-residue diet and dicyclomine. Additionally, bacterial and viral stool cultures were ordered. On hospital course day 2, the patient had a slight improvement in her abdominal pain and PO intake but continued cramping. Bacterial and viral stool cultures resulted positive for Campylobacter group. The patient was subsequently transitioned to a 3-day course of PO Azithromycin. On hospital course day 3, the patient was cleared by GI with decreased episodes of diarrhea with marked improvement in abdominal pain. Discharge planning included continued oral Azithromycin for 2 additional days, continued home regimen of omeprazole, famotidine, sucralfate PRN, and follow-up with both PCP and outpatient GI.
Discussion:
This case illustrates an atypical presentation and uncommon findings associated with campylobacter infections and highlights the importance of obtaining stool studies given acute gastrointestinal symptoms. These studies can be important in helping distinguish infection from inflammatory bowel disease and other gastrointestinal pathologies.

**Abstract ID:** 105 **Research Category:** Basic Science

**Title**: Optimization and characterization of the isolation of brain-derived exosomes from human plasma/serum

**Presenting Author**: Jared Rack

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Edina Kosa - Kansas City University
Dr. Abdulbaki Agbas - Kansas City University

**Location**: Kansas City Campus

**Abstract**

Jared Rack, Edina Kosa, Abdulbaki Agbas
College of Biosciences, Kansas City University, Kansas City, MO

Chemically modified aberrant Transactive Response DNA Binding Protein 43 (TDP-43) derivatives were found to represent a major accumulating protein in neuronal cytoplasmic inclusions and in exosomes in Frontotemporal Lobar Degeneration (FTLD), and in ALS patients. Exosomes are nano-size membranous vesicles that contain several macromolecules including aberrant pathological proteins. The size and membranous structure of exosomes allows them to pass through the blood brain barrier. These features make exosomes a potential platform in which targeted biomolecules can be analyzed. Our objective is to develop a method to isolate serum/plasma-derived brain-cell originated exosomes and their TDP-43 content as part of a surrogate biomarker development for limbic-predominant age-related TDP-43 encephalopathy (LATE).

A heterogenous mixture of extracellular vesicles was obtained by running healthy human plasma through an Izon qEVoriginal size exclusion chromatography column with 70-1000nm matrix size. The exosome enriched fractions were pooled, and brain-derived exosomes were isolated by antibody cross-linked high-performance immunoprecipitation (HPIP) tips in conjunction with urea elution. For the isolation of astrocyte-derived exosomes, anti-GLAST antibody was cross-linked for the HPIP. Anti-TMEM119 and anti-MOG antibodies were cross-linked to HPIP tips to isolate microglia-derived and oligodendrocyte-derived exosomes, respectively. Western blot analysis and transmission electron microscopy (TEM) were used to confirm the presence of exosomes.

Western blot results showed the presence of TSG101, GLAST, TMEM119 and TDP-43 in the HPIP eluates. TEM images confirm the presence of intact exosomes in the GLAST cross-linked HPIP eluates. These results suggest that intact astrocyte-derived exosomes and microglia-derived exosomes can be isolated from human plasma and that these exosomes contain TDP-43, a potential blood-based biomarker for neurodegenerative disease.

The blood-based biomarker (a.k.a. liquid biopsy) would be a minimally invasive way to check for the progress of neurodegenerative diseases. Being able to isolate brain-derived exosomes from blood, our prediction is that TDP-43 and pTDP-43 levels in these brain-derived exosomes will be a good analytical tool to monitor longitudinal changes of TDP-43 and its derivatives during neurodegenerative diseases.

**Abstract ID:** 106 **Research Category:** Basic Science

**Title**: TTC7: A possible pharmaceutical target for treating iron overloading in hereditary hemochromatosis

**Presenting Author**: Cole Miller

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Amber Wiggins-McDaniel - Kansas City University
Robert White - Kansas City University

**Location**: Kansas City Campus

**Abstract**

Hereditary Hemochromatosis (HH) is a genetic progressive iron-overloading disease that affects 1 out of every 300 people. It is caused by a homozygous C282Y mutation of the Hereditary Iron (HFE) gene which results in a change in the 282nd amino acid position in the protein where a cysteine is replaced by a tyrosine. This mutation causes a loss of function in the HFE protein, which is a vital protein in the regulation of tissue iron in the body. There are currently two treatments for this disease, including: weekly phlebotomies until iron deplete (typically 80 weeks), then monthly maintenance phlebotomies for the duration of the patient's life; or iron chelating drugs, which are costly and have deleterious side effects. Due to the intense and painful nature of these treatments, patient compliance to treatment after reaching normal iron levels drops significantly. These patients are very challenging to treat. Flaky skin (fsn) mutant mice are iron deficient due to excess urinary iron excretion of 100 times the normal urinary iron excretion. The mutation causing the fsn phenotype is located in the Ttc7 (tetratricopeptide repeat domain 7) gene. Preliminary data suggest that the presence of the fsn mutation in HH model mice rescues the mice from their iron overload. The fsn mice have a defective mechanism of iron reabsorption in the kidney and understanding this will allow us to identify a pharmaceutical target to manipulate iron levels in HH patients and recreate that excessive urinary iron excretion to rescue HH patients from their disease state. My project is focused on identifying the protein partners of TTC7. Expression vector plasmids, that have wildtype Ttc7 and fsn-Ttc7 insertions, will be transfected into human embryonic kidney (HEK) cells. After stable transfection has been achieved, co-immunoprecipitation of TTC7 and fsn-TTC7 protein extractions from HEK cells will be conducted to identify protein partners of TTC7. Identifying the protein partners of TTC7 will allow us insight into the mechanism of urinary iron excretion in fsn mice, and eventually will allow us to identify a pharmaceutical target for treatment of iron-overloading in patients with Hereditary Hemochromatosis or transfusion-dependent diseases.

**Abstract ID:** 107 **Research Category:** Health Service Psychology

**Title**: Adolescent athletic coaches' perceptions of player mental health and mental health training

**Presenting Author**: Chace Hinnegan

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**:

**Location**: Kansas City Campus

**Abstract**

The present study plans to investigate adolescent athletic coaches and their perception of their own abilities to handle player mental health. Also, plan to study whether coaches received mental health training, and if they believe they received enough mental health training and where deficits may lie in the training. This study will aim to reach at least 50 participants, who are all coaches working with individuals between 9th grade and 12th grade. Participants of the study will be asked to answer questions in a qualitative study regarding various questions related to mental health training, experiences with player mental health issues, and areas where the coaches would like to receive more or less training. These questionnaires are going to be sent out through state high school athletic association groups, as these have access coaches on a national level. It is expected that coaches will express their mental health training as being inadequate, having not worked with mental health enough to be confident in handling crises. It is expected that coaches will have had many situations where a better understanding of mental health could have been beneficial for players. Lastly, it is expected that many coaches will have ways in which they would like to see mental health training expand.

**Abstract ID:** 108 **Research Category:** Basic Science

**Title**: Sex-based differences in the sciatic nerve and piriformis muscle relationship: a cadaveric study

**Presenting Author**: Charlie Marchese

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Aaron Graves - Kansas City University
Ryan Schiller - Kansas City University
Jennifer Dennis, PhD
Bradley Creamer, PhD

**Location**: Kansas City Campus

**Abstract**

Variations of the relationship between the sciatic nerve and piriformis muscle (SN-PM) must be taken into consideration when discussing anatomically based pathologies and/or orthopedic procedures within the region. Thirty-one formalin embalmed, prosected cadavers were evaluated using the Beaton and Anson classification system (1939). Major landmarks of the SN-PM relationship were identified, including posterior superior iliac spine (PSIS), ischial tuberosity (IT), greater trochanter (GT), popliteal fossa (PF), iliac crest (IC), and a pin inserted in the middle of SN as it exits under the PM (S1). Distances collected included: PSIS-IT, PSIS-GT, IT-GT, PSIS-S1, IT-S1, GT-S1, IC-PF, IC-S1, Q (intersection point drawn from S1 to the line created by PSIS-IT), R (intersection point drawn from S1 to the line created by PSIS-GT), piriformis muscle width at S1, width of the SN, thigh length, and S1 to bifurcation of the common tibial n. and fibular n. Statistical analysis from 52 lower extremities were evaluated using a two-tailed T-test to compare by sex. Eleven of 14 measurements were statistically significant between sexes ($p<0.05$), indicating substantial sex-based differences within typical anatomy. Only the PM width, distance from S1 to SN bifurcation, and the Q ratio were not significant. Our results indicate multiple significant relationships that exist in the gluteal region when comparing male versus female donors. This data highlights sex-based differences in the variability of SN pain/piriformis syndrome presentations and helps explain general risks associated with SN blocks prior to foot and ankle surgeries. Research was funded by KCU Student Summer Research Fellowship (IBC 1871804-2).

**Abstract ID:** 109 **Research Category:** Clinical Science

**Title**: Effects of As-Needed Intravenous Hydralazine on Mean Arterial Pressure: A Retrospective Review

**Presenting Author**: Grace Park

**Presenting author affiliation**: Freeman Health System

**Co-Authors and Affiliation**: Robert McNab, DO, FACP, FACOI - Kansas City University;
Scott Goade, PharmD, BCNSP - Freeman Health System;
Adrienne Carey, PharmD, BCPS - Freeman Health System;
Amanda Adkins, PharmD - Freeman Health System;
Kerry Johnson, PhD - Missouri Southern State University;
Jack Udell, PharmD - Freeman Health System

**Location**: Joplin Campus

**Abstract**

Purpose:
Inappropriately large drops in BP and mean arterial pressure (MAP) are linked with adverse events, including hypoperfusion-related injury. Despite this, as-needed [PRN] intravenous (IV) hydralazine is commonly used for inpatient BP management. The current literature disfavors hydralazine for hypertension due to its unpredictable dose response. This study's purpose is to assess the incidence of patients experiencing a MAP decrease by >25% from baseline after administration of PRN IV hydralazine and its risk associated with acute kidney injury.
Methods:
This retrospective review was conducted at Freeman Health System West. From 1/1/2022 to 6/30/2022, study participants were identified by generated reports of patients with ages ≥18 years who received at least one dose of PRN IV hydralazine. Patients seen in the emergency department without inpatient admission or pregnant at the time of hydralazine administration were excluded.
The primary outcome was the proportion of patients who experienced a decrease in MAP by >25% after hydralazine administration. The following data were collected: pre-treatment MAP (MAP immediately prior to hydralazine administration) and post-treatment MAP (lowest MAP documented within 4 hours post-administration). Data were excluded if the pre-treatment MAP was not documented within 2 hours prior time of administration.
The incidence of acute kidney injury - increase in serum creatinine (SCr) by at least 0.3 mg/dL or 50% from baseline within 48 hours from the time of administration - was assessed as a secondary outcome. Data were excluded if a patient's baseline SCr was ≥2.0 mg/dL or if no SCr levels were documented within 24 hours before and 48 hours after the time of hydralazine administration
Results: Among the 395 patients included, 108 patients (27.3%; 95% CI 0.23-0.32) experienced a drop in MAP by >25%. The number of patients who experienced AKI were similar between the group that experienced a drop in MAP >25% and those who did not (11.1% vs. 7.3%).
Conclusion: The use of PRN IV hydralazine was associated with a notable risk in dropping patient's MAP by >25%. Due to limited sample size, study could not assess if a drop in MAP >25% may increase risk of AKI.

**Abstract ID:** 111 **Research Category:** Health Service Psychology

**Title**: Prevalence and beliefs associated with vaccine hesitancy among Muslim-Americans

**Presenting Author**: Marina Ali

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Dr. William Sorensen - University of Texas in Tyler

**Location**: Joplin Campus

**Abstract**

Author: Marina Ali, Kansas City University
Co-Author: William B. Sorensen, PhD, University of Texas in Tyler
Background. Vaccine hesitancy hinders the eradication of preventable illnesses. Furthermore, there are gaps in public health research on vaccine hesitancy among Muslims in heterogenous societies.
Objective. This study aimed to determine whether socioeconomic demographics, political beliefs and trust in public institutions were associated with vaccine hesitancy beliefs. Additionally, two models were applied to determine which factors had the strongest influence in rejecting vaccines.
Method. Participants were recruited through Facebook group posts. Seventy-three responses were received. Sixty-three responses met the inclusion criteria and were included in the final analysis. Participants rated their opinions on political beliefs, religious practices, trust in institutions and vaccines. Answers were compiled into the following belief scores: political leaning, religiosity, trust in public institutions, and vaccine hesitancy.
Results. From bivariate analysis, participants who were older in age, attained higher levels of education, were employed, were not married, and identified with the Sunni sect were less vaccine hesitant. From multiple regression analysis, participants with higher education levels and trust in public institutions were the least likely to express vaccine hesitancy. No belief score had a significant correlation with vaccine hesitancy. Most participants (36.5%) were more likely to receive a vaccine it had no potential safety issues. Moreover, they were hesitant with vaccines if they had safety concerns or had poor efficacy.
Discussion. Results both align with and contradict previous studies in Muslim majority and religiously heterogenous countries. This study is the first of its kind to find an association between Islamic sect and proclivity towards vaccines. Follow up studies are necessary to gauge a larger, more diverse population of Muslim-Americans. Based on this study's findings, healthcare professionals can better promote vaccines by addressing their patient's trust in public institutions.
Keywords: vaccine hesitancy, vaccines, Muslim health, Muslim-American

**Abstract ID:** 115 **Research Category:** Health Service Psychology

**Title**: Working Title: Anxiety as a Mediator on the Relationship Between Self-talk and Sports Performance

**Presenting Author**: Summer Williams

**Presenting author affiliation**: Kansas City University Health Service Psychology

**Co-Authors and Affiliation**:

**Location**: Kansas City Campus

**Abstract**

Mental health is an important aspect of youth. Approximately 10-20% percent of adolescents are affected by a mental health diagnosis. Participating in physical activity such as sports has been shown to help adolescents combat the effects of mood disorders such as anxiety and depression and build future resiliency to them. However, participating in sports can also come with its own anxieties. An individual's affective state can affect their athletic performance. When an individual is feeling confident in their ability, they are more likely to perform at a higher level and this is depicted in their game statistics. If someone is feeling more anxious about the situation their performance may struggle. Self-talk is noted to affect athletes' performance as well. Self-talk can help with skill acquisition such as shooting a basketball, serving a volleyball, or shooting a basketball and other performance enhancing activities. It is important to understand that self-talk and anxiety both effect athletic performance individually.

The aim of this study is to provide information on how anxiety mediates the relationship between self-talk and performance. By comparing baseball players batting average statistics through GameChanger over multiple time periods you can identify changes in athletic performance. It is anticipated that there will be a positive change in athletic performance and lower levels of anxiety after athletes attend a detailed course on self-talk. Levels of anxiety will be measured through the GAD-7 and measured at multiple time points as well. If the field of sports psychology, this is the direction that current research has identified as an area that needs to be elaborated on. Understanding how anxiety mediates the relationship between self-talk and performance is important to the growth of the field.

**Abstract ID:** 116 **Research Category:** Basic Science

**Title**: Effects of cannabidiol on neural development

**Presenting Author**: Jessica Bennett

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Bonny Millimaki - Lipscomb University

**Location**: Kansas City Campus

**Abstract**

Background: Several studies have found that women who use cannabidiol (CBD) while pregnant double their risk of giving birth to a child with neurodevelopment disorders characterized by aberrant neuron pathfinding. Whether CBD is safe has yet to be determined. Preliminary studies in our lab using zebrafish embryos as a model revealed that Hu-331, a product of CBD oxidation in vivo, induces neurological defects. The observed defects included neuronal failure to cross midline in the hindbrain and failure to properly innervate the tail and dorsal muscles. This present study aimed to determine whether exposure to CBD would impact neural development.

Methods: Using zebrafish as a model organism, we assessed the effects of CBD when administered at ten hours post-fertilization (hpf). Embryos were either given a vehicle control (dimethyl sulfoxide) or a concentration of CBD of 2 µM, 4 µM, 6 µM, 8 µM, or 10 µM. Counts for survival and hatching curves were tallied at 24 hpf, 48 hpf, and 72 hpf. Morphology assays, startle response assays, and immunohistochemistry were performed at 72 hpf.

Results: Exposure to CBD was correlated with a decline in embryonal vitality. The most significant impact was found in the survival and hatching assays, where 10 µM of CBD yielded average survival and hatching rates of 37.5%, whereas control groups had average survival and hatching rates of 90.0% and 94.4%, respectively ($p < 0.05$). Startle response assays revealed a decreased response to stimuli in groups exposed to CBD. Although there was not a statistically significant difference among the quantity of responses between groups, subjective evaluation of swim behaviors revealed a marked decrease in the distance traveled by zebrafish exposed to CBD. Lastly, the frequencies of abnormal body morphology and aberrant neural migration were both increased in the groups exposed to CBD: from an average of 2% (control) to 7% (4 µM) for body morphology and from an average of 7% (control) to 37% (4 µM) for neural migration.

Conclusion: Exposure to CBD produces a trending decline in neural development and embryonic viability in zebrafish embryos when administered at 10 hours post-fertilization.

**Abstract ID:** 117 **Research Category:** Clinical Science

**Title**: Covid-19 and respiratory failure: a retrospective observational study from a rural midwest hospital.

**Presenting Author**: Alex Kneller

**Presenting author affiliation**: Kansas City University

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**Location**: Joplin Campus

**Abstract**

Infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) produces the wellknown coronavirus disease of 2019 (COVID-19), presenting with respiratory symptoms, including cough, shortness of breath, chest pain, etc2. Respiratory failure (RF) can clinically present very similarly, so it is important to compare them and relate the mortality rates to improve patient outcomes. RF and COVID-19 data was collected via the electronic medical records system at Freeman Health System from April 2020 through December 2021. Patients included in the study are the following: hospitalized patients diagnosed with COVID-19 (with or without RF), and hospitalized patients diagnosed with RF (with or without COVID-19). There was a significant increase in mortality (17.28%) for patients with COVID-19 and RF (P1) compared to patients with COVID-19 without RF (P2). When looking at age, there was no significant difference between mortality (p-value=0.1449) for patients with COVID-19 and a diagnosis of RF under the age of 65 (P5) and patients with RF that did not have COVID-19 (P9). When comparing patient populations, patients with COVID-19 and RF had similar mortality rates as those with RF without COVID-19, while patients with COVID-19 without RF had a markedly reduced mortality rate, relatively. When considering patient age, there was a significant increase in mortality in patients aged ≥65 with both RF and COVID-19 compared to patients under 65. Future studies can investigate alternate treatment plans for patients aged ≥ 65 who are at higher risk of mortality with COVID-19 and RF.

**Abstract ID:** 119 **Research Category:** Basic Science

**Title**: Association between age and renal artery stenosis classification: a cadaver study

**Presenting Author**: Ginger Chant, MS

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Kristof Gutowski - Kansas City University
Janice Wang - Kansas City University
John Robert Dobson III, MD - Kansas City University
Larry Segars, PharmD - Kansas City University
Jennifer Dennis, PhD - Kansas City University (Principle Investigator)

**Location**: Kansas City Campus

**Abstract**

INTRODUCTION: Renal artery stenosis (RAS) is a pathological condition that narrows the lumen of the renal artery, reducing blood flow to the kidneys. RAS can lead to refractory hypertension and end stage renal disease. Literature has shown increased mortality and shortened survival in cardiac catheterization patients and hemodialysis patients with renal artery stenosis, respectively. A guideline on which patient populations to screen for renal artery stenosis has yet to be defined; however, age has been shown to be a significant factor in the development of RAS. The present study sought to identify patient age ranges associated with the presence of renal artery stenosis. METHODS: Renal artery samples were taken from 30 formalin-embalmed cadavers from Kansas City University. The left renal arteries were removed from each body and divided into 3 mm segments and stained with H&E. For histological analysis, a microscope was used to analyze specimens. The lumen area and area circumscribed by the internal elastic lamina were traced using the measuring device within the microscope. The stenosis of each segment was documented to assess for average percent stenosis among age groups. ANOVA and Pearson correlation were run to compare mean luminal diameters. CONCLUSION: Physicians would benefit from knowing that their patients are at risk for a certain degree of renal artery stenosis based on their age. Additionally, this information serves as support for creating guidelines on which patient populations to screen for renal artery stenosis.

**Abstract ID:** 120 **Research Category:** Clinical Science

**Title**: Immunohistochemical analysis of geriatric features of the superior ophthalmic veins: a cadaveric study

**Presenting Author**: Keanna G Theobalt

**Presenting author affiliation**: Kansas City University-COM, Anatomy Fellow, Medical Student

**Co-Authors and Affiliation**: George Kalu-Kansas City University-COM, Anatomy Fellow, Medical Student
Miles Turk-Kansas City University-COM, Anatomy Fellow, Medical Student
Robert Hillard, MD -Kansas City University, Chair of Department of Pathology and Anatomical Sciences
Farida Mehrhoff (PI) -Kansas City University, Assistant Professor of Anatomy

**Location**: Joplin Campus

**Abstract**

Background: Due to the fact that a significant number of vascular diseases rise with aging, there is continuous interest in research on the vasculature of the elderly. Previous studies tend to emphasize arterial geriatric changes, omitting both routine and specialized assessment of the veins. Our research is an effort to explore vascular aging in the superior ophthalmic veins (SOV) which should be indicative of similar venous changes throughout the brain.
Methods: We dissected the SOV on 18 orbits (n=18; 9 left, 9 right) of 12 formalin preserved human cadavers (average age 77.5 ± 14.3; 8 males, 4 females) without history of obvious severe vascular abnormalities prior to death. Entire veins and their segments were photographed, before and after removal from the cadaver, and analyzed with ImageJ software to measure the blood vessels' diameter and size of its tunics thickness (intima, media, and externa). In addition, H&E, Verhoeff staining, and immunohistochemical evaluation for CD31 and laminin were performed.
Results: Immunohistochemical staining with CD31 reveals a consistent vasa vasorum pattern in the SOVs smaller than 1.0 mm. There is a correlation between tunica media thickness and the SOV diameter. Verhoeff staining reveals different patterns in elastin's arrangement in the veins themselves and their vasa vasorum in different age categories.
Conclusion: Finding of vasa vasorum in small ophthalmic veins in geriatric donors opens a new aspect on the venous structure as it has been considered absent in veins this size. It raises a question whether these vessels have existed long term or are a result of neovascularization in geriatric patients. Further comparison of the SOVs in younger age cadavers should be considered in order to improve our overall understanding of the vascular circuit, making a small step toward winning the battle against debilitating neurovascular diseases.

**Abstract ID:** 121 **Research Category:** Clinical Science

**Title**: A preliminary report on varying morphological patterns and characteristics of the soleus muscle

**Presenting Author**: Keanna G Theobalt

**Presenting author affiliation**: Kansas City University-COM, Anatomy Fellow, Medical Student

**Co-Authors and Affiliation**: Miles Turk-Kansas City University-COM, Anatomy Fellow, Medical Student
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Charles Withnell, PhD- TCU Assistant Professor
(PI) Robert Hillard, MD-KCU, Chair of department of pathology and anatomical sciences

**Location**: Joplin Campus

**Abstract**

The soleus muscle is one of the most powerful plantar flexors of the foot. Its unique architecture is built upon several different muscle fascicular compartments held together by multiple tendinous structures. Due to the great amount of force generated during contraction of the soleus, the myotendinous junctions (MTJ) are susceptible to injury. The MTJ serves as an interface between muscle tissue and a tendon and may differ in morphology between individuals. This study aims at identifying variations in the soleus muscle's tendinous structures as a starting point to understanding the distribution of connective tissue and its relationship to injury susceptibility and morphological classification of the soleus. Forty (n=40) bilateral soleus muscles from twenty (n=20) formalin-embalmed cadavers (average age 78 years old; 10 males, 10 females), who donated their bodies for medical education to Kansas City University, were dissected in-situ then removed for precise measurements of connective tissues. Variations of tendinous structures seen on the anterior surface of the muscle were subsequently visualized and reconstructed in three-dimensions using an Artec Space Spider. Each muscle was then cut in cross-section at three locations: proximal, middle, and distal to simulate views observed in a clinical setting on MRI. Each MTJ (central tendon, lateral/medial aponeuroses) was followed through the course of the muscle by measuring and comparing its appearance at the three locations.

We found that the soleus muscle is not anatomically homogeneous. Approximately half of the donor specimens had a variation between their own two soleus muscles. Within a single muscle, the proximal location displayed a similar length of intramuscular lateral and medial aponeuroses despite the size of its corresponding origin tendon on the anterior surface. In most specimens, the central tendon was not internally visualized until the middle portion of the muscle despite visualization on the anterior surface.

The muscular compartments of the soleus intertwine to form a complex architecture creating unique arrangements of tendinous structures. With a better understanding on how MTJs differ in relationship to the morphological pattern of the soleus' muscular arrangement, we can better anatomically classify the soleus.

**Abstract ID:** 122 **Research Category:** Health Service Psychology

**Title**: Discerning the effects of death anxiety and communication apprehension about death on willingness to work with older adults

**Presenting Author**: Cristiana Cottone

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**:

**Location**: Kansas City Campus

**Abstract**

As the proportion of older adults continues to grow, so will the need for psychologists who desire to work with the older adult population. As the population ages, it will become more likely that psychologists will encounter clients who are facing issues related to death and dying; therefore, it will be crucial for doctoral psychology students to be comfortable with treating clients who have death related issues. Previous research has shown a link between anxiety about death and willingness to work with older adults. However, there are no known studies on death anxiety and willingness to work with older adults that includes the factor of communication apprehension about death. The proposed study addresses communication apprehension about death, as the ability to communicate effectively about death-related topics is critical to the work of clinical psychologists that practice with older adults. This study will contribute to the literature by determining if doctoral level clinical psychology students' death anxiety and apprehension of communicating about death influences their decision to work with older adults. The proposed study will utilize a survey research design and use a convenience sample of enrolled clinical psychology doctoral students. Willingness to work with older adults will be analyzed in relation to death anxiety and communication apprehension about death using linear regression analyses. It is hypothesized that students who have less death anxiety and less communication apprehension about death will be more willing to work with older adults. It is also hypothesized that the relationship between death anxiety and willingness to work with older adults will be affected by the level of communication apprehension that students endorse. The aim of the proposed study is to contribute to the understanding of attitudes about death and the ability to communicate about death related topics as predictors of professional behavior and interests of future clinical psychologists.

**Abstract ID:** 123 **Research Category:** Case Reports

**Title**: Hypertrophic obstructive cardiomyopathy: a cadaveric case study

**Presenting Author**: Celeste Murtha

**Presenting author affiliation**: KCU Anatomy Fellow

**Co-Authors and Affiliation**: John Dobson, MD - KCU Department of Anatomy and Pathology
Anthony Olinger, PhD - KCU Department of Anatomy and Pathology

**Location**: Kansas City Campus

**Abstract**

Introduction: Hypertrophic obstructive cardiomyopathy (HOCM) describes a pathologic state in which the subaortic region of the interventricular septum undergoes significant hypertrophy and fibrosis with resultant septal bowing into the left ventricle. On gross examination of a heart affected by HOCM, the septal wall is typically found to be three times thicker than that of the left ventricular free wall (Kumar et al.). The most common disease variants are due to autosomal dominant mutations in sarcomere proteins, which are responsible for myocardial contraction. The altered cardiac function and reduced left ventricular chamber size impair diastolic filling, stroke volume, and cardiac output. While patients are often asymptomatic, the most serious complication is sudden death due to arrhythmia (Stroumpoulis et al.).
Case: We report a case of HOCM in a 36-year-old male cadaver with cause of death listed as left middle cerebral artery stroke and hypoxic respiratory failure. This donor's heart was found to be larger than average, weighing 510.1 g. In addition to heart weight, the following five parameters were measured and compared to normal values: transverse size, longitudinal size, left ventricular wall thickness, right ventricular wall thickness, and interventricular septal thickness. Cardiac tissue samples were sent for histologic analysis to confirm the diagnosis. On examination, an implantable cardioverter defibrillator and two mechanical bi-leaflet valves were discovered.
Discussion: This donor's heart is 52% heavier than the predicted value of 335.6 g for a male of similar build (Vanhaebost et al.). Regardless of weight and stature, cardiomegaly is defined as a heart weight greater than 500 g in males (Basso et al.). By both standards, this donor's heart is larger than average, suggesting abnormal cardiac pathology. Additionally, interventricular septal thickness was found to be approximately 50% thicker in the donor's heart compared to unaffected cardiac tissue (Kitzman et al.).
Conclusion: This case report provides an overview of the gross and pathologic cardiac findings associated with HOCM. To our knowledge, this is the first case report evaluating HOCM in a cadaver donated for medical education.

**Abstract ID:** 124 **Research Category:** Clinical Science

**Title**: Anterior cruciate ligament surgery vs conservative treatment - a literature review

**Presenting Author**: Idrees Siddiqui and Trent Koehler

**Presenting author affiliation**: Idrees Siddiqui - Kansas City University COM and Trenton Koehler - Kansas City University COM

**Co-Authors and Affiliation**: Jessie Gerczynski - Kansas City University COM
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Dr. Kevin Treffer - DO, FACOFP, Chair of Osteopathic Manipulative Medicine/Associate Professor - Kansas City

**Location**: Kansas City Campus

**Abstract**

Anterior cruciate ligament (ACL) tears is a common knee injury. Despite the frequency of this injury, there are still questions when it comes to their treatment. While some research supports surgery, other research provides conservative treatment as an alternative with fewer long term effects. In order to study this problem, we gathered 30 articles that discussed the two differing approaches. We reviewed the literature and synthesized the results of the studies in order to view what the collective research supports. We found that the return to sports largely impacted recovery, however the majority of studies showed that when the patients were deciding to return to sports, the treatment modality was not a significant factor in their decision (surgery vs conservative). Younger patients were more likely to return to sports then older patients, and experienced more pathological knee laxity and instability when conservative treatments were chosen. Ultimately the research favored ACL reconstruction in younger patients, particularly those who are skeletally immature. Excluding patients returning to sports after intervention, results showed no significant difference in outcomes between the two approaches except one benefit that conservative treatment offered. Conservatively treated patients scored higher on joint position sense tests, indicating an advantage in mechanical proprioception. We conclude that a patient-centered approach is best for management of ACL tears due to the situational benefits of surgical and conservative approaches.

**Abstract ID:** 125 **Research Category:** Clinical Science

**Title**: Dose response of oxybutynin in a pediatric cohort with neurogenic bladder

**Presenting Author**: Katherine Wu

**Presenting author affiliation**: Kansas City University College of Osteopathic Medicine

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Jack Campbell – University of Missouri Columbia School of Medicine
Joel F. Koenig – Children's Mercy Hospital

**Location**: Kansas City Campus

**Abstract**

Introduction

Neurogenic bladder, ranging from detrusor areflexia to overactivity, remains a significant source of morbidity for children born with spinal pathology despite modern-day advances. Without adequate and early intervention, high intravesical pressures during bladder storage and high detrusor pressure during voiding will lead to dangerous renal consequences. Oxybutynin is currently the mainstay of pharmacological treatment for neurogenic bladder despite its variable bioavailability. It has poor oral absorption (1.6-1.9%) with an extensive first pass effect, numerous potential drug-drug interactions, and unpredictable responses in children. We aimed to characterize the use of oxybutynin and its dose response in a modern cohort of pediatric patients with neurogenic bladder secondary to spinal pathology.

Methods

We collected retrospective data from pediatric patients treated in a multidisciplinary, spinal differences clinic at Children's Mercy Hospital. Descriptive statistics were employed to characterize the patient cohort along with oxybutynin dosing, drug interactions, and urodynamic parameters. We used a linear regression model to determine the degree to which age influenced dose variability.

Results

A total of 41 patients (20 female) with a median age of 2.3 years were included in this study. The interquartile range of oral oxybutynin dosing was relatively wide at 0.25-0.54 mg/kg/day with a mean dosage of 0.312 mg/kg per day. There was a negative correlation between dosage and change in leak point pressure (LPP) with a greater percentage of patients having supratherapeutic dosages (> 0.4 mg/kg/day) of oxybutynin. Among patients with effective therapeutic responses of LPP < 40 cm $H_2O$, there appeared to be no correlation between dosage and change in LPP.

Conclusions

We identified wide dosing variability for oxybutynin in a pediatric population with neurogenic bladder. The wide variability demonstrates the intersubject heterogeneity in the dosing necessary to achieve therapeutic levels for desired clinical outcomes. Given oxybutynin's significant side effect profile and patient idiosyncrasies in dosing tolerability, more studies are warranted to understand oxybutynin's variability among different ages and metabolic profiles. More precise pharmacokinetic data on oxybutynin, including comparison to newer agents such as mirabegron, will ultimately guide personalized, and potentially genome-based dosing to optimize management of neurogenic bladder.

**Abstract ID:** 126 **Research Category:** Clinical Science

**Title**: The area of the left atrium as a predictor for the anatomy involved in cardiac device treatments

**Presenting Author**: Klea Agollari

**Presenting author affiliation**: Kansas City University

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**Location**: Kansas City Campus

**Abstract**

If the cross section area of the left atrium (LA) can be used as a predictor for the size of the coronary sinus (CS) as well as the left atrial auricular os (LAAO) it would aid in two commonly performed cardiac device procedures. Using the LA as a predictor to the CS could help surgeons estimate the size of the CS and determine if a patient is suitable for implantation. Devices called 'left atrial appendage closure devices' (LAACD) are designed to prevent stroke in patients with persistent atrial fibrillation (AF), which are deployed over the LAAO, where thrombotic emboli frequently develop. Using the LA as a predictor, clinicians could determine the appropriate sized LAACD preoperatively, which could alleviate the need further intervention, given the increase in the size of the LA over time due to AF.

**Abstract ID:** 127 **Research Category:** Clinical Science

**Title**: Effects of OMM on carpal tunnel syndrome, a literature review

**Presenting Author**: Aaditya Patel and Ali Elhenawy

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Matthew Sterling - Kansas City University
Tyler Perleberg - Kansas City University
Kevin Treffer, DO - Kansas City University

**Location**: Kansas City Campus

**Abstract**

Carpal tunnel syndrome (CTS) is the result of median nerve compression inside the carpal tunnel by the transverse carpal ligament of the wrist. Affecting 3% to 5% of the general population, CTS is one of the most common peripheral nerve entrapment syndromes. It is also a leading cause of short-term work disability and time taken away from work. Surgery is an option, but a plethora of non-invasive options also exist, such as osteopathic manipulative medicine. There are many benefits of osteopathic manipulative treatment (OMT) on CTS, and many studies have been conducted that measure OMT effects on CTS. We gathered 30 academic articles that measured CTS before and after OMT. Results were compiled in order for us to show conclusions pervasive in the literature and provide a single article that covered many types of OMT and their clinical impact. We found that OMT has benefits similar to NSAIDS when treating the pain aspect of CTS and in some ways can even outperform traditional over-the-counter medications. This makes it a great alternative for patients who do not tolerate NSAIDS well. Soft tissue, counterstrain and muscle energy techniques in particular provided significant benefits to patient symptoms. When OMT was compared to infrared laser and ultrasound therapy, it was just as effective or slightly more effective, further emphasizing the viability of OMT for CTS. These treatments however did not prevent progression of the disease and patients with more severe CTS may need to consider other options. We concluded that there is enough literature supporting OMT for carpal tunnel syndrome to encourage a paradigm shift toward the usage of this modality.

**Abstract ID:** 132 **Research Category:** Clinical Science

**Title**: Differentiation of Neurocognitive Functional Dysfunction in the Context of Opioid Use Disorder Attributable to Suboxone Use versus Post-COVID Syndrome

**Presenting Author**: Ozge Ceren Amuk Williams

**Presenting author affiliation**: Ozark Center

**Co-Authors and Affiliation**: Nauman Ashraf, M.D- Ozark Center
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Rebecca Sanders, M.D. - Freeman Health Hospital

**Location**: Joplin Campus

**Abstract**

Background: There is often diagnostic uncertainty in the differentiation of cognitive decline in the context of opioid use disorder attributable to suboxone use versus post-COVID syndrome. There is a gap in the literature identifying risk factors and outcomes of neurocognitive symptoms.
Objectives: To understand the clinical correlations and differentiating factors between suboxone use and post-COVID syndrome in patients with neurocognitive functional decline.
Methods: We conducted a cross-sectional study at Ozark Medical Center including a total of 42 participants between 18 - 65 years old who are admitted to the suboxone outpatient unit at Ozark Medical Center. Data was collected through a survey consisting of eight questions related to suboxone treatment, brain fogging, COVID-19, comorbid medical conditions, co-morbid psychiatric conditions, and medication. SPSS version 28 was used for data analysis. Mean and standard deviation was reported as a measure of central tendency and measure of dispersion, respectively. Fisher's exact test was applied to find the association between variables.
Results: 73.8% of participants used suboxone from the last 3 to 5 years, while 16.7% used Suboxone from 6 months to 2 years. 69.0% of the participants used 2–8 mg of suboxone three times daily. 4.8% of the participants noticed brain fog symptoms after initiating suboxone treatment. There was a significant association between brain fog during COVID-19 diagnosis and opioid addiction treatment other than Suboxone, while there was no significant association between brain fog during COVID-19 and Suboxone treatment duration or comorbid medical and psychiatric conditions.
Discussion: Our study results could guide behavioral health professionals by providing a better understanding of the causality and diagnostic differential of neurocognitive functional decline in patients treated with suboxone who had a COVID infection.
Conclusion: Differentiating clinical predictors associated with diagnostic uncertainty of neurocognitive functional decline symptoms in patients could promote early awareness of risk factors and symptoms of this phenomenon with subsequent development of intervention programs, educate clinicians, and raise awareness.

**Abstract ID:** 136 **Research Category:** Basic Science

**Title**: Expression and Activation of Pregnane X Receptor (PXR) in Human Breast Cancer

**Presenting Author**: Gauri Patel

**Presenting author affiliation**: Kansas City University-Joplin, College of Medicine OMS II

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**Location**: Joplin Campus

**Abstract**

Breast cancer is the second most common type of cancer diagnosed worldwide and is also the second leading cause of cancer-related deaths among women overall. While much progress has been made in the diagnosis and treatment of breast cancer, traditional chemotherapeutic treatments can lead to the development of chemotherapeutic resistance and remains a major challenge in overall patient outcomes. The activation of the Pregnane X Receptor (PXR) by numerous endo- and xenobiotics, including several chemotherapeutic drugs, is known to regulate many of the metabolic pathways associated with drug metabolism and resistance. Our long-term goal is to understand the transcriptional and metabolic targets of PXR in human breast cancers, and to apply this knowledge in their treatment to improve patient outcomes. Our hypothesis, which is formulated on PXR's known roles in drug metabolism in healthy and pathogenic tissues, is that PXR activation increases xenobiotic metabolism via the induction of Phase I and II enzymes, as well as Phase III transporters, in addition to alterations in the cell cycle and apoptosis in breast cancer. We have developed multiple constructs for the expression of human Pregnane X Receptor (hPXR) in-vitro in human breast cancer cell lines. Following the transfection of each construct, we have verified the expression of exogenous hPXR mRNA, as well as PXR protein. Functional analysis of the exogenous hPXR was demonstrated through qRT-PCR of known hPXR target genes following PXR activation with rifampicin. The next phase will include: 1) studying the transcriptome of human breast cancer cells following exogenous hPXR activation in both transfected and non-transfected human breast cancer cell lines using RNA-Seq and 2) determining the effects of hPXR expression and activation in human breast cancer subtypes on cell cycle progression, cell viability, apoptosis, cell motility, and tumor invasiveness. At the successful completion of this project, we expect to gain new insights into the function of the Pregnane X Receptor within in-vitro human breast cancer cell lines, and to have identified novel gene expression changes associated with its role(s) in acquired chemoresistance and cell cycle changes.

**Abstract ID:** 138 **Research Category:** Basic Science

**Title**: Investigation into a novel treatment of iron overloading

**Presenting Author**: Abygayle Hampton

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Leandra Collier
Idialu Abhulimen
Christian Bernard Alarcon
Samiha Mohammed
Megan Unrath

**Location**: Kansas City Campus

**Abstract**

Hereditary Hemochromatosis (HH) is an autosomal recessive disorder arising from a C282Y mutation the HFE (Hereditary Iron) protein. HH results in uncontrolled absorption of dietary iron leading to iron overloading with severe morbidity and mortality, including failure of heart, pancreas, and liver with symptom onset in the fifth decade of life. Juvenile Hemochromatosis (JH) affects a related protein, the Hemojuvelin protein, with iron overloading occurring at a much earlier stage in the life course. Current treatments for HH include iron chelating medications and phlebotomy; however, treatment for JH patients consists solely of phlebotomy. Lack of patient compliance for all hemochromatosis patients with iron chelating medications or maintenance phlebotomy following iron depletion is a serious challenge due medication side effects, medication cost, and the pain associated with phlebotomy. Investigation into a mouse mutant with an iron metabolism defect has provided a possible novel pharmaceutical target for treatment of iron overloading. Flaky skin (fsn) mice are iron deficient due to excessive urinary iron excretion measuring 100x the normal. The fsn mice exhibit mutations in the Ttc7 gene which codes for the TTC7 (tetratricopeptide repeat domain 7) protein. The fsn mutation is due to a viral DNA insertion of a 5.5 kilobase early transposon (ETn) between exons 14 and 15, resulting in an extra in-frame exon of 183 bp in the Ttc7 mRNA. Mice with +/fsn genotype produce 50% normal TTC7 protein and 50% abnormal TTC7 protein which is larger by 61 amino acids. Preliminary studies of heterozygous +/fsn HH model mice also homozygous for an Hfe knockout mutation revealed rescue from iron overloading at 10 weeks of age. Preliminary analysis revealed that male mice had maintained decrease in iron overload at 15 weeks. This project investigates whether HH model mice with the genotype +/fsn, Hfe -/- are rescued from iron overloading at 15 and 26 weeks of age as well as if JH model mice with the genotype at +/fsn, Hjv -/- are rescued at the younger age of 7 weeks.

**Abstract ID:** 140 **Research Category:** Case Reports

**Title**: Rare type of hernia associated with high mortality in parkinson patient

**Presenting Author**: Sophia Vozza

**Presenting author affiliation**: Kasnas City University

**Co-Authors and Affiliation**: Harris Leach- KCU
Alexander Elortegui- KCU
Katie Jaffe- KCU

**Location**: Joplin Campus

**Abstract**

Obturator hernias are among the rarest types of hernias, yet they are associated with the highest mortality among all abdominal wall hernias. The high mortality rate can be partially explained by the nonspecific symptoms and physical exam findings. Obtaining an adequate history can often be complicated in elderly patients with medical history of neurocognitive disorders. We present the case of a 94 year old female patient with a past medical history of Parkinson's who presented for abdominal and thigh pain to demonstrate the utility of considering rare types of hernias as the cause of acute, nonspecific abdominal pain with uncommon radiation patterns. These symptoms should especially be considered in emaciated, elderly female patients with concurrent neurocognitive disorders given the high mortality rates.

**Abstract ID:** 141 **Research Category:** Case Reports

**Title**: Diagnostic challenges in determining etiology of secondary spontaneous pneumothorax

**Presenting Author**: Sophia Vozza

**Presenting author affiliation**: KCU

**Co-Authors and Affiliation**: Alexander Elortegui, KCU

**Location**: Joplin Campus

**Abstract**

Secondary spontaneous pneumothorax (SSP) is a spontaneous, atraumatic pneumothorax occurring due to underlying lung disease. SSP is most commonly due to chronic obstructive pulmonary disease (COPD), Tuberculosis (TB), and Cystic Fibrosis (CF). Primary tumors and metastatic disease with tumor necrosis are also suspected etiologies of SSP. Tumors, primary or metastatic, pose treatment challenges as well as risk recurrence of SPP. We present a 59 year old female with PMH of renal cell carcinoma (RCC) metastatic to lungs and bone who presented for one month of progressive shortness of breath after starting Cabometyx, a tyrosine kinase inhibitor (TKI). The case demonstrates the diagnostic challenges in determining the etiology and treatment of SPP to prevent recurrence on superimposed RCC lung metastasis.

**Abstract ID:** 143 **Research Category:** Health Service Psychology

**Title**: Social skills and academic performance in high schoolers with ADHD: a strength based approach

**Presenting Author**: Colin McLaughlin

**Presenting author affiliation**: KCU PsyD Program

**Co-Authors and Affiliation**:

**Location**: Kansas City Campus

**Abstract**

Children diagnosed with the neuropsychological disorder ADHD have been found to have worse functional outcomes in a number of areas, especially in regard to academic performance (Arnold et al., 2020). A study from Arnold et al. (2020) found that individuals with ADHD showed the most improvements in academic functioning when treated with a multimodal approach (both pharmacological and behavioral therapy) as opposed to just pharmacological or behavior therapy. However, there is little research regarding what specific behavioral interventions are most effective for improving academic performance in children with ADHD (Martin & Burns, 2014; Arnold et al., 2020). While medication may assist in sustained attention, many children with ADHD may still suffer from an already established cycle of difficulty with regulating tasks, behavior, thought, etc. that has affected their self-concept regarding academic achievement, relationships with teachers, and ultimately their academic resiliency (Martin & Burns, 2014). Work from Hai & Clime (2022) found that children diagnosed with ADHD who perceived they had higher social skills also showed higher scores on self-report measures for self-efficacy, self-concept, and resilience. In theory, if individuals with better perceived social skills are observed to have a more positive self-concept, this improved self-concept will likely boost academic resiliency and mitigate some of the academic adversity that individuals with ADHD often face. If this relationship were to be established, it would suggest implications regarding social skills training as a viable strength based behavioral intervention for children with ADHD. The proposed study will examine this relationship by surveying high school students with ADHD and comparing self-reported measures of social skills, self-efficacy, and quality of teacher relationship to self-reported GPA. It is hypothesized that Individuals with ADHD who report higher perceived social skills will report better academic performance, operationalized by GPA and that this relationship will be mediated by self-efficacy and teacher relations.

**Abstract ID:** 147 **Research Category:** Case Reports

**Title**: Management of a complex heterogeneous uterine mass as an incidental abdominal computed tomography finding: a case report

**Presenting Author**: Kathryn Messelt

**Presenting author affiliation**: KCU

**Co-Authors and Affiliation**:

**Location**: Joplin Campus

**Abstract**

We report the case of a twenty-year-old female who presented to the emergency department with right anterolateral rib pain, nausea, unintentional weight loss of twenty pounds over several months, and an elevated white blood count who was treated for cavitary lesion of the right upper lobe and right lower lung abscess. An incidental heterogeneous pelvic mass was identified on computed tomography of the abdomen and further workup demonstrated a mass originating from the left uterine body and fundus that appeared to arise from the myometrium. The overall appearance of the mass was concerning for leiomyoma vs leiomyosarcoma.

**Abstract ID:** 148 **Research Category:** Basic Science

**Title**: Non-transformed breast epithelial cells show neural-like gene signature after lipid exposure

**Presenting Author**: Gannon Cottone

**Presenting author affiliation**: Kansas City University - College of Medicine

**Co-Authors and Affiliation**: Mariana Bustamente Eduardo - Surgery, Breast Surgery Division; Feinberg School of Medicine
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Susan Clare - Surgery, Breast Surgery Division; Feinberg School of Medicine

**Location**: Kansas City Campus

**Abstract**

Introduction. Identifying risk and developing targeted treatment for estrogen receptor negative breast cancer (ER-BC) is a significantly unmet clinical need. We have identified and a lipid metabolism gene signature associated with ER-BC (PMID: 2826339). Exposure of non-transformed breast epithelial cells (NTBEC) to lipids in vitro produces profound changes in gene expression and histone post-translational modifications. We hypothesize that lipid exposure imparts a survival advantage of stem-like cells fostering epigenetic changes that lead to a neural-like transcription signature that underlies malignant transformation.

Methods: MCF-10A cells were exposed to vehicle or octanoic acid (OA) for 24 hours. OA responsive genes were identified using bulk RNA-seq and cell-lineage was deconvoluted using Bisque. Unsupervised clustering (Seurat/v3.4.1) of single-cell RNA-seq (scRNA-seq) from 14 human reduction mammoplasties (RM) (PMID: 34031589) was performed using cell-type markers (PMID: 34031589). The most significant OA upregulated neural/neuronal genes were plotted on resulting clusters using FeaturePlot to determine their presence in normal breast epithelium. The plots were then filtered and re-clustered to look at basal-luminal cell types only. Lastly, a resource for snATAC-seq data from various stages of mouse mammary development was utilized (PMID 31597106).

Results: Deconvolution revealed a transition to a pericyte transcription program following OA exposure. Nerve growth factor (NGF) was expressed in pericytes while nerve growth factor receptor (NGFR) was found within basal cells. Schwann cell precursor (SCP) markers, S100B and FOXD3, upregulated upon OA, were not observed in human breast but were observed in mouse fetal mammary stem cells. CDH19, SCP specific, is expressed in stroma following murine birth. SCP markers ERBB3 & SOX10 had low expression in luminal progenitor cells and ERBB3 was also found in mature luminal cells. Neuronal markers PPP1R1C, DIO3, & MOXD1, were minimally expressed. PRRX1, a neural-mesenchyme marker upregulated in OA is found primarily in fibroblast and pericyte lineages.

Conclusions: Treatment of NTBEC with OA shows significant upregulation of multiple neural crest genes as well as markers of a neural-mesenchymal cell lineage. scRNA-seq from RM patients reveals that many of these same markers are either found in non-epithelial cell clusters or are found with low expression in luminal mammary lineages (progenitors and mature).

**Abstract ID:** 153 **Research Category:** Basic Science

**Title**: Altered PTEN levels induces inappropriate mRNA expression in cardiomyocytes

**Presenting Author**: Ekenediri Obi, Alex Hiesberger

**Presenting author affiliation**: Dr. Doug Bittel, Dr. Nataliya Kibiryeva

**Co-Authors and Affiliation**:

**Location**: Kansas City Campus

**Abstract**

Foundational heart development relies on regulation of cardiomyocyte differentiation. Phosphatase and tensin homolog (PTEN), an important tumor suppressor and metabolic regulator, also plays significant roles during embryonic cardiomyocyte differentiation. However, many of PTEN's roles in cardiomyocyte differentiation are still unresolved. Particularly, noncanonical regulatory mechanisms, such as alternative splicing, have not been investigated. In this study, we analyzed the effects of PTEN knockout (KO) on alternatively spliced mRNA isoforms in the context of cell differentiation into cardiomyocytes. Using mouse embryonic stem cells (ESCs), Wang et al. have demonstrated that PTEN ablation leads to decreased inhibition of DNA-methyltransferase-3 (Dnmt3), a potent enhancer of non-CG methylation. While it has been shown that PTEN regulates DNA methylation and thus indirectly regulates gene expression, PTEN's more specific effects on how these methylation changes affect alternatively spliced isoforms are largely unexplored. Our analysis of high-throughput sequencing of PTEN KOs has revealed disparities in isoform expression when compared to wild-type PTEN samples. Further analysis showed significant isoform switching of genes known to be important for heart development. As an example, isoforms of Tropomyosin-1 (Tpm1), a gene implicated in multiple cardiomyopathies, demonstrated significant shifts in expression patterns. Specifically, Tpm1-206 was highly expressed after PTEN KO relative to wild-type, while Tpm1-219 was not expressed at all. Similar patterns were observed within Sorbs2 isoforms, a gene highly expressed in cardiac tissue, and within Mid1 isoforms, a key factor in pathways involving cell growth and metabolism. Ultimately, our data suggests that altered PTEN expression induces the inappropriate processing of mRNA, an idea that is novel to PTEN's traditional role as a tumor suppressor in multiple cellular growth pathways. Additional research is needed to establish the clinical importance of altered PTEN levels with respect to gene isoform variation.

**Abstract ID:** 154 **Research Category:** Medical Education

**Title**: Publication trends of orthopedic surgery residency graduates specific to former American Osteopathic Association programs

**Presenting Author**: Grace Thiel

**Presenting author affiliation**: College of Osteopathic Medicine, Kansas City University, Kansas City, Missouri, USA

**Co-Authors and Affiliation**: Troy B Puga (1), Morgan McBride (1), Charles Marchese (1), Jessica Gerczynski (1), and Jennifer F Dennis (2)

1. College of Osteopathic Medicine, Kansas City University, Kansas City, Missouri, USA
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**Location**: Kansas City Campus

**Abstract**

Introduction: In undergraduate medical education, research can be a way to distinguish oneself from a pool of applicants in the residency match process. In addition, it may be strongly recommended or required for several residency programs. Orthopedic surgery residency programs heavily emphasize research output, including poster and/or oral presentations or publication in a peer-reviewed journal. While it is a common component of an orthopedic surgeon's pathway into practice, it is also a known element for residents to successfully complete allopathic residency programs. To evaluate the number of research publications specific to former American Osteopathic Association (AOA) orthopedic surgery residency program participants, a study was conducted to assess research outputs in relation to a future in academic medicine.

Methods: Former AOA orthopedic surgery residency programs with a graduating class from 2014-2016 were evaluated. Doximity and AOA residency program websites were reviewed to identify graduates. Program coordinators were contacted to determine missing or incomplete information (KCU IRB # 1973346-1); no response resulted in exclusion. The number of publications specific to each graduate was searched using Scopus, PubMed, and Google Scholar. Publications from pre-residency, residency, and post-residency (including fellowship, when applicable) timeframes were determined, as were journal name and the order of authorship. An independent sample test was used to 1) compare the mean publications of those whom pursued a career in academic medicine or entered private practice, and 2) assess publication outputs between those whom pursued fellowship training and those whom did not.

Results: 135 residents were included in the study, with a total research publication output of 359 manuscripts. The average number of publications per resident entering academic practice was higher (8.06) and found to be statistically significant as compared to those entering private practice (1.98) ($t=-3.44$, $p<0.001$). However, there was no significant difference in publication numbers of residents whom did or did not complete a fellowship ($t=1.13$, $p=0.13$).

Discussion: Conducting research is beneficial for students planning to apply to orthopedic surgery, especially for those who want to practice in an academic setting in the future.

**Abstract ID:** 155 **Research Category:** Medical Education

**Title**: Ultrasound-Assisted Bony Landmark Palpation in Untrained Palpators

**Presenting Author**: Vishnu Basude

**Presenting author affiliation**: KCU

**Co-Authors and Affiliation**: Jared Nichols - KCU, Dipika Raghuraman - KCU

**Location**: Joplin Campus

**Abstract**

Context: Medical students with no prior experience may find it difficult to identify and palpate bony landmarks while learning physical examination skills. Ultrasound (US) is an emerging modality in clinical settings; however, it is not yet commonly taught in medical school curriculum.

Objective: To identify whether using US-assistance in teaching palpation of specific thoracic vertebral bony landmarks would improve palpation accuracy in first-year medical students with no prior palpatory experience.

Methods: First year medical students were given video instructions to palpate and identify a thoracic vertebral transverse process and to mark it with invisible ink. The participants were then taught and instructed to use US to identify the same landmark and mark it with a different color. The accuracy of palpation was measured with digital calipers.

Results: Test of the overall hypothesis that participants will show improved accuracy using ultrasound compared with hand palpation was not significant ($F=0.76$, $p>.05$). When separating students into groups according to patient BMI, however, there was a trend toward significance ($F=2.90$, $p=.071$) for an interaction effect between patient BMI and the repeated measures variable of palpation/ultrasound. When looking specifically at only those participants working with a normal BMI patient, there was a significant improvement in their accuracy with the use of ultrasound ($F=7.92$, $p=.017$).

Conclusion: The analysis found increased accuracy in bony landmark identification in untrained palpators utilizing ultrasound vs. palpation alone in a normal BMI model, but not in obese or overweight BMI models. This study shows promise to the value ultrasound may have in medical education, especially with respect to early palpation training and landmark identification.

**Abstract ID:** 156 **Research Category:** Medical Education

**Title**: Medical students participate in Clinical Anatomy Fellowship: Is there benefit?

**Presenting Author**: Celeste Murtha and Grace Thiel

**Presenting author affiliation**: College of Osteopathic Medicine, Kansas City University, Kansas City, Missouri, USA

**Co-Authors and Affiliation**: Jennifer F Dennis PhD, and Mari Hopper MS, PhD
all parties have the same affiliation

**Location**: Kansas City Campus

**Abstract**

Introduction: Kansas City University (KCU) offers a Clinical Anatomy Fellowship that enrolls nine medical students during each academic year with the intent of providing robust training in research, teaching, and advanced anatomical topics. The Fellows work closely with Anatomy Faculty and first-year medical students, providing dissection instruction. They are also enrolled in several courses and are expected to produce research during their tenure. To investigate the advantages of participating in the program, a study was designed to explore student motivation for pursuing the opportunity and the program's impact on residency applications and early career success.

Materials and Methods: Three surveys (IRB #1996817) were developed for distribution via Qualtrics. Survey #1, distributed to current and past Fellows who have not yet graduated from the university (n=19), collected data about motivations for pursuing the fellowship. Survey #2, distributed to Fellows who have graduated from the university (n=42), gathered data about how the fellowship impacted their residency application process and post-graduate medical career. Survey #3, distributed to students in the Classes of 2024 and 2025 (n=850), gathered information about factors that influence students' decision to apply to the fellowship. Percentage distribution was reported for multiple choice questions. Open-ended responses were coded by a team of two researchers (CM/GT). Descriptive codes were applied to the data to summarize responses (Saldaña, 2016).
Results: Early evaluation of an ongoing analysis reveals that students commonly pursue the fellowship to gain research and teaching experience, indicating that they feel this opportunity will distinguish them during the residency application process. Past fellows report that the program had a positive impact on their careers, with the majority reporting they would do the fellowship again.
Discussion: There is a dearth of literature exploring the impact of medical school anatomy fellowships on student residency prospects and career success. These results bring awareness to the benefit of medical school fellowship opportunities, particularly in anatomy. This study is well-positioned to fill a gap in medical education research.
Conclusion: The Clinical Anatomy Fellowship benefits Fellows, signaling other medical institutions to consider adopting a similar program.

**Abstract ID:** 158 **Research Category:** Basic Science

**Title**: Anatomical variations in the branching of the aortic arch: a cadaveric study

**Presenting Author**: Miles A. Turk

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Keanna Theobalt- Kansas City University
George Kalu- Kansas City University
Robert Hillard- Kansas City University

**Location**: Joplin Campus

**Abstract**

Background: The aortic arch (AA) traditionally has three major vessel branches, the brachiocephalic trunk (BCT), the left common carotid artery (LCCA), and the left subclavian artery (LSA). However, several variations have been reported, including a common trunk for the BCT-LCCA, direct branching of the left vertebral artery, and an aberrant right subclavian artery. Assessing the prevalence and comparing types of AA variations with detailed mapping of vessel orientation would add to the literature and solidify practical knowledge for surgery applications, radiologic-directed interventions, and prosthetic development.

Methods: Traditional dissection of forty-eight formalin-embalmed cadavers' thoracic cavities exposed the thoracic aorta, including the ascending aorta and arch. On examination, the aortic arch vessel patterns were recorded as either traditional three-vessel branching or specific anatomic branching variation. Three-vessel arches were further sub-classified as type I, II, or III. To understand orientation, each arch was measured from photos using Image-J software for vessel diameter, angle of branching, and distance between branches. Physical measurement with tape for torsion was also performed.

Results: The prevalence of both traditional and variation arch patterns was calculated. Furthermore, a heatmap was produced to highlight features more common to each branching pattern, utilizing the data from the vessel location and angle off the aorta. 60% of the AAs examined in the study showed a traditional three-vessel branching pattern. The most common variation identified was a common origin of the BCT-LCCA which represented 36% of cases – this result was reflective of its known prevalence. Four AAs had a direct branch of the left vertebral artery proximal to the LSA, with three having a common origin of BCT-LCCA. A single arch with an aberrant right subclavian artery was also identified.

Conclusion: The percentage of traditional and bovine arch variations of the aorta observed helps to further confirm their accepted range, consistent with previous findings. While the variations discussed in this study have been seen before, information regarding the orientation and characteristics of the major vessels for each classification is lacking. The heatmap produced elucidates more specific common features of aortic vessel variations that may be encountered by practicing clinicians.

**Abstract ID:** 159 **Research Category:** Basic Science

**Title**: Novel Treatment for Iron Overloading in Juvenile Hemochromatosis

**Presenting Author**: Idialu Abhulimen

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Amber Wiggins-McDaniel- Kansas City University
Robert White- Kansas City University

**Location**: Kansas City Campus

**Abstract**

Adult Hereditary Hemochromatosis (HH) is a disease that causes uncontrollable iron absorption. This results in excess iron in vital organs which leads to numerous pathologies including diabetes, liver cirrhosis and cardiomyopathy. The current treatments for HH are the use of iron chelating drugs and phlebotomy. Alternatively, Juvenile Hemochromatosis (JH) occurs in children and is more severe than adult hemochromatosis due to the fact iron overloading occurs much earlier in life and develops at a faster rate. The sole treatment available for patients with JH is phlebotomy and compliance is a challenge due to the painful nature of this type of treatment. As an alternative, a novel treatment of JH may be uncovered by studying an iron deficient mouse mutant with an autosomal recessive mutation. These mice excrete 100 times more iron in the urine than normal mice in a 24-hour period due to a mutated protein called TTC7 (Tetratricopeptide repeat domain 7). This protein is found in the kidneys and we hypothesize that the production of an abnormal TTC7 protein leads to substantial urinary iron excretion, thus possibly could decrease the amount of iron overload in JH model mice. This abnormal TTC7 protein is observed in the fsn (flaky skin) mouse mutant. The mouse mutation of the Ttc7 gene (20 exons) is caused by the insertion of a 5.5 kilobase early transposon viral DNA into the gene at a position upstream of exon 15, which adds an extra exon in-frame resulting in a larger abnormal protein. Knockout mice of the hemojuvelin gene (Hjv) exhibit JH and are significantly iron overloaded at seven weeks of age. We are studying mice with the genotype +/fsn, Hjv-/- (Juvenile Hemochromatosis heterozygous for +/fsn) vs Hjv -/- mice to see if iron overloading can be prevented at seven weeks of age. Four groups of mice, both male and female, with and without the Hjv KO and +/fsn genotype are being analyzed for tissue iron levels, serum iron levels, hematocrit, hemoglobin and red blood count number.

**Abstract ID:** 160 **Research Category:** Clinical Science

**Title**: Evaluating the Incidence of Hypoglycemia Associated with Insulin Driven Treatment of Hyperkalemia

**Presenting Author**: Tyler Specking

**Presenting author affiliation**: Freeman Health System

**Co-Authors and Affiliation**: Scott Goade - Freeman Health System
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**Location**: Joplin Campus

**Abstract**

Purpose: Inpatient hyperkalemia has been cited to occur in as many as 10% of hospitalized patients nationally. Hyperkalemia may result in cardiac instability and potentially fatal arrhythmia. Following cardiac stabilization, one method for management of hyperkalemia includes the use of insulin. Current American Academy of Family Physicians (AAFP) guidelines suggest the use of 10 units of insulin paired with 25 grams of dextrose. Studies suggest that this dosing regimen places patients at an elevated risk of hypoglycemia. This study's purpose was to assess inpatient insulin use for hyperkalemia and its association with hypoglycemic events.

Methods: This retrospective observational study analyzed electronic medical records (EMR) of patients with hyperkalemia (serum potassium ≥ 5.4 mmol/L) who subsequently received either 5 units or 10 units of insulin regular. Our primary endpoint was incidence of hypoglycemia (serum glucose < 70 mg/dL) within 6 hours of insulin administration. Secondary endpoints include incidence of hypoglycemia among renal insufficiency (CrCl ≤ 50 mL/min), hypoglycemia in patients who received 25 grams of dextrose versus 50 grams of dextrose alongside the insulin, and incidence of severe hypoglycemia (serum glucose < 54 mg/dL). Patients excluded from analysis were those under age 18, diabetic ketoacidosis, pregnancy, dialysis, and receipt of more than one insulin bolus. Our facility's data mining software identified qualifying patients from July 2022 to February 2023.

Results: Of the 242 patients included in the final analysis, 164 received 5 units of insulin and 78 patients received 10 units. Among those who received 5 units, 15 patients (9.1%, 95% CI 4.7 – 13.6) experienced hypoglycemia. In the group who received 10 units, 13 patients (16.7%, 95% CI 8.4 – 24.9) experienced hypoglycemia. Comparison of the two treatment groups utilizing the two sample proportion test yielded a p-value of 0.087.

Conclusion: This study demonstrated an increase in incidence of hypoglycemic events in patients who received 10 units versus 5 units of insulin for the treatment of hyperkalemia. Although there was insufficient evidence to conclude that there is a significant difference between the two populations, the results are consistent with existing literature and offer guidance to help drive prescribing habits at our facility.

**Abstract ID:** 162 **Research Category:** Health Service Psychology

**Title**: The effects of emotional language and granularity on emotion perception, regulation, and well-being

**Presenting Author**: Annalise McCurdy

**Presenting author affiliation**: OMS-II, Kansas City University

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**Location**: Kansas City Campus

**Abstract**

People show incredible variation in emotion language (emotion word) knowledge and the ability to effectively communicate emotional feelings. This individual difference is termed emotional granularity (EG). High EG is positively correlated with a wide range of well-being outcomes and is associated with better judgment of other's emotion, known as emotion perception. What is less known, however, is whether a person's emotion word knowledge mediates EG to these outcomes. These studies proposed herein assessed this relationship. Thirty-eight KCU students and employees completed assessments of their emotional vocabulary (e.g., ability to correctly define highly granular emotion words) as well as basic (non-emotion) vocabulary. To assess EG, participants completed two validated survey measures. To assess emotion perception, participants completed computerized trials in which they viewed ambiguous emotion faces and were asked whether two faces (separated in time) matched. Finally, participants also completed two validated surveys of emotion regulation, a survey of emotional dysregulation, a survey of mood, and a survey of emotional intelligence. We performed a boot-strapped (n = 500 ML estimator) mediation analysis with emotion vocabulary accuracy as the predictor (controlling for control word accuracy as a background confounder) and both measures of EG as mediators. The surveys of emotion regulation, dysregulation, mood, emotional intelligence, and emotion perception behavior (reaction time and accuracy) were the outcomes. Both measures of the EG were significantly correlated, but only one measure was a significant mediator. Specifically, EG (as measured by alexithymia scale) was a significant mediator on emotion dysregulation, emotional intelligence, and mood, all in the predicted direction. There were no direct or indirect effects on the other surveys. These effects were largely confirmed with follow-up t-tests on each dependent variable using a median split to create a "high" emotion word accuracy group and a "low" emotion word accuracy group. Emotion word accuracy had a direct effect on emotion perception task accuracy, but in the reverse direction from predicted: Participants who had lower emotion word accuracies performed significantly better on the emotion perception task. Additional analyses, however, showed that these participants performed the task more slowly, which may have resulted in an accuracy-speed tradeoff.

**Abstract ID:** 164 **Research Category:** Clinical Science

**Title**: Exploration of the Tensor of the Vastus Intermedius in Cadavers

**Presenting Author**: George Kalu

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Melissa Zolnierz, PhD - Kansas City University
Miles Turk, MS - Kansas City University
Keanna Theobalt, MS - Kansas City University

**Location**: Joplin Campus

**Abstract**

Introduction: The quadriceps femoris (QF) is an anterior thigh muscle group traditionally defined as four muscles: rectus femoris, vastus lateralis, vastus intermedius, and vastus medialis. However, a fifth muscle called the tensor of the vastus intermedius (TVI) has been identified in some individuals. The TVI, a possible stabilizer of the knee, is much smaller than the other four QF muscles and exhibits morphological variation. Understanding these morphologies has implications for knee surgeries and physical therapy.

Methods: The anterior thighs of 48 formalin-embalmed cadavers were bluntly dissected from the lower thigh to the origins of the QF muscle group. When a TVI was identified, measurements of the muscle's length, width, and thickness were taken, and it was classified by its origin, insertion, and shape into different morphological categories. In addition, its neurovascular supply was identified and traced to origin points to determine where the supply was derived.

Results: Five distinct TVI morphologies based on origins were identified in 30 of the 48 cadavers studied (62.5%) with 36 TVIs in total found among the 96 legs (37.5%). Based on previous research defined typology, there were five Type IA TVIs (13.89%), 20 Type IIA TVIs (55.56%), nine Type IIB TVIs (25.00%), one Type IIIA TVI (2.78%), and one Type IIID TVI (2.78%). The TVIs seen were typically unilateral (n=30) with left leg prevalence at 61% (n=22). Most TVIs were fusiform (n=25) and some were unipennate (n=11). The TVIs innervation was via the nerve to vastus lateralis and vascular supply through branches of the lateral circumflex femoral artery.

Discussion: The TVI is a fifth muscle within the QF muscle group. It has multiple morphologies, including variable muscle shape, origin, insertion, and tendon length. This variation may result in a difference in the function or stability provided to the knee and could be crucial to improving our understanding of the QF and approaches to knee surgery and rehabilitation.

**Abstract ID:** 166 **Research Category:** Basic Science

**Title**: CRISPR-targeting of scaRNA1 to investigate epigenetic programming of the spliceosome

**Presenting Author**: Madeleine Brown

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Dr. Nataliya Kibiryeva- Kansas City University
Mr. Michael Filla- Kansas City University
Dr. James E. O'Brien Jr.- Children's Mercy Hospital
Dr. Douglas C. Bittel- Kansas City University

**Location**: Kansas City Campus

**Abstract**

Congenital heart defects (CHDs) affect 1% of babies. A clear genetic cause for CHDs has yet to be identified, but small Cajal body-specific RNAs (scaRNAs) appear to play a role in spliceosome function and regulation of heart development. scaRNAs are small non-coding RNAs that target the RNA subunits of the spliceosome for biochemical modification. Our research team identified 12 scaRNAs that were reduced in the right ventricle of babies with tetralogy of Fallot (TOF, a CHD). We subsequently showed that mRNA splicing was deregulated and furthermore we showed scaRNA played a direct role in the regulation of mRNA alternative splicing. We hypothesize that scaRNAs influence mRNA splicing and are important for heart development. ScaRNA1 is responsible for the pseudouridylation of U89 of the U2 small nuclear RNA and is one of the aforementioned 12 identified scaRNAs. I am using CRISPR-Cas13d and a guide RNA (gRNA) that targets the scaRNA1 transcript for knockdown (KD) in quail QM7 cells to evaluate the efficiency of the vector. I plan to continue the investigation using a quail embryo model to examine the effects of the scaRNA1 knockdown on heart development in vivo. These experiments will contribute to our understanding of a novel epigenetic regulatory mechanism that appears to critical for vertebrate heart development.

**Abstract ID:** 168 **Research Category:** Health Service Psychology

**Title**: Re-examining use of force within the kansas city police department: a comprehensive approach.

**Presenting Author**: Jessica Zamora

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**:

**Location**: Kansas City Campus

**Abstract**

The use of force is a core attribute of police functioning. As such, the use of force has been a key focus of research within police psychology. Previous research has focused on the reasons behind officers resorting to force, including the examination of social and environmental determinants, officer characteristics, organizational factors, neighborhood context, and officer characteristics. However, only certain types of force are documented, and almost no de-escalation tactics, or avoidance of force, behaviors are documented. The purpose of this proposed dissertation is to work in a collaborative partnership with the Kansas City Police Department (KCPD) to identify behavioral themes and risks for increased use of force, determine a comprehensive understanding of interactions with civilians, including de-escalation incidents that had not been previously recorded, and improve documentation within the department. The proposed dissertation will be broken into a three-part process. To start, use of force documentation from the past year (i.e. 187 forms) will be examined using thematic and frequency analyses to determine what specific behavioral themes or catalysts are present, as well as how these themes escalate to the use of force. Secondly, once themes are identified, focus groups with selected officers will be held to determine the accuracy of the forms, gain a further understanding of the types of interactions with civilians, and identify any gaps in documentation. Data from this second portion will be examined through thematic analysis as well. Finally, as a result of collected data, a new, more comprehensive use of force form that accurately collects data of a wider range of force (e.g. weapon, neck-hold, hand contact) and de-escalation strategies (e.g. verbal and physical) will be created.

**Abstract ID:** 169 **Research Category:** Medical Education

**Title**: Osteopathic presence within neurosurgery: An update on current representation and analysis of resident data from 2014 to 2022

**Presenting Author**: Gretchen M. Koller, BS

**Presenting author affiliation**: Kansas City University

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Jennifer M. Strahle, MD - Washington University in St. Louis

**Location**: Kansas City Campus

**Abstract**

Introduction/Background:
Since welcoming its first osteopathic colleague in the late 1940's, the number of osteopathic residents and physicians within the field of neurosurgery, as well as totally, has continued to increase. While this growth is much needed to preserve diversity and encourage future talent to pursue the field, osteopathic students have yet to match into surgical specialties at the same rate as allopathic graduates as evidenced throughout the history of the National Residency Match Program (NRMP).
Objective:
Here we aim to provide a comprehensive update on the current representation of osteopathic graduates practicing and training within the field of neurosurgery.
Methods:
The Association of American Medical Colleges Physician Specialty Data Reports published between 2008 and 2022 were retrospectively queried for total numbers of physicians, neurosurgeons, trainees, neurosurgical trainees, and those of the mentioned with osteopathic designation. With an alpha of 0.05, Fisher's Exact Test and chi-squared analysis were performed to analyze the compiled data set within Microsoft Excel.
Results:
As of 2022, osteopathic attending neurosurgeons accounted for 0.01% of total practicing physicians, 0.15% of practicing DOs, and 2.0% ($p<0.001$) of practicing neurosurgeons – representing a 65.7% increase from the 70 osteopathic neurosurgeons practicing in 2007. Additionally, 1,568 of the 149,353 (1.0%) total residents/fellows training within the United States were participating in neurosurgical residency. Osteopathic graduates represent 25,260 (16.9%) and 56 (3.6%; $p<0.001$) of the total and neurosurgical cohorts, respectively, with the DO neurosurgical trainees accounting for 0.2% of the total osteopathic cohort. These quantities represent a 38.9%, 266.5%, 70.4%, and 2700% increase from the 107,515 total residents/fellows, 6,892 total osteopathic residents/fellows, 920 total neurosurgical residents/fellows, and 2 osteopathic neurosurgical residents/fellows training in 2007, respectively.
Conclusions:
While the number of osteopathic graduates matching into and practicing within neurosurgery is on the rise, overall numbers remain low when compared to those graduating from MD-awarding medical schools. Identification of obstacles DO students face when attempting to obtain a neurosurgical residency position and efforts to mitigate the ongoing disproportionality are warranted.

**Abstract ID:** 172 **Research Category:** Basic Science

**Title**: Transcriptomic Analysis Between Truncus Arteriosis (TA) and Pulmonary Atresia with Intact Ventricular Septum (PA/IVS)

**Presenting Author**: Anh Nguyen

**Presenting author affiliation**: Dr. Doug Bittel, Dr. Natalya Kirbiryeva

**Co-Authors and Affiliation**:

**Location**: Kansas City Campus

**Abstract**

Congenital heart defects (CHDs) account for nearly 1% of infant deaths, and are the most common birth defect in the United States. Though most CHD cases are idiopathic, several lines of evidence suggest a genetic contribution to distortion of regulation of heart development due to alternative splicing of mRNA. There remains a lack of research on the impact of alternative splicing patterns on CHDs. Among the various CHDs that are prevalent in the neonatal population, our focus was on Truncus Arteriosus (TA) and Pulmonary Atresia with Intact Ventricular Septum (PA/IVS). Both conditions have distinct structural defects, but a similar impact on the right ventricle. Our study focused on performing comparative analysis of transcriptomes between TA and PA/IVS utilizing RNA from neonatal right ventricular tissue. Although further investigation is needed, our study is supportive of the importance of alternative splicing of mRNA as an important component of the regulation of embryonic development. This is an under appreciated mechanism that is crucial to our understanding of genomic variations causing cardiac developmental aberrations in neonates.

**Abstract ID:** 175 **Research Category:** Health Service Psychology

**Title**: The Presence and Impact of Bias Within the Psychology Field Toward the Forensic Community

**Presenting Author**: Reece Sunclades

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**:

**Location**: Kansas City Campus

**Abstract**

Abstract

Bias is an important area of research in reference to the justice system, which often relies upon expert judgement to make informed decisions regarding appropriate steps to take for legal cases. These decisions are further complicated if the defendant suffers from a mental health diagnosis. There is a plethora of research on the bias and stigma the general population has towards the forensic population, but research is lacking with regards in measuring the bias within psychologists. Previous research has identified at least 12 possible sources of bias within forensic neuropsychologists. Research has also indicated that higher levels of bias can occur amongst those with more experience in the field. Implying that those who are regarded as experts in mental illness may be more vulnerable to the influence of bias. The perceived presence of evaluator bias by those within the forensic population has shown to create a negative and often adversarial relationship, which can disrupt the evaluation and treatment process. Assessment of forensic inpatient facilities found that a positive therapeutic relationship reduces symptomatology, increases engagement with services and medication adherence. The purpose of this study is to identify and measure the presence of psychologist bias towards the forensic population utilizing a mixed quantitative and qualitative 2x2 factorial design. Psychologists and psychology graduate students with experience in the forensic evaluation process will be recruited via Mturk and separated into two groups of “high expertise” and “low expertise” groups via a median split of years of experience. Participants will be presented with a vignette of either a forensic inpatient or non-forensic inpatient. Then they will be administered three self-report Likert scales measuring negative attitudes. These scores will be summed and used to quantify level of bias towards the patient and asked to provide recommendations. These scores will be analyzed via a two-way ANOVA. The two hypotheses of this study are that those with higher experience and those with the forensic vignette will have higher levels of bias.

**Abstract ID:** 177 **Research Category:** Clinical Science

**Title**: Dose fractionation of CAR-T cells. A systematic review of clinical outcomes

**Presenting Author**: Ayub Ansari

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**Location**: Kansas City Campus

**Abstract**

CAR-T cells are widely recognized for their potential to successfully treat hematologic cancers and provide durable response. However, severe adverse events such as cytokine release syndrome (CRS) and neurotoxicity are concerning. Our goal is to assess CAR-T cell clinical trial publications to address the question of whether administration of CAR-T cells as dose fractions reduces toxicity without adversely affecting efficacy. Systematic literature review of studies published between January 2010 and May 2022 was performed on PubMed and Embase to search clinical studies that evaluated CAR-T cells for hematologic cancers. Studies published in English were considered. Studies in children (age < 18), solid tumors, bispecific CAR-T cells, and CAR-T cell cocktails were excluded. Data was extracted from the studies that met inclusion and exclusion criteria. Review identified a total of 18 studies that used dose fractionation. Six studies used 2-day dosing schemes and 12 studies used 3-day schemes to administer CAR-T cells. Three studies had both single dose and fractionated dose cohorts. Lower incidence of Grade ≥ 3 CRS and neurotoxicity was seen in fractionated dose cohorts in 2 studies, whereas 1 study reported no difference between single and fractionated dose cohorts. Dose fractionation was mainly recommended for high tumor burden patients. Efficacy of CAR-T cells in fractionated dose was comparable to single dose regimen within the same or historical trial of the same agent in all the studies. The findings suggest that administering dose fractions of CAR-T cells over 2–3 days instead of single dose infusion may mitigate the toxicity of CAR-T cell therapy including CRS and neurotoxicity, especially in patients with high tumor burden. However, controlled studies are likely needed to confirm the benefits of dose fractionation.

**Abstract ID:** 179 **Research Category:** Quality Improvement

**Title**: Length of stay in patients with non-COVID illness during the COVID-19 pandemic.

**Presenting Author**: August Miller, B.A.

**Presenting author affiliation**: Kansas City University COM Class of 2024

**Co-Authors and Affiliation**: Julia Fashner, M.D. - HCA Florida St. Lucie Medical Center

**Location**: Kansas City Campus

**Abstract**

Introduction: The COVID-19 pandemic impacted healthcare systems around the world as hospitals received surges of infected individuals. Patients with diabetes mellitus (DM) were at risk for serious COVID illness [1], but research is scant for DM patients without COVID during the pandemic [2]. Our objective was to identify if the COVID-19 pandemic had an impact on the length of stay (LOS) of patients admitted with DM. Secondary aims were to measure if there was a difference in ICU admission or mortality for DM patients during COVID.

Materials and Methods: A secondary analysis was used of HCA Florida St. Lucie Medical Center data for patients with Diabetes Mellitus using ICD-10 codes. Outcome variables analyzed were LOS, intensive care unit (ICU) admission and mortality during two time periods: pre-COVID (1/1/2018-2/29/2020) and during COVID (3/1/2020-12/31/2021). Statistical analysis included chi-square and Fisher's exact tests.

Results: For the 4,246 individuals that fit the criteria of non-COVID admissions for DM, 2,560 patients were pre-COVID and 1,686 were during COVID. It was found that the average LOS for both groups were 4.58 (SD=4.88) and 4.68 (SD=4.74) days for pre-COVID and during COVID respectively. February LOS during COVID was 19.84% longer (p=0.039), but for all other months the average LOS was found to be similar before and after the beginning of COVID-19. Furthermore, the mortality and ICU admission quantities were similar for DM.

Discussion: Further analysis of other hospitals in the United States are necessary to generalize these findings more broadly, however this study found that LOS, ICU admission, and death for patients with diabetes mellitus was not impacted by the pandemic. Medically fragile populations such as DM patients had potential to experience more complications during COVID and this study was used to identify if this risk impacted their stay.

Conclusion: This study is reassuring regarding the standard for treatment of DM even with the impact of COVID-19 on the medical system. Continuing to identify the impact of the pandemic on non-COVID illness could further the understanding of how COVID-19 challenged the healthcare system.

**Abstract ID:** 186 **Research Category:** Basic Science

**Title**: Epigenetic modifications of the spliceosome following scaRNA2 knock down results in MYL3 isoform switching

**Presenting Author**: Reginald Boateng

**Presenting author affiliation**: Dr. Douglas Bittel Lab

**Co-Authors and Affiliation**:

**Location**: Kansas City Campus

**Abstract**

Tetralogy of Fallot (ToF) is a Congenital Heart Defect (CHD) marked by a tetrad of structural abnormalities of the heart including stenosis, right ventricular hypertrophy, ventricular septal defect, and an overriding aorta. ToF causes insufficient blood oxygenation through pulmonary circulation and therefore poor oxygenation in the systemic circulation, which often requires expensive surgical interventions to remedy. Despite efforts to understand the nature of ToF, the genetic cause of the disease is poorly understood. To elucidate the uncertainties in this field, we previously identified small Cajal body-specific RNA (scaRNAs) as significant modifiers of spliceosome RNA subunits. Dysregulation of these noncoding RNAs may contribute to Congenital Heart Defects. Formerly, our team recognized scaRNA2 as one of 12 scaRNAs that presented a lower expression profile in neonatal ToF heart tissue. We identified a subset of genes important in embryonic development that exhibit modified mRNA processing when scaRNA2 was targeted for knockdown (KD), suggesting a potential regulatory role for scaRNAs. One of these identified genes, Myosin Essential Light Chain 3 (MYL3), demonstrates alternative splicing patterns after scaRNA2 downregulation. MYL3 is expressed in ventricular cardiac muscle and controls muscle contractility via actin-myosin cross-bridge regulation. Mutations in MYL3 cause mid-left ventricular chamber-type hypertrophic cardiomyopathy and MYL3 upregulation has been observed in atrial defects. My current research focuses on the KD of scaRNA2 and subsequent MYL3 isoform switches in HEK293T cells. I hypothesized that scaRNA2 KD would result in altered processing of MYL3 resulting in changes in mRNA isoform patterns. I used confirmatory qPCR with TaqMan probes targeting the specific isoforms of MYL3 to amplify and quantify MYL3 isoforms. Through this project, I confirmed the switch in expression patterns of MYL3 isoforms following scaRNA2 KD. These results and our prior research on the downregulation of scaRNAs in ToF tissue potentially implicate MYL3 as a possible contributor to ToF. Future studies may assess wild-type transcriptome levels of MYL3 in pluripotent cells, fetal cardiomyocytes, and ToF cells to trace the expression profiles of MYL3 throughout the course of development. This study could help elucidate the genetic mysteries of ToF and inch closer to discovering novel methods of treatment.

**Abstract ID:** 187 **Research Category:** Case Reports

**Title**: Intracranial neurological complications from IVDU; a case report of mucormycosis

**Presenting Author**: Maxine Derrick

**Presenting author affiliation**: Kansas City University - OMSIII

**Co-Authors and Affiliation**: Hannah Riga - KCU, OMS III
Dr. Warren Reuther, MD

**Location**: Kansas City Campus

**Abstract**

Introduction:
Mucormycosis is a rare but serious fungal infection that can occur in individuals with compromised immune systems, uncontrolled diabetes, and those who have undergone certain medical procedures. Intravenous drug use is also a risk factor for mucormycosis, as drug injection can introduce the fungus into the bloodstream. Mental status changes can occur in individuals with mucormycosis, particularly if the infection has spread to the brain. Symptoms of brain involvement may include confusion, altered consciousness, seizures, headaches, and focal neurological deficits. Intravenous drug use can also cause mental status changes, particularly if the individual is using opioids or other central nervous system depressants. These substances can cause sedation, drowsiness, confusion, and impaired cognitive function.
Therefore, a patient with a history of intravenous drug use and mucormycosis infection who experiences mental status changes should be evaluated promptly by a healthcare professional. Further diagnostic testing, such as a Computed Tomography (CT) scan or Magnetic Resonance Imaging (MRI) of the brain, may be necessary to determine the cause of the mental status changes and guide appropriate treatment. Imaging is the first line of diagnosis in patients presenting with mental status changes but when this imaging is inconclusive, histopathological correlation is necessary. We discuss the case of an IVDU presenting with mental status changes, that upon further clinical correlation and histopathological review was diagnosed with a mucormycosis abscess of the brain.
Methods: In this case report we evaluate the neurologic complications that are associated with a cranial mucormycotic infection. We evaluated the CT and MRI scans of the 30 year old male patient and assessed pathology biopsies of the same patient to understand how mental status changes were a direct complication of a cranial mucormycotic infection.
Conclusion: It is challenging to create clear differentials in patients with history of IVDU presenting with mental status changes. We believe it is important for the practicing clinician to take into consideration pathology studies and evaluation for fungal infections because of their direct tie to mental status changes in IVDU especially when CT and MRI imaging is inconclusive.

**Abstract ID:** 188 **Research Category:** Clinical Science

**Title**: Plasma protein profiling analysis in patients with atrial fibrillation before and after three different ablation techniques

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**Location**: Kansas City Campus

**Abstract**

There are controversies on the pathophysiological alteration in patients with atrial fibrillation (AF) undergoing pulmonary vein isolation using different energy sources. Although the primary treatment for AF is pharmacology therapy, it has limited effectiveness. Currently, radiofrequency (RF) ablation and cryoballoon (CB) ablation are the most common techniques to treat AF. Clinical studies between RF and CB showed comparable increases in cell damage markers, platelet activation, and inflammatory response. There were less data about biomarkers' changes in radiofrequency balloon ablation (RB). We used the Olink proximity extension assay to assess protein changes during the acute post-procedure phase of each technique.

We evaluated plasma protein changes in acute phase post-ablation in patients receiving cryoballoon ablation, radiofrequency balloon ablation, or radiofrequency ablation.

Blood samples from eight healthy controls and 24 patients with AF were taken on the day of admission, day 1, and day 2 post-ablation and analyzed by the Olink proximity extension assay. Proteins were identified and performed with enrichment analysis. Protein–protein interaction network and module analysis were conducted using Cytoscape software.

Of the 181 proteins, 42 proteins in the cryoballoon group, 46 proteins in the radiofrequency balloon group, and 43 proteins in the radiofrequency group significantly changed after ablation. Most of the proteins altered significantly on the first day after ablation. Altered proteins were mainly involved in cytokine–cytokine receptor interaction. Both balloon-based ablations showed a similar shift toward enhancing cell communication and regulation of signaling while inhibiting neutrophil chemotaxis. However, radiofrequency ablation presented a different trend. Seed proteins, including osteopontin, interleukin-6, interleukin-10, C-C motif ligand 8, and matrix metalloproteinase-1, were identified. More significant proteins associated with hemorrhage and coagulation were selected in balloon-based ablations by machine learning.

Plasma protein response after three different ablations in patients with AF mainly occurred on the first day. Radiofrequency balloon ablation shared similar alteration in protein profile as cryoballoon ablation compared with radiofrequency ablation, suggesting that lesion size rather than energy source is the determinant in pathophysiological responses to the ablation. By comparison, balloon-based ablation (CB and RB) showed a higher tendency of inflammation and had more influence on hemorrhage and coagulation activity.

**Abstract ID:** 189 **Research Category:** Basic Science

**Title**: Sex-based Differences in the Length and Diameter of the Popliteal Vein: Consideration for Central Venous Cannulation

**Presenting Author**: Aaron Graves

**Presenting author affiliation**: Kansas City University - COM 2025

**Co-Authors and Affiliation**: Charlie Marchese- Kansas City University - COM 2025
Drew Klocke- Kansas City University - COM 2025
Dr. Bradley Creamer, MS, PhD- Kansas City University
(PI) Dr. Jennifer Dennis, MS, PhD- Kansas City University

**Location**: Kansas City Campus

**Abstract**

The popliteal vein is a possible entry site for central venous catheterization, particularly in COVID pneumonia/ARDS prone patients (1). However, vascular access is rarely attempted at this location as it carries with it a higher risk of DVT formation. As such, little research has been conducted on the popliteal vein and the vascular variations that may be present within this region. The objective of this study was to evaluate popliteal vein variations in length, diameter, and structural relationships in an effort to better characterize this area as a potential site for cannulation.

The popliteal region in formalin-embalmed, prosected cadavers (n=23) were utilized at Kansas City University (IBC #1954741-1). The entirety of the popliteal vein was exposed when viewed from the posterior aspect of the popliteal fossa. Various landmarks of the region were used for measurements: the adductor hiatus (AH), small saphenous vein (SSV), half of the distance from AH to SSV (MID), and the femoral condyles (FC). The length of the popliteal vein was measured from AH – SSV, AH – FC, AH – MID, MID – SSV, and FC – SSV using digital calipers. The diameter of the popliteal vein was also measured at AH, MID, and SSV. A two-tailed, T-Test was used for statistical analysis. When compared across gender, diameter at AH, MID, and SSV were found to be significantly different ($p=0.0002$, $p=0.0014$, $p<0.0001$ respectively). Additionally, length at AH – SSV and MID – SSV were found to be significantly different ($p=0.0219$, $p=0.0219$) between male and female cadavers.

This data indicates that sex based differences of the popliteal vein length and diameter may direct clinicians to a specific approach for successful cannulation. Future directions include incorporating this data to map out a ‘best-practice’ approach for popliteal vein cannulation in a prone patient.

1. Yang MX, Ng PK. Central Venous Catheter Insertion in the Prone Position—A Last Resort in Critically Ill COVID-19 Patients. Journal of Intensive Care Medicine. 2021;36(3):373-375.

**Abstract ID:** 191 **Research Category:** Clinical Science

**Title**: Hypertension and COVID-19Outcomes in a Rural, MidwesternPopulation

**Presenting Author**: Hannah Newland

**Presenting author affiliation**: KCU-Joplin

**Co-Authors and Affiliation**: Manvir Heer1†, Katherine Wu2†, Scott Andelin MD 1, Greg Stahl 3, Nova Beyersdorfer 1,Kerry Johnson EdD 4, Scott Goade PharmD 3, Robert Arnce MD 1,3
1 Kansas City University, Joplin MO, 2 Kansas City University, Kansas City MO, 3 Freeman Health System, Joplin MO, 4 Missouri Southern State University, Joplin MO, † These authors contributed equally

**Location**: Joplin Campus

**Abstract**

Coronavirus disease 2019 caused by SARS-CoV-2 (COVID-19) is an acute respiratory infection that may be affected by a variety of risk factors. Much of the current literature surrounding the interaction between hypertension and COVID-19 supports a positive correlation between chronic hypertension and COVID-19 morbidity. While a definite independent relationship of hypertension and COVID-19 still warrants further investigation, the association of hypertension with increased COVID-19 severity is strong. Our study primarily aimed to identify the role of hypertension in mortality in patients admitted to the hospital with COVID-19.

Our retrospective study was done with data collected from two Southwest Missouri rural hospitals from April 1, 2020 through December 31, 2021. Study populations came from patients admitted to the hospital with COVID-19 and/or hypertension and were subdivided into three groups: those with both COVID-19 and hypertension, those with COVID-19 and without hypertension, and those without COVID-19 and with hypertension. Mortality rates were compared among these groups. To determine sample proportions, we used Wald's method and the two-sample proportion summary hypothesis test with 95% confidence intervals for the proportion difference.

Both groups with COVID-19 had higher mortality rates when compared to the group without COVID-19 and with hypertension, each comparison with a p-value of <0.0001. However, when comparing the two groups with COVID-19 directly, those without hypertension had a higher mortality rate than those with hypertension, with a p-value of 0.0109. Contrary to our hypothesis, COVID-19 patients without hypertension had higher mortality rates than those with hypertension. This could be from many factors not considered during the study, including the possible use of antihypertensive medications, as our study did not include a review of patients' home or hospital medications. We are limited in this study by population size, rural community, number of hospitals included, and human error. The studied population was not randomly chosen. Selection bias is decreased with a retrospective study but cannot be entirely erased. Data is reliant on patient reporting and input by medical professionals. Regardless of the cause, our study highlighted an association between hypertension and COVID-19 outcomes, and with this, we have shown the need for further research.

**Abstract ID:** 193 **Research Category:** Case Reports

**Title**: Case Presentation of Neuroradiological MRI Artifacts Commonly Misinterpreted as Pathology with Imaging Examples

**Presenting Author**: Maxine Derrick

**Presenting author affiliation**: KCU-OMS III

**Co-Authors and Affiliation**: Hannah Riga KCU OMS III
Dr. Warren Reuther, MD

**Location**: Kansas City Campus

**Abstract**

Introduction

The neuroradiological examination is the cornerstone for emergency medical care for patients in acute mental status changes and stroke. With increasing prevalence of stroke centers and emergency treatments of intracranial hemorrhages, we see the utilization of computed tomography (CT) and increasing magnetic resonance imaging (MRI) as a first line in diagnostic assessment of the acutely ill patient. With the increasing prevalence of MRI as a common imaging modality, it is important for the clinician neurologist, stroke team, radiologist, and emergency medicine physician to be aware of these common MRI artifacts which can be easily misinterpreted as intracranial pathology.

Methods

We present four cases illustrating four common artifacts on MRI beginning with chemical shift artifact, then exploring ferromagnetic susceptibility artifact, cerebrospinal fluid flow artifact, and lastly discussing vascular pulsatile artifact. Our case report illustrates four cases in which these neuroradiological artifacts can easily be mistaken as pathology.

Results

MRI artifacts are commonly misdiagnosed as intracranial pathologies.

Conclusion

Chemical shift artifacts occur due to resonant frequencies changes where fat meets a fluid like water within the tissue. Chemical shift artifact can be misdiagnosed as an intracranial mass.

Ferromagnetic susceptibility artifacts are defined by dark areas on MRI due to metallic or orthopedic objects. These artifacts mimic cystic glioblastomas and other intracranial tumors.

CSF flow artifacts are imaging distortions that can be misinterpreted as ependymomas, intraventricular masses, spinal arterial venous and malformations.

Vascular pulsatile artifacts are defined by arterial or venous pulsations that can emulate metastatic foci.

**Abstract ID:** 194 **Research Category:** Clinical Science

**Title**: Use of trial registry data in critical care systematic reviews

**Presenting Author**: Quen Virden

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Michael Weaver DO,Justin Wilberding DO, Zachary Anderson DO, Freeman Health System
Ryan Bader, Nicholas Diehl, Andrew Payne, Kansas City University

**Location**: Joplin Campus

**Abstract**

Authors:
Michael Weaver DO,Justin Wilberding DO, Zachary Anderson DO, Freeman Health System
Ryan Bader, Nicholas Diehl, Andrew Payne, Quen Virden, Kansas City University
Abstract:
The use of systematic reviews and meta-analysis by physicians is a common practice to help with decision-making. Publications are skewed towards statistically significant results, while a majority of statistically nonsignificant results remain unpublished. Knowing this, there is still a deficit in the use of unpublished data in systematic reviews and meta-analysis. The publication bias this creates can steer the analysis to an incorrect conclusion. We reviewed meta-analyses and systematic reviews from the top ten critical care journals identified by the Google h5 index for evidence of searches of unpublished data and calculated the association of these searches with significance of the overall analysis using Fisher's exact test. Additionally, we calculated the risk of bias of these manuscripts. We found that only 24.32% of published manuscripts in critical care journals reported searches for unpublished data. There was no association between risk of bias and report of unpublished data searches ($p > 0.05$). We noted that manuscripts with searches for unpublished data were significantly more likely to find significance in their meta-analysis ($p < 0.05$). The results of this study indicate that writers of systematic reviews and meta-analyses are potentially omitting data from their analyses which could alter the practice of medicine in the field of critical care medicine.

**Abstract ID:** 195 **Research Category:** Clinical Science

**Title**: Vaccine hesitancy in rural Guatemala

**Presenting Author**: Hannah Riga

**Presenting author affiliation**: KCU

**Co-Authors and Affiliation**: Sarah Brendalen - KCU
Hayley Länge - KCU
Dr. Gautam Desai - KCU

**Location**: Kansas City Campus

**Abstract**

Vaccinations remain an integral part of modern medicine when considering preventing disease occurrence, spread, and associated symptom severity. With the recent COVID-19 pandemic, one of the major tools used to combat disease spread was the rapid development of novel vaccines. In Latin America, Guatemala had one of the lowest vaccination rates for COVID-19. According to the World Health Organization, as of October 2022, only 38.6% of Guatemala's population is fully vaccinated with the primary series and only 19.75% is boosted. When compared to the US population (67.4% primary, 32.9% boosted) and the global population (63.4% primary, 28.9% boosted) the deficit is apparent. Major contributors to vaccine hesitancy in rural Guatemala include distrust between indigenous peoples and the government, language barriers leading to misinformation, shortage of stores, and religious ideologies. Previous investigations reveal Guatemalans may perceive receiving novel vaccines as risky behavior, with concerns about side effects being the most common cause of hesitancy. The aim of this study was to determine differences in Guatemalan vaccine hesitancy when comparing COVID-19 versus other preventive vaccines and to explore whether demographics have an effect on hesitancy. The survey was divided into three groups of questions, including demographics (i.e. educational/employment status, religion, traditional medicine practices), COVID-19 vaccine information, and preventive vaccine information. Individuals who took the survey were local inhabitants of multiple healthcare clinics throughout the rural Highlands of Guatemala. In regards to questions of hesitancy, out of 26 individuals: 19% were hesitant to receive both the COVID-19 vaccine and preventive vaccines, 23% were hesitant to receive the COVID-19 vaccine but not preventive vaccines, and 58% were not hesitant of either. Strikingly, even amongst hesitant individuals, every one of the 26 individuals believed that vaccinations improve the overall health of the community, demonstrating positive progress toward educating this community on vaccinations. Limitations to the study included sample size and miscommunication with individuals when completing the survey so certain parts were inadvertently left blank. Areas of future research include longitudinal studies in the same Guatemalan population to explore whether continued health education affects vaccine hesitancy.

**Abstract ID:** 196 **Research Category:** Case Reports

**Title**: Solitary fibrous tumor of the retroperitoneum

**Presenting Author**: Hannah Riga

**Presenting author affiliation**: KCU

**Co-Authors and Affiliation**: Dr. Anthony Pasarin
Dr. Ihor Pidhorecky

**Location**: Kansas City Campus

**Abstract**

Solitary fibrous tumors are rare mesenchymal neoplasms that were historically thought to occur predominantly in the pulmonary parenchyma. Recent findings have demonstrated the variation in the location of these tumors, with more than 50% of cases reported occurring outside the lung parenchyma. This case report details a 61-year-old man who presented with lower abdominal fullness that was found to be a right retroperitoneal mass with ureter invasion upon abdominal CT. There were no additional masses visualized on imaging. A biopsy of the mass demonstrated pathology consistent with a solitary fibrous tumor. The patient underwent complete en-bloc resection of the tumor with a right nephrectomy. The patient's perioperative and postoperative courses were uncomplicated. Considering there were clear margins for resection and no high-risk histological features, the patient did not undergo radiation or chemotherapy. More research is necessary to determine guidelines specific to solitary fibrous tumor posttreatment surveillance, however current protocol in place is to follow soft tissue sarcoma guidelines. The patient will undergo abdominal/pelvic CT every 6 months for the next three years, and then yearly for two years after, with posttreatment surveillance discontinuing after year five.

**Abstract ID:** 197 **Research Category:** Health Service Psychology

**Title**: Does Disciple-Specific Simulated Training Reduce Impostor Phenomenon in Medical and Graduate Students?

**Presenting Author**: Aaron D. Pehrson

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Jennifer Fugate - Kansas City University

**Location**: Kansas City Campus

**Abstract**

Simulated patient training is a growing practice among medical and graduate schools in the United States. As technology improves, simulation becomes more immersive and sophisticated; capable of identifying specific areas of growth each individual needs. While there is a wealth of research detailing how simulations improve the competency and training of students who regularly undergo simulated training sessions, little research has been conducted regarding how such immersive, embodied learning improves confidence among students. Impostor phenomenon, or Impostorism, plagues many students, especially in their beginning years of medical and graduate training. Impostorism is the feeling that one is not qualified to occupy their current position, accompanied by the fear that their supposed incompetence will expose them as the fraud they believe themselves to be. This phenomenon can negatively affect one's personal perception, distorting their beliefs that their intelligence and personal achievements are not the products of merit but of external forces beyond their control. Such perceptions lead to feelings of discouragement and eventual poor performance in a person's area of expertise. This study aims to examine the change in levels of impostorism and self-efficacy in Medical and Psychology doctoral students as they experience simulated case-based learning in their curriculum in their second year of training. Students' self-reported feelings of impostorism will decrease (using the Leary Impostorism Scale), and feelings of self-efficacy will increase (using the New General Self-Efficacy Scale) after completing a discipline-specific simulated case-based learning semester. Simulation cases are designed as part of the students' curriculum and review key discipline skills-based interactions with patients taught in second-year medical school (e.g., developing diagnostic skills) or second-year professional psychology program (e.g., identifying thinking errors). These simulated cases are meant to both test students' capabilities and provide immersive training experiences while in school. Approximately 56 participants will complete both measures (30 medical students and 26 psychology doctoral students) prior to simulated case one, prior to simulated case three, and post simulated case six, each separated by approximately two months of training. Scores on both measures will be compared across time points for each group of students separately.

**Abstract ID:** 198 **Research Category:** Basic Science

**Title**: 12-LOX inhibitors a potential adjuvant therapy targeting pancreatic adenocarcinoma tumor microenvironment

**Presenting Author**: Adora Klinestiver

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Ehab H. Sarsour and Kami Person - Basic Science Department, Kansas City University, Kansas City, MO
Prabhat C. Goswami - Radiation Oncology Department, University of Iowa, Iowa City, IA
Theodore Holman - Department of Chemistry and Biochemistry, Unversity of California Santa Cruz, Santa Cruz, CA

**Location**: Kansas City Campus

**Abstract**

The mean age of pancreatic adenocarcinoma (PDAC) diagnosis is 70 years. Pancreatic cancer is desmoplastic; most of the tumor microenvironment consists of fibroblasts. Previously we showed that older quiescent fibroblasts, compared to younger ones, have significant changes in their lipid metabolism. Specifically, there is an increased expression of the oxygenase 12-LOX [arachidonic acid 12-lipoxygenase] and its product 12-(S)-HETE [12-(S)-hydroxy-5,8,10,14-eicosatetraenoic acid], which is an inflammatory mitogenic mediator. We have shown that 12-(S)-HETE increases PDAC proliferation and confers resistance to therapy. We have also shown that patients with higher 12-(S)-HETE serum levels have higher metastatic and recurrence risk. Currently, the standard of care for PDAC is surgery, chemotherapy, radiation, or a combination of these. Unfortunately, the five-year survival rate in PDAC patients is only 11.5% suggesting additional therapy strategies that target the tumor microenvironment may be needed. ML355 [N-benzo[d]thiazol-2-yl)- 4((2-hydroxy-3 methoxybenzyl)-amino) benzenesulfonamide], an anti-thrombotic drug, and its more selective derivative, Lox12Slug001 [4-((2-hydroxy-3-methoxybenzyl)amino)-N- (naphtho[1,2-d]thiazol-2-yl)benzenesulfonamide], are potent 12-LOX inhibitors. Using ELISA assays, our results show 12-LOX inhibitors significantly decreased 12-(S)-HETE levels expressed in the aged fibroblasts with no significant effects on cell viability, death, and toxicity, indicating that these inhibitors are safe on normal cells. Using 2D co-culture of aged fibroblasts and FUCCI (Fluorescent Ubiquitination-based Cell Cycle Indicator) engineered MIA-PaCa-2 pancreatic cancer cells, we tested cancer cell proliferation and therapy response in the presence and absence of 12-LOX inhibitors. Our results showed that12-LOX inhibitor significantly decreased the growth index in the pancreatic cancer co-cultures treated with radiation, chemo, or combination. The growth index decline was associated with altered cell cycle progression in PDAC cells, indicating a G1 arrest and higher mitotic death. These results indicate that 12-LOX inhibitors are strong and promising adjuvant therapy targeting the pancreatic tumor microenvironment to improve clinical outcomes.

**Abstract ID:** 200 **Research Category:** Basic Science

**Title**: Identifying gene networks in ovarian cancer

**Presenting Author**: Sasank Aramandla

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Rachel Steffes OMS-2, MS - Kansas City University
Dr. Joseph Shaffer PhD - Kansas City University

**Location**: Joplin Campus

**Abstract**

Ovarian Cancer is the second most common and deadliest gynecologic cancer in the United States and is the fifth most deadly female cancer by mortality overall. Early detection of ovarian cancers is difficult, and so it is frequently identified only after it has metastasized, leaving few options for intervention. In this research project, bioinformatic data analysis was performed on RNA expression data in order to differentiate between early-stage and late-stage tumor samples. Data was collected from the Gene Expression Omnibus (GEO) on the NCBI website. Selection criteria was implemented to ensure samples were collected with similar extraction protocols and tissue characteristics. Samples were then separated into early (stages 1 or 2) and late (stages 3 or 4) groups. Bioinformatic software including Partek and Bioconductor (R package) were used to align the data with a reference genome and to quantify gene expression values. Preliminary data analysis was performed on Partek and Bioconductor to visualize differential gene expression, identify potential genes worth investigating, and characterize gene ontology enrichment for biological pathways responsible for variance. AGL, a gene that codes for glycogen debranching enzyme, showed greater expression levels in early samples. The top biological pathways were related to signal transduction and fatty acid metabolism. Several machine learning models were then trained on the RNA expression data in order to predict whether a sample is early or late progression. The models used were logistic regression, random forest, support vector machine, neural network using python programming language and several packages such as pandas, sci-kit learn. RISE approach is being utilized for feature reduction. The model that had the best performance metrics was random forest, and had 96% precision and 95% accuracy at predicting whether a sample was early or late progression based on gene expression values. Using feature reduction, the top 5 genes that are the most predictive: DLGAP4 (Disks large-associated protein 4), ZNF219 (Zinc Finger Protein 219), MLST8 (MTOR Associated Protein, LST8 homolog), ZNF218 (Zinc Finger Protein 218), BICRA 9 (BDR4 Interacting Chromatin Remodeling Complex Associated Protein). This is an iterative approach, with MLST8 having the most scientific characterization and known cancer association.

**Abstract ID:** 201 **Research Category:** Clinical Science

**Title**: Prevalence of Variability in Radial Artery Anatomy

**Presenting Author**: Cecilia Leng, Ethan Hayes, Nathan Salts, Brian Stevens

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Dr. Charlie Withnell - Burnett School of Medicine
Dr. Jennifer Dennis - Kansas City University

**Location**: Joplin Campus

**Abstract**

Cardiovascular disease is the prevalent cause of death in the United States, diagnosed in roughly 18 million Americans annually, with approximately one million cardiac infarctions addressed by physicians yearly. From 1968 to 1986, all-venous-conduit coronary artery bypass graft (CABG) was considered standard of care, but changed when Loop et. al identified an increased 10-year actuarial survival rate in patients who instead had an internal-mammary-artery graft. Currently, the internal thoracic artery and radial artery are considered by thoracic surgeons for CABG due to the lowered risk of death and better patient prognosis. This study aims to use computed tomography technology to study abnormalities in the normal radial artery anatomy that may occur, in order to discover how it might tailor pre-surgery procedural decisions and inform surgeons on vessel choice for CABG procedure.

**Abstract ID:** 202 **Research Category:** Clinical Science

**Title**: Distance from the uterine body to the uterine artery-ureter crossover point in female cadavers

**Presenting Author**: George Kalu

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Mary Jo Martin, MD - Kansas City University
Miles Turk, MS - Kansas City University
Keanna Theobalt, MS - Kansas City University

**Location**: Joplin Campus

**Abstract**

Purpose: Gynecological procedures, such as hysterectomies to treat endometriosis, uterine cancers, etc. and uterosacral colpopexies, account for over 50% of iatrogenic ureteral injuries, which can lead to urinary complications. To illuminate the amount of space that surgeons have before causing distal ureter injury, our goal was to determine the distances of various points of the uterus to the uterine artery-ureter crossover point (UA-U point) and compare these distances bilaterally.

Methods: The pelves of 22 formalin-embalmed female cadavers at Kansas City University's anatomy labs in Kansas City and Joplin, MO were dissected to reveal the uterus and the UA-U point. In cadavers with an intact uterus, the distance from the UA-U point to the uterine fundus, ipsilateral uterine cornu, ipsilateral outer uterine wall, ipsilateral cervical wall, midpoint of the anterior outer cervical wall, and center point of the anterior uterine wall were measured bilaterally. In cadavers who have had a hysterectomy, the distance from the posterosuperior aspect of the bladder's base (representing the location of the vesico-uterine pouch) to the UA-U point was measured.

Results: Distances from each measurement were combined together to create a heatmap from our specific locations to the uterine artery ureter meeting point. We also compared our data from the left and right sides to determine which side of the uterus had the smaller working window for surgeons.

Conclusion: When performing hysterectomies and other gynecologic and pelvic surgeries on women, surgeons not only need to be aware of the ureter's course and anatomy, but they also need to understand the amount of space between the uterus and the ureter. In addition, they also need to be cognizant of the space between their surgical instruments and the ureter. Ultimately, this will allow them to avoid causing distal ureteral injury, which can ultimately lead to significant urinary system pathologies for the patient.

**Abstract ID:** 203 **Research Category:** Basic Science

**Title**: Characterization of sequence variations contributing to cardiotoxicity in pediatric patients undergoing chemotherapy.

**Presenting Author**: Michelle Mathew

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Dr. Nataliya Kibiryeva - Kansas City University

**Location**: Joplin Campus

**Abstract**

Cancer therapy-induced cardiomyopathy (CCM) is one of the most adverse and complex effects of chemotherapy. It is associated with certain pharmacological agents and is classified as dose dependent or dose independent. CCM has affected 10% of patients causing a spectrum of cardiovascular effects including myocardial infarction, congestive heart failure, pericarditis, arrhythmias, and valvular dysfunction (Sabater-Molina et al., 2020). An important class of chemotherapeutic agents that treats solid and hematologic malignancies in adults and children are anthracyclines such as doxorubicin. Unfortunately, anthracycline has been found to induce dose-dependent cardiotoxicity, which can cause irreversible heart damage. Combining anthracyclines with trastuzumab, another therapy, can induce even greater cardiotoxic effects. Additional factors are recognized to contribute to CCM, such as preexisting cardiac risk factors, age, and lifestyle factors. However, even after accounting for these factors, predicting an individual's risk of developing CCM remains challenging. In addition, cohorts that have been exposed to the same dosage of doxorubicin have shown varying outcomes of cardiotoxicity, ranging from no effect to very adverse outcomes. This brings up the important question of why some patients are presenting with cardiotoxic effects while others do not. This research proposal will use DNAseq analysis to identify variants present in a cancer cohort of 30 children from Children's Mercy Hospital (CMH) who have undergone doxorubicin treatment. In this cohort, the children have varying effects of cardiotoxicity, as mentioned before. The variants will be identified using bioinformatic tools and these mutations will be further investigated to elucidate their biological function and potential relationship to the cardiotoxic effects of doxorubicin therapy.

**Abstract ID:** 205 **Research Category:** Health Service Psychology

**Title**: The role of embodied cognition in the neurorehabilitation of ischemic stroke

**Presenting Author**: Eva M. Hernández Cuevas, MA

**Presenting author affiliation**: Kansas City University, Health Services Psychology, COB-PsyD

**Co-Authors and Affiliation**: Dr. Jennifer Fugate, Ph.D. - Kansas City University, Health Services Psychology, COB-PsyD

**Location**: Kansas City Campus

**Abstract**

Authors: Hernández Cuevas, Eva M., & Fugate, Jennifer, PhD

Ischemic strokes, the blockage of blood flow to the brain, is the most common type of stroke that affects adults around the world and is the fifth most common cause of death. Adults surviving from stroke are also affected by a wide array of physical and cognitive aftermaths, impacting their quality of life and their activities of daily living. Current standards for post-stroke treatment highlight the importance of early detection and medication, and the neurorehabilitation of physical, cognitive, behavioral, emotional, social, sexual, and vocational consequences of stroke. Although the body and movement are essential for the recovery of stroke, few studies examine how embodied treatments play a role in the neurorehabilitation of post-stroke patients. Embodied treatments are based on the notion of embodied cognition, which postulates that the brain works in bidirectional pathways, in which body and cognition are connected. Treatments using embodiment focus on how the body, and its presence in the environment, plays a significant role in cognitive processing. With recent technological advances, virtual reality (VR), artificial intelligence (AI), and robot-assisted (RA) neurorehabilitation have become of interest. However, the understanding of the mechanisms that underlie stroke recovery is limited, and the neurorehabilitation field is still in its early stages of development. This dissertation will use a systematic narrative literature review to examine the effectiveness of these newer embodied treatments in the neurorehabilitation of cognitive and physical post-stroke symptoms. Specifically, I will evaluate the published peer-reviewed empirical articles in the last ten years utilizing specific scientific databases. The review will compare the treatment efficacy for cognitive improvement and physical symptom reduction between interventions which used VR, AI/robot-assisted, or neurorehabilitation training for post-stroke recovery in adult stroke patients. Treatment efficacy will be operationalized by critically evaluating each article's sample, design, methodology, treatment outcomes in physical and cognitive symptoms, and their respective effect size.

**Abstract ID:** 208 **Research Category:** Basic Science

**Title**: Altered scaRNA2 expression changes alternative splicing of PTEN mRNA

**Presenting Author**: Ekenediri Obi

**Presenting author affiliation**: Dr. Doug Bittel, Dr. Nataliya Kibiryeva, Mike Filla

**Co-Authors and Affiliation**:

**Location**: Kansas City Campus

**Abstract**

Congenital heart disease (CHD) is the leading cause of death in babies aged 12 months or less. While clinical CHD treatments have grown over the years, its core etiology is not well understood. Recently, small cajal body-associated RNAs (scaRNAs) were observed to be significantly reduced in the right ventricle of children presenting with a CHD called tetralogy of Fallot (TOF). Additionally, scaRNA2 downregulation has been observed to indirectly alter mRNA splicing through increased methylation of the spliceosomal subunit U2. Impaired spliceosome fidelity has been shown to influence exon retention in several genes, including phosphatase and tensin homolog (PTEN), a gene known to be critical in embryonic cardiomyocyte differentiation. The more precise implications of scaRNA downregulation on the processing of PTEN and how this may contribute to TOF prevalence are poorly understood. In this study, we investigated and validated our previous hypothesis on the effects of scaRNA knockouts (KOs) on PTEN exon retention. Using previous RNA-seq analysis from human embryonic kidney (HEK) cells and Ensembl, we prepared TaqMan probes targeting exon 2 of PTEN-205 and exon 3 of PTEN-206. After that, these probes were used as region-specific primers in qPCR, analyzing PTEN expression between the two isoforms. Our data suggests that a decrease in scaRNA2 expression induces disproportional expression between the isoforms. More specifically, PTEN-205 was significantly upregulated in scaRNA KO relative to wild-type, while PTEN-206 showed decreased expression. Ultimately, this validates our previous notion that decreases in scaRNA2 induce significant changes to alternative mRNA splicing of genes that may be critical for proper cardiomyocyte differentiation. Further research on the clinical consequences of a shift in PTEN's isoform ratio is needed to determine how much it phenotypically contributes to CHDs like TOF.

**Abstract ID:** 209 **Research Category:** Basic Science

**Title**: Transcriptome RNA-seq analysis of Doxorubicin treated epithelial cells on the Smad3-dependent TGF-β using a custom in-house data pipeline

**Presenting Author**: Youssef Mohamed

**Presenting author affiliation**: KCU BIOS

**Co-Authors and Affiliation**: Jacob Protopopov -BIOS, Kass Sjostrom -BIOS , Obinna Iwuji - BIOS

**Location**: Kansas City Campus

**Abstract**

Doxorubicin(Dox) treatment, a chemotherapy drug, is associated with activation of Smad3-dependent TGF-β pathway in endothelial cells. TGF-β is a key regulator in cell-cell interaction, cellular senescence, and cell mobility. Dox induced phenotypic changes contribute to cardiovascular damage. Epithelial cells and endothelial cells are very similar and TGF-β is the master regulator of mesenchymal transition in both. Understanding these pathways may provide new targets for improved therapies to help mitigate this type of damage. We hypothesized that the mechanism through which doxorubicin activates the canonical TGF-β pathway in endothelial cells may also be activated in these epithelial cells resulting in measurable changes to the transcriptomic phenotype contributing to dox induced lung basal epithelial cell damage. We developed a custom RNA-seq analysis pipeline (GeneTicTek) in order to perform transcriptome analysis on the phenotypically distinct human lung basal epithelial cells in doxorubicin treated samples compared to a controlled population retrieved the data through the NCBI's Sequence Read Archive such as SRA from the GEO (Gene Expression Omnibus).

**Abstract ID:** 210 **Research Category:** Clinical Science

**Title**: Folic Acid Affect on Homocysteine Regulation of Gene Expression.

**Presenting Author**: Colleen Mills

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Andrea Winingar - Kansas City University
Dejanae Potter - Kansas City University

**Location**: Kansas City Campus

**Abstract**

Intro: Methylenetetrahydrofolate Reductase (MTHFR), encodes the protein which serves as the rate-limiting enzyme in the folate processing pathway. Variation in the MTHFR gene may result in susceptibility to hematologic cancers such as acute myeloid leukemia (AML).

Hypothesis: In patients with AML, folic acid abundance or starvation may affect homocysteine availability which can alter epigenetic patterns that rely on homocysteine as a source for regulation of gene expression. We hypothesize that mimicking MTHFR defects by starving AML derived cells of folic acid will dramatically change histone methylation reflecting the necessity for adequate enzymatic activity from MTHFR.

Methods: Eight files derived from the DNA from AML cells IMS-M2 were downloaded from the Gene Expression Omnibus into Partek Flow, for alignment and biostatistical analysis DNA from four samples (two with folic acid and two starved for folic acid) were sequenced directly and the other four (two with folic acid and two without folic acid) were precipitated with an H3K9me2 antibody and then ChIP-sequenced. Comparison is made between groups of folic acid starved and folic acid adequate IMS-M2 cell lines.

Results and conclusions: We will describe patterns of methylation between those cells with and without folic acid. For patients with AML, folic acid is clearly an important component of epigenetic variability and thus may be important to treatment and prognosis.

**Abstract ID:** 212 **Research Category:** Clinical Science

**Title**: Color Facilitates Naming Ability in Cognitive Impairment

**Presenting Author**: Katie Rennie

**Presenting author affiliation**: KCU PsyD student

**Co-Authors and Affiliation**: Jennifer Fugate, Ph.D. - Dissertation Chairperson

**Location**: Kansas City Campus

**Abstract**

Color Facilitates Naming Ability in Cognitive Impairment
Rennie, Katie & Fugate, Jennifer, Ph.D.
Abstract
Alzheimer's Disease (AD) is the most common cause of dementia in the United States and represents a loss of memory and impairment in other cognitive abilities. It is distinguishable from Mild Cognitive Impairment (MCI) in which cognitive impairment is present that is not typical for age, but in which daily functioning is not impacted. Neuropsychological assessment is one of the ways in which dementias and neurocognitive impairment are assessed and diagnosed. Therefore, it is important that tests used are diagnostically accurate and sensitive. The hallmark of AD in earlier stages is impairment in word-finding and naming ability indicating deficits in semantic memory. The Boston Naming Test (BNT-2) and Multilingual Naming Test (MiNT) are valid and reliable tests of naming ability used to diagnosis AD. The inclusion of color is thought to facilitate object recognition and naming ability and may allow for more sensitive assessment of cognitive impairment to help identify earlier stages of AD and MCI. The purpose of the proposed dissertation is to test whether adding color in the MiNT affects accuracy in discriminating diagnosis between normal cognition (NC), MCI, and AD. Additionally, this dissertation will compare the diagnostic efficacy between the MiNT and the traditional BNT-2 directly. I will recruit one group of older adults age 60+ referred to Ability KC for Memory Loss and another group of healthy older adults from the community. Participants will be assigned randomly to one of two group. Participants in one group will receive the MiNT and the BNT-2, and participant in the other subgroup will receive a new, created color version of the MiNT (C-MiNT) and the BNT-2. This modified version will be directly compared to the black and white MiNT as well as the BNT-2. I hypothesize that C-MiNT will result in an assessment of naming ability with higher specificity and sensitivity to MCI and mild AD compared to the non-color MiNT and reduced false negative rates compared to the BNT-2 No differences are expected among measures in performance for the normal aging control participants.

**Abstract ID:** 251 **Research Category:** Clinical Science

**Title**: Coronary artery disease as a risk factor for mortality in patients with COVID-19: a retrospective study

**Presenting Author**: Hanyu Liu, Adam Holbrook, Cameron Burr

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Scott Andelin - Kansas City University
Greg Stahl - Freeman Health System
Nova Beyersdorfer - Kansas City University
Kerry Johnson - Missouri Southern State University
Scott Goade - Freeman Health System
Robert Arnce - Kansas City University

**Location**: Joplin Campus

**Abstract**

Authors:
Hanyu Liu (1), Adam Holbrook (1), Cameron Burr (1), Scott Andelin (1), Greg Stahl (2), Nova Beyersdorfer (1), Kerry Johnson (3), Scott Goade (2), Robert Arnce (1)
(1): Kansas City University
(2): Freeman Health System
(3): Missouri Southern State University
Body:
Numerous studies have been conducted looking at the role of comorbid conditions on outcomes in patients infected with COVID-19. Previous studies have identified coronary artery disease (CAD) as a risk factor for increased severity of COVID-19 infections. In this retrospective analysis, we reviewed data from the electronic medical records of patients hospitalized with COVID-19 infection at a healthcare system in Southwest Missouri, between the dates of April 1, 2020 and December 31, 2021. The patients admitted with the diagnosis of COVID-19 infection were then further subdivided based on the presence or absence of CAD. There were 1,729 patients admitted with COVID-19 during the time period of the study. Of those patients admitted to the hospital with COVID-19 infection, 375 patients also carried the diagnosis of CAD while 1,354 did not have CAD. Mortality rates of the two subpopulations were compared. The mortality rate of patients admitted with both COVID-19 and CAD was found to be 23.2%, compared to the mortality rate of patients admitted with COVID-19 but without CAD which was 16.03%. Comparison of these two groups was associated with a p-value of 0.0012. We recognize the following limitations: as a retrospective study, the data studied were retrieved from a single healthcare system in Southwestern Missouri and did not specify the level of manifestation of diseases. Some patients with CAD or COVID-19 diagnoses may not be diagnosed with the list of ICD-10 codes we used and therefore may have been excluded. Confounding factors not accounted for, including comorbidity and demographic factors, may influence patient outcomes as well. This study showed a significant increase in mortality in patients admitted to the hospital with COVID-19 and CAD when compared to those admitted with COVID-19 but without CAD.

**Abstract ID:** 254 **Research Category:** Clinical Science

**Title**: Evaluating the Incidence of Hypoglycemia Associated with Insulin Driven Treatment of Hyperkalemia

**Presenting Author**: Tyler Specking

**Presenting author affiliation**: Freeman Health System

**Co-Authors and Affiliation**: Jack Udell - Freeman Health System
Scott Goade - Freeman Health System
Lacey Schultz - Freeman Health System
Adrienne Carey - Freeman Health System
Justin Wilberding - Freeman Health System
Kerry Johnson - Missouri Southern State University

**Location**: Joplin Campus

**Abstract**

Purpose: Inpatient hyperkalemia has been cited to occur in as many as 10% of hospitalized patients nationally. Hyperkalemia may result in cardiac instability and potentially fatal arrhythmia. Following cardiac stabilization, one method for management of hyperkalemia includes the use of insulin. Current American Academy of Family Physicians (AAFP) guidelines suggest the use of 10 units of insulin paired with 25 grams of dextrose. Studies suggest that this dosing regimen places patients at an elevated risk of hypoglycemia. This study's purpose was to assess inpatient insulin use for hyperkalemia and its association with hypoglycemic events.

Methods: This retrospective observational study analyzed electronic medical records (EMR) of patients with hyperkalemia (serum potassium ≥ 5.4 mmol/L) who subsequently received either 5 units or 10 units of insulin regular. Our primary endpoint was incidence of hypoglycemia (serum glucose < 70 mg/dL) within 6 hours of insulin administration. Secondary endpoints include incidence of hypoglycemia among renal insufficiency (CrCl ≤ 50 mL/min), hypoglycemia in patients who received 25 grams of dextrose versus 50 grams of dextrose alongside the insulin, and incidence of severe hypoglycemia (serum glucose < 54 mg/dL). Patients excluded from analysis were those under age 18, diabetic ketoacidosis, pregnancy, dialysis, and receipt of more than one insulin bolus. Our facility's data mining software identified qualifying patients from July 2022 to February 2023.

Results: Of the 242 patients included in the final analysis, 164 received 5 units of insulin and 78 patients received 10 units. Among those who received 5 units, 15 patients (9.1%, 95% CI 4.7 – 13.6) experienced hypoglycemia. In the group who received 10 units, 13 patients (16.7%, 95% CI 8.4 – 24.9) experienced hypoglycemia. Comparison of the two treatment groups utilizing the two sample proportion test yielded a p-value of 0.087.

Conclusion: This study demonstrated an increase in incidence of hypoglycemic events in patients who received 10 units versus 5 units of insulin for the treatment of hyperkalemia. Although there was insufficient evidence to conclude that there is a significant difference between the two populations, the results are consistent with existing literature and offer guidance to help drive prescribing habits at our facility.

**Abstract ID:** 255 **Research Category:** Basic Science

**Title**: RNA-Seq data analysis of alternative splice variants of the SMAD4 regulated genes, FOSL1, SERPINE1, ADAM19, and LCN2 in the development of pancreatic malignancy

**Presenting Author**: Katie Bussard-Serrano

**Presenting author affiliation**: Kansas City University, College of Bioscience; Bioinformatics

**Co-Authors and Affiliation**: Leandra Collier- Kansas City University, College of Bioscience
Douglas Bittel, MSc, PhD- Kansas City University, College of Bioscience
Nataliya Kibiryeva- Kansas City University, College of Bioscience

**Location**: Kansas City Campus

**Abstract**

Authors: Katie Bussard-Serrano, Leandra Collier, Natalyia Kibiryeva, MD, Douglas Bittel MSc, PhD;
Kansas City University College of Bioscience

Pancreatic malignancy often indicates poor prognosis for cancer. Often, disease is not diagnosed until metastasis has already occurred which makes the survival rate past 5 years low. The genetic mechanism of metastasis is poorly understood but TGF-β and the SMAD genes likely play a role. The SMAD family of genes is involved in spliceosome regulation and specifically, SMAD4 is a known tumor suppressor. TGF-β is known to be involved in many developmental processes and promotes invasion in late stages of cancer. Here we use bioinformatic tools to reexamine RNA-seq data from the European Nucleotide Archive (ENA) to assess mRNA alternative splice variants in SMAD4 and SMAD4 associated genes. Cell lines with wild type and knockout SMAD4 treated with and without exogenous TGF- β were evaluated to further examine the relationship between alternative splicing of mRNA and development of metastatic pancreatic cancer. Our analysis implicated splice variants of FOSL1, SERPINE1, ADAM19, and LCN2 are alternatively spliced. These genes are associated with phenotype reprogramming and metastatic colonization of pancreatic adenocarcinomas via altered function. Our data suggests that splice variants may contribute to metastatic progression; however, further study is needed.

**Abstract ID:** 269 **Research Category:** Case Reports

**Title**: ENDOVASCULAR STENT REPAIR OF AN OCCLUDED PERSISTENT SCIATIC ARTERY

**Presenting Author**: John Lukish, MS

**Presenting author affiliation**: Kansas City University College of Osteopathic Medicine

**Co-Authors and Affiliation**: Juan C. Correa, MD, FACS, RPVI - Modern Vascular, Overland Park, Kansas

**Location**: Kansas City Campus

**Abstract**

Introduction: Persistent sciatic artery (PSA) is a rare congenital vascular anomaly of the lower extremity that occurs in approximately 0.025-0.04% of the population. Pathology of this aberrant artery is common and includes stenosis and occlusion as well as aneurysmal formation, which can lead to sciatic neuropathy, distal embolization, and rupture. The management of refractory lower limb ischemia due to PSA disease typically involves surgical by-pass or angioplasty with post-operative antiplatelet and/or anticoagulant medical therapy.

Case Report: A 63-year-old patient with bilateral PSA and severe claudication underwent endovascular treatment in our center. Recanalization of the right PSA was achieved using laser atherectomy and balloon angioplasty followed by stenting utilizing the bare metal Supera stent. Drastic clinical improvement was noted from the patient for several weeks following revascularization of the PSA, however, at the 6 month visit from the initial revascularization procedure, significant plaques were noted in the common and superficial femoral arteries as well as the popliteal artery of the RLE.

Conclusion: Persistent sciatic artery is a rare congenital vascular abnormality. Due to its anatomic location, it has a propensity to develop occlusive or aneurysmal vascular disease that can lead to morbidity including ischemia and embolism of the lower extremity. Management may necessitate revascularization of the artery. We report an endovascular approach that resulted in an outstanding outcome. The clinical picture should dictate management and when considering an open or endovascular approach, classifying the type of PSA, and the associated vascular anatomy is critically important to reduce the risk of morbidity.

**Abstract ID:** 270 **Research Category:** Basic Science

**Title**: Validation of a salivary cortisol ELISA in the BMRL at the MKRC

**Presenting Author**: Kyleigh Getchell

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Clayton Tindell – Kansas City University, Millie Shah - Kansas City University, and Kaitlin Barnes - Kansas City University, Jeff Staudinger - Kansas City University

**Location**: Joplin Campus

**Abstract**

This study was performed in the Biomedical Research Laboratory (BMRL) located on the campus of Missouri Southern State University (MSSU) as part of the MSSU-KCU Stress Research Consortium (MKRC). The data presented in this study validate the enzyme-linked immunosorbent assay (ELISA) used to detect levels of salivary cortisol. Cortisol is the most abundant circulating steroid and the major glucocorticoid secreted by the adrenal cortex. When used as a medication, it is known as hydrocortisone. Salivary cortisol is frequently used as a biomarker of the psychological stress response. However, psychobiological mechanisms, which trigger the hypothalamus-pituitary-adrenal axis (HPAA) can only indirectly be assessed by salivary cortisol measures. The measurement of cortisol can help identify (1) bodily changes that are stressor-specific, (2) people at risk for development of stress-related disorders, and (3) the efficacy of interventions aimed at stress reduction. Competition occurs between an unlabeled antigen (present in standards, controls and patient samples) and an enzyme-labeled antigen (conjugate) for a limited number of antibody binding sites on the microplate. The washing and decanting procedures remove unbound materials. After the washing step, the enzyme substrate is added. The enzymatic reaction is terminated by addition of the stopping solution. The absorbance is measured on a microtiter plate reader. The intensity of the color formed is inversely proportional to the concentration of cortisol in the sample. A set of standards is used to plot a standard curve from which the amount of cortisol in patient samples and controls can be directly read. These studies lay the foundation for future studies that seek to determine the extent to which mind-body interventions will reduce stress levels in various study subjects to include student athletes, first-responders, and those individuals with post-traumatic stress disorder in our local community.

**Abstract ID:** 272 **Research Category:** Clinical Science

**Title**: Diagnosis of Autism in Pediatric Patients with Known SYT1 Associated Neurodevelopmental Disorder: A Possible Correlation and Clinical Implication

**Presenting Author**: Edith Riggs

**Presenting author affiliation**: University of Missouri

**Co-Authors and Affiliation**: Thompson Center for Autism and Neurodevelopment University of Missouri

**Location**: Kansas City Campus

**Abstract**

Synaptic dysregulations caused by mutations disrupting synaptic proteins often result in damaging effects on the central nervous system, including a wide range of brain and neurodevelopmental disorders. SYT1, an identified synaptotagmin protein, plays an essential role in mediating the release of calcium-triggered neurotransmitters (NT) involved in regular synaptic vesicle exocytosis, resulting in a severe neurological impairment. Genetic variants lead to a newly discovered rare disorder, known as SYT1-Associated Neurodevelopment Disorder. Genetic and functional studies revealed that SYT1 has an essential role in mediating the release of calcium-triggered neurotransmitters involved in regular synaptic vesicle exocytosis [1, 2]. Additionally, SYT1 plays a regulatory role in endocytosis, functioning as a crucial vesicle cargo molecule [3].

Although the severity of clinical symptoms varies depending on the genotypic SYT1 variant, there are hallmark symptoms that are universal among patients. These include developmental delay, sleep disturbances, EEG abnormalities, abnormal motor function, and abnormal eye physiology [1, 4]. Other symptoms that occur on a spectrum include mood and behavioral disturbances, seizures, intellectual deficit, delayed speech and motor function, and involuntary movements [1, 4, 5]. While intellectual delay and overlapping comorbidities have been reported, autism, as a tested clinically tested diagnosis, has never been recorded in patients with SYT1 Associated Neurodevelopmental Disorder until recently. In this presentation, we will discuss two patients with different SYT1 missense mutations who additionally met diagnostic criteria for autism spectrum disorder (ASD). This finding has implications on the treatment and long-term management for other patients diagnosed with SYT1 Associated Neurodevelopmental Disorder.

**Abstract ID:** 273 **Research Category:** Clinical Science

**Title**: Evaluation of time to first therapeutic Anti-Xa in obese versus non-obese patients using a weight-based intravenous heparin dosing protocol

**Presenting Author**: Ashley Jimenez, PharmD

**Presenting author affiliation**: Freeman Health System

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David Buvat de Virginy, MD - Freeman Health System
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Scott Goade, PharmD, BCNSP - Freeman Health System

**Location**: Joplin Campus

**Abstract**

Unfractionated heparin (UFH) is used for treatment/prevention of myocardial infarction (MI) and venous thromboembolism (VTE). Weight-based UFH dosing is the current standard of practice. While obesity is a risk factor for both MI and VTE, there is a lack of guidance for UFH dosing in this population. The impact of obesity on pharmacodynamics and pharmacokinetics of UFH remains unclear. Due to bleed risk, weight-based UFH dosing often has a maximum infusion rate. In obesity, this dose cap may lead to subtherapeutic anticoagulation thereby exacerbating morbidity and mortality risk. A retrospective review was conducted on adult patients who received intravenous (IV) UFH from April 1, 2022 , to June 30, 2022 at a not-for-profit hospital operating in a rural area. Inclusion criteria was patient age ≥ 18 years and IV UFH monitored using plasma anti-Xa levels (AXA). Exclusion criteria was pregnancy, monitoring using partial thromboplastin time (PTT), never attaining therapeutic AXA, or if UFH was held for surgical procedure before therapeutic. Primary outcome was time to first therapeutic AXA, defined as 0.3-0.7 IU/mL, in obese and non-obese patients. Obese and non-obese were patients categorized by BMI  30 kg/m2 and BMI < 30 kg/m2, respectively. Secondary outcomes compared time to first therapeutic AXA for indication and stratified by BMI. Statistical analysis showed that with and without outliers, neither test could detect a significant difference in the average time to first therapeutic AXA between obese and non-obese patients. Secondary outcomes showed insufficient evidence to detect a difference in time to first therapeutic AXA. Results showed a trend of attaining first therapeutic AXA within approximately 15 hours of IV UFH initiation, regardless of BMI or indication. Limitations include small sample size, short study time period, and non-randomized study design. After adjusting for presence of outliers, this study was not able to detect statistically significant differences in time to first therapeutic AXA between obese and non-obese patients. This suggests the utilized weight-based IV UFH protocol can be implemented without dose adjustments for BMI. However, further randomized studies are needed to verify these findings.

**Abstract ID:** 275 **Research Category:** Medical Education

**Title**: An evaluation of medical students' retention of pathology after integration in the anatomy lab

**Presenting Author**: Morgan McBride

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Sylvia Jennette- Kansas City University
Dr. Tony Olinger- Kansas City University

**Location**: Kansas City Campus

**Abstract**

Morgan Mcbride*1, Ginger Chant*1, George Kalu1, and Jennifer Dennis2
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The foundation of an effective medical education is a strong understanding of the interplay between anatomy and pathology. The preclinical curriculum at Kansas City University (KCU) includes anatomy and pathology content that is delivered as two separate entities: anatomy occurs during the first year and pathology occurs during the second year, despite being tightly interrelated. Integrating previously learned information with new information is crucial on the journey to becoming a physician. This study aims to integrate pathology into the gross anatomy lab experience of first-year medical students to set a foundation and pique interest for learning pathology in their second year. It is hypothesized that early exposure to pathology with a specific memory link to the gross anatomy lab will increase retention and test scores during the second year. Seven, 10-minute pathology presentations were created based on topics included on COMLEX level 1 and second-year exams, and a KCU pathologist vetted each presentation prior to delivery. The presentations were delivered during gross anatomy laboratories in the cardiopulmonary-renal (CPR, n=3) and gastrointestinal (GI, n=4) courses at the Kansas City and Joplin campuses. After each laboratory session, the presentations were posted on the course learning management system for the students to access at their discretion. In fall 2023, de-identified, CPR2 and GI2 exam outcomes will be collected from the COM 2026 KC cohort (pathology group) and the COM 2024 and 2025 KC cohorts (control group). The mean scores for each exam will be calculated and compared among the two groups. We hypothesize an association between early exposure to major pathology topics and increased CPR2 and GI2 exam scores for the pathology group. This study is predicted to further exemplify the need to begin integrating pathology early in the first year of medical school in the cadaver lab.

**Abstract ID:** 300 **Research Category:** Basic Science

**Title**: Identification of the Human Retinal Dystrophin Core Promoter: A Potential Treatment for Duchenne Muscular Dystrophy

**Presenting Author**: Aaron Graves

**Presenting author affiliation**: Kansas City University - COM 2025

**Co-Authors and Affiliation**: Madeline Meyer - Kansas City University COB
Hunter Kramer - Kansas City University COM 2025
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Amber Wiggins-McDaniel - Kansas City University
(PI) Dr. Robert White, MS, PhD - Kansas City University (Dean, College of Biosciences)

**Location**: Kansas City Campus

**Abstract**

Duchenne muscular dystrophy (DMD) is a lethal, degenerative muscle disease that affects 1 in 3,500 male births leading to progressive weakness, loss of ambulation and eventually death. The underlying defect in these patients is a genetic mutation resulting in the loss of skeletal muscle 427 kDa dystrophin protein (Dp427). No cure for this disease currently exists and therapeutics are limited. However, previous studies have elucidated an isoform of the dystrophin protein, retinal dystrophin (Dp260), which is able to rescue phenotypes in severe DMD model mice and thus may serve as a potential therapeutic for treatment of individuals with DMD. A significant number of DMD patients have the genetic machinery to make retinal dystrophin in muscle where it is not expressed. As such, it is important to identify the DNA promoter region of Dp260 in preparation for attempting to induce activity of the Dp260 promoter to provide Dp260 protein in muscle as a treatment for their disease. Bioinformatic software identified putative DNA regions that contain the Dp260 promoter between Exon 29 and Exon R1. Four regions of human DNA were identified due to their location relative to promoter recognition sequences, CAAT and TATA Boxes, and named FARA I, II, III+, IV. FARA III+ and FARA IV were recently amplified by PCR to be cloned into a plasmid Luciferase expression vector. All four plasmids will be transfected into WERI-RB1 cells for identification of the Dp260 promoter DNA. Subsequent confirmation of the promoter activity will occur via measurement of Luciferase activity. The end goal of this project is to identify the minimal DNA region containing the Dp260 promoter so that high throughput drug/compound screening can be testing for induction of Dp260 expression in skeletal muscle. A proof of concept study is also being conducted in which WERI-Rb cells will be exposed to methylprednisolone to determine if this treatment will activate the endogenous Dp260 promoter and generate Dp260 mRNA expression.

**Abstract ID:** 303 **Research Category:** Clinical Science

**Title**: The awareness and desirability of labor analgesia for patients and providers in rural Guatemala

**Presenting Author**: Yuki Kurosu

**Presenting author affiliation**: OMS 3, Kansas City University

**Co-Authors and Affiliation**: Elizabeth Rengers, OMS3 KCU, Mark Chiodo, OMS3 KCU, Gautam Desai, DO, FACOFP dist., KCU

**Location**: Kansas City Campus

**Abstract**

Yuki Kurosu, OMS 3 KCU, Elizabeth Rengers, OMS3 KCU, Mark Chiodo, OMS3 KCU, Gautam Desai, DO, FACOFP dist., KCU

Hypothesis:

Anesthesia and analgesia for labor pain management are the mainstay of treatment in the United States, however, this is not the case in many other countries. The investigators hypothesize that patients in rural Guatemala would want to have this as an option, however may be limited by a lack of resources. The investigators also hypothesized that cultural differences may play a role, as well as attitudes of healthcare providers.

Materials/ Methods:

After KCU IRB approval, investigators distributed surveys to adult women and healthcare providers presenting at clinics during KCU's Global Health Outreach: Guatemala in collaboration with ACIDICO, a Guatemalan Non-Government Organization. The survey was comprised of 4 sections: demographic, labor experience, receptiveness towards labor pain analgesics, and questions to providers about their opinions.

Results:

Of the total number of respondents (n=61), 24.6 % cited financial barriers as the greatest contributing factor to women receiving labor pain analgesics. Additionally, 63.5% (n=63) expressed a desire to receive this intervention for future pregnancies despite having some reservations about the safety of this therapeutic option. While responses from healthcare providers (n=14) did not identify any significant contributing barriers to providing labor pain analgesics, 85% did desire to learn how to administer this intervention and all (100%) expressed willingness to provide pain relief if their facilities had the resources.

Discussion:

Possible limitations to this study include formatting issues with the survey, lack of privacy while completing the surveys, and varying literacy levels among respondents.

Conclusions:

Although culture and religion do not serve as significant barriers to receiving labor pain analgesics, financial barriers do contribute to the limited accessibility of this intervention for women. Furthermore, results of our study conclude there is a need for labor pain analgesics in rural Guatemala communities. Through the contributions of this study, the investigators hope to provide women with the holistic care they deserve and better equip them with greater autonomy in future labor experience. Providers seem willing to offer it if it is available as a resource.

**Abstract ID:** 304 **Research Category:** Case Reports

**Title**: Characterization of an invasive fungating breast mass: a cadaveric study

**Presenting Author**: Colleen Reed, BS

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Tamara Stojilkovic, BA- Kansas City University, Hana Hamdan, MBBS- Kansas City University, Jennifer Dennis, PhD- Kansas City University

**Location**: Kansas City Campus

**Abstract**

Introduction/Background: Breast cancer is the second most common female cancer in the United States. Of breast cancer types, ductal carcinoma is the most prevalent and constitutes 80% of diagnoses. However, metaplastic breast carcinoma is rare, making up less than 1% of diagnoses. Metaplastic breast carcinoma usually occurs as 'triple negative,' defined as lacking estrogen (ER), progesterone (PR), or HER2 neu receptor expression. To further characterize a rare, metaplastic breast cancer, this study follows a stage IV high-grade breast carcinoma with metaplastic features that is ER 45%, PR 30%, and HER 2 neu negative.

Methods: A large breast mass was identified and dissected from the chest wall of a 55-year-old female formalin-embalmed cadaver (IBC# 1984068). Diagnostic information related to ER, PR, and HER2 expression was obtained from the donor's medical record. Gross measurements of the primary breast tumor and metastatic lesions were noted and photographed. Samples of the breast mass and lung tissue were sent for histological staining with hematoxylin and eosin (Mizzou OneHealth Biorepository, Columbia, MO). Histopathology of the samples were evaluated for overall morphology and characterization and compared to the known tumor profile.

Results: A 10cm highly ulcerative, fungating left breast mass with necrotic, foul-smelling tissue was identified. Normally observable components of the breast, such as the nipple-areolar complex, were indiscernible due to the considerable size and extent of the mass. Multiple infiltrative nodules measuring up to 1cm were noted in bilateral lungs upon further dissection. Histopathologic examination of the lung and breast specimens reveled sheets of malignant cells, with a high nuclear to cytoplasmic ratio, significant nuclear atypia with prominent nucleoli, exhibiting marked variation in size and shape, with frequent large and bizarre forms, numerous mitotic figures, and areas of geographic necrosis.

Conclusions: Studies of breast cancer with metaplastic features that are ER and PR positive are not widely available in current literature, most likely due to the rare occurrence of this tumor type. Our characterizations of such a tumor aid in further evolving this area of study and may provide insight into the aggressive nature of this cancer type as compared to its triple negative counterparts.

**Abstract ID:** 310 **Research Category:** Medical Education

**Title**: Evaluating explicit bias in foreign aid post-Guatemalan syphilis trials

**Presenting Author**: Bianca Glass, MS3 Kansas City University

**Presenting author affiliation**: Self

**Co-Authors and Affiliation**: Jieen Bae, MS3 Kansas City University
Rebecca Camacho, MS3 Kansas City University
Niyata Madhukar, MS3 Kansas City University

**Location**: Joplin Campus

**Abstract**

During the 1940s, nearly 1,500 people in Guatemala City were intentionally inoculated by the United States with sexually transmitted diseases (STDs) including syphilis, chancroid and gonorrhea. Unbeknownst to participants, the U.S.-led study evaluated the effectiveness of available STD treatments. In 2015, a lawsuit was filed against Johns Hopkins, the Rockefeller Foundation and Bristol-Myers Squibb Company by beneficiaries of victims who died as a result of the experimentation. The lawsuit was dismissed in 2022 due to inadequate records proving misconduct from the experimentation.

This cross-sectional study aims to identify potential bias towards receiving foreign medical aid in communities surrounding Guatemala City. The survey consisted of statements regarding participants' attitudes towards foreign aid, U.S. doctors and Guatemalan doctors. Participants were asked to check a box on a Likert scale that best represented their stance on each statement. It is hypothesized that the 1940s study and poor allocation of resources in Guatemala would induce bias against receiving aid.

A convenience sample of fifty-four participants from five different Guatemalan communities completed the survey. It was found that amongst all responders, most participants' ages ranged between 18 and 64. 36% preferred care from a Guatemalan doctor as opposed to a foreign doctor and 44% felt some level of obligation to receive foreign medical aid due to lack of local healthcare access. The results showed that 44% of respondents felt US doctors were more educated than Guatemalan doctors and 62% felt US doctors were more compassionate than Guatemalan doctors. Only 74% of respondents felt comfortable receiving vaccines from a foreign medical team. This can be compared to 88% and 85% of respondents that felt comfortable receiving medical aid and medications, respectively. Only 28% of respondents were knowledgeable about the Guatemalan syphilis trials when directly asked. Over 50% of the respondents did not know if their views changed about receiving foreign aid after knowledge about the trials.

This study provides insight on improving foreign representation in developing countries and establishing safety guidelines for future research. It highlights important ethical implications of research targeting marginalized members through coercion and misplaced trust.

**Abstract ID:** 311 **Research Category:** Basic Science

**Title**: Novel treatment of iron overloading in hereditary hemochromatosis

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**Location**: Kansas City Campus

**Abstract**

Hereditary hemochromatosis (HH) is a homozygous recessive disease causing uncontrollable iron absorption through intestinal cells. HH is caused by a C282Y mutation in the HFE (Hereditary Iron) gene. Excess iron is deposited in toxic amounts in vital organs causing cardiomyopathy, liver disease, pancreatic disease, diabetes, skin discoloration, and arthritis. HH results in severe morbidity and death if not treated properly. Treatments for HH consists of iron chelating drugs and phlebotomy. Both have side effects and consequently lead to low patient compliance once maintenance therapy is achieved, which is a challenge for treatment. A new potential treatment option for HH is identifying a pharmaceutical target affecting iron overloading uncovered by studying an iron deficient mouse mutant. These mice exhibit 100x more urinary iron excretion than normal mice, thus causing iron deficient anemia. The fsn (flaky skin) mouse mutant has a mutation caused by an insertion of a 5.5 kb Early Transposon (ETn) upstream of Exon 15 in the Ttc7 (Tetratricopeptide repeat domain 7) gene. The ETn adds an additional 183 bp in frame to Ttc7 mRNA which results in an insert of 61 additional amino acids and a larger TTC7 protein. Mating Hfe knockout mice with fsn carrier mice has shown Hfe -/-, +/fsn mice to have prevention of iron overloading at 10 weeks of age. Our hypothesis is that Hfe -/- mice heterozygous for fsn will have significant reduction of iron overloading through urinary iron excretion. In this study iron overloading of Hfe -/-, +/fsn mice will be studied to determine if iron overload is prevented at 15 weeks of age. TTC7 would be an effective pharmaceutical target as an alternative approach to treat iron overloading in Hereditary Hemochromatosis patients.

**Abstract ID:** 313 **Research Category:** Clinical Science

**Title**: Abnormal Coagulation and COVID-19 Impact on Patient Mortality in the Rural Midwest

**Presenting Author**: Het Patel

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**Abstract**

Since December 2019, COVID-19 has affected more than 6 billion people worldwide. It is primarily an upper respiratory infection, but many studies have also correlated increased coagulation abnormalities in patients with SARS-CoV-2. These coagulation abnormalities can translate into fatal complications such as acute pulmonary embolism, ischemic strokes, etc. This retrospective study aimed to investigate the potential of using an abnormal coagulation panel as an early predictor of severity.

This was done by comparing the mortality rate in COVID-19 patients with and without an abnormal coagulation panel (ACP) in a rural Midwest population. Three sample populations were analyzed: ACP with COVID-19 (P1), COVID-19 without ACP (P2), and ACP without COVID-19 (P3). Sample proportions were done using the Wald's method. Two-sample proportion tests with a 95% confidence interval were used to analyze and compare the data sets. While the mortality rates for patients with an ACP and COVID-19 are greater, the results did not show whether this combination resulted in greater mortality than any individual factor. A comparison between P1 and P3 did not demonstrate a significant difference between patients with an abnormal coagulation panel with or without COVID-19. This provides a mixed image, as a significant difference would have been expected against both factors for the combination to demonstrate greater mortality.

The study did not provide sufficient data to demonstrate that abnormal coagulation in COVID-19 patients led to significantly higher mortality rates in our selected patient population. Therefore, the current collected evidence does not support the use of an ACP as an early predictor of severity in our patient population.

**Abstract ID:** 316 **Research Category:** Basic Science

**Title**: Substance use disorder, the oral microbiome, and associated medical and dental health outcomes: future opportunities to predict and prevent disease in an underserved population

**Presenting Author**: Cole Dattel

**Presenting author affiliation**: Kansas City University

**Co-Authors and Affiliation**: Sarita Hira – Kansas City University, Avina Mahroke – Kansas City University, Ethan Hayes – Kansas City University, Sahana Reddy – Kansas City University, Annemarie Parker – Kansas City University, and Jeff Staudinger – Kansas City University.

**Location**: Joplin Campus

**Abstract**

Substance use disorder is an ongoing health issue throughout the United States and the Four States region, likely contributing to prevalent chronic dental and medical diseases seen in this region. The data presented here have broad social and economic implications in light of the fact that these patients affected by substance use are often overlooked in the healthcare industry. Our findings provide key insight and social context for future physicians and dental healthcare providers, while engaging with this uniquely vulnerable population of individuals in our region. We highlight exciting near-term biomedical research opportunities for students at KCU across our programs using the newly acquired Next-Generation Sequencing (NGS) capabilities at this university in Joplin, Missouri. This NGS platform will be used to determine the extent to which identified dysbiosis of the oral microbiome can be used to predict and ultimately prevent poor health outcomes in people with substance use disorder. The long-term desired outcome of these studies will be to provide interdisciplinary research opportunities for students, thereby shaping the careers of our regional future healthcare providers and help improve the well-being of people in our community.

**Abstract ID:** 317 **Research Category:** Clinical Science

**Title**: Improving health outcomes in student athletes at MSSU, a partner institution in Joplin Missouri

**Presenting Author**: Sarita Hira

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**Location**: Joplin Campus

**Abstract**

The Missouri Southern State University (MSSU)-Kansas City University (KCU) Research Consortium (MKRC) presents an interdisciplinary research study. This study seeks to determine the extent to which clinical yoga improves stress levels, both perceived and measured, in MSSU student athletes engaging the women's soccer team as study participants. Health outcomes related to the stress response were measured via the biomarker cortisol as measured using ELISA and saliva as a biosample. Student doctors collected study participant vital sign measures including heart rate, body temperature, blood pressure, respiratory rate, oxygen saturation, height, and weight. Perceived stress was measured using self-report questionnaires and scales that seek to quantify aspects of psychosocial and mental health parameters. KCU-COM student doctors collected vital signs at specific timepoints throughout the study that are indirect measures that reflect the stress response. The study also sought to strengthen the interface with an important community partner in Joplin through interaction with faculty in the Social Work Department and their senior level students who were paired with our student doctors at KCU as a team. The desired outcome of this study will likely determine the extent to which the practice of clinical yoga improves the well-being of student athletes at this university, and in general, folks in the community.

**Abstract ID:** 321 **Research Category:** Case Reports

**Title**: Asymptomatic Disseminated Varicella Zoster Virus: A Case Report

**Presenting Author**: Emily Woolhiser

**Presenting author affiliation**: COM 2025 student

**Co-Authors and Affiliation**: Taylor Harp DO - Georgetown University Dermatology Resident

**Location**: Kansas City Campus

**Abstract**

Introduction

Varicella Zoster Virus is a member of the herpes virus family and can affect children in the form of chickenpox. The virus stays latent in the ganglia where it can be reactivated when immunity diminishes and presents as shingles. Shingles characteristically presents as a very painful vesicular rash in a dermatomal distribution. Here, we report an atypical case of shingles in a 66-year-old male who developed a diffuse, asymptomatic vesicular rash positive for varicella zoster virus while in the hospital awaiting CABG procedure.

Case-Report

A 66-year old male with past medical history of lymphoma and newly diagnosed adenocarcinoma of the color was transferred from an outside hospital for CABG due to complications after elective hemicolectomy. Infectious disease and Dermatology were consulted for a diffuse vesicular rash on his face, chest, abdomen, arms and thighs that developed two days prior to transfer from the outside hospital. The pt denied any pain, pruritus, tingling or numbness and denied having the rash develop prior to being transferred to our institution. The lesions were vesicles on an erythematous base but were not painful and not in a dermatomal distribution. After an extensive workup, the rash was positive for VZV after being swabbed from a newly-unroofed vesicular base for PCR. The patient was therefore determined to have disseminated varicella zoster virus and was treated with IV acyclovir 10mg/kg IV administered every 8 hours with transition to oral valtrex 1g by mouth twice daily to complete a total of 14 days of antiviral therapy. This resulted in resolution of the rash with crusting of all lesions.

Discussion

This case presents a deviation from VZV's characteristic dermatomal distribution of extremely painful lesions. To our knowledge there have been no cases reported of VZV presenting concurrently without symptoms and in a disseminated form. This puts patients at risk of diagnostic delay so it is imperative to have a high index of suspicion to diagnose VZV and start empiric treatment to prevent poor outcomes.

**Abstract ID:** 327 **Research Category:** Clinical Science

**Title**: Characterization of vital landmarks in relationship to BMI pertaining to central line placement in the femoral vein: a cadaveric study

**Presenting Author**: Tamara Stojilkovic

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**Co-Authors and Affiliation**: Kelsey Staudinger-Swedish Medical Center, Celeste Murtha-Kansas City University, Anthony Olinger-Kansas City University

**Location**: Kansas City Campus

**Abstract**

Introduction: Central venous catheters (CVCs) are frequently needed in traumatic and critically ill patients to provide fluid, medication, etc. Although ultrasound can be a helpful adjunct when placing CVCs, a thorough understanding of anatomy remains crucial in using the "landmark technique" to locate the femoral vein. Because adipose tissue can alter the relationship between anatomic structures, utilizing traditional landmarks, the anterior superior iliac spine (ASIS) and pubic tubercle, to estimate the location of the femoral vein in overweight patients may be difficult or unreliable. This study seeks to understand if increased BMI alters the anatomic relationship of these classic landmarks.

Methods: 30 formaldehyde-preserved human cadavers (18 male, 12 female) were obtained through a medical school cadaver lab, and permission to dissect for research was granted. BMI was calculated in each cadaver: 19 cadavers had a BMI less than 25 and 11 cadavers had a BMI over 25. A careful dissection of the bilateral femoral triangle was performed to expose the inguinal ligament, femoral artery, and femoral vein. The ASIS and pubic tubercle were also dissected and used as key landmarks for taking measurements. A pin was placed between the femoral artery and the vein. The following measurements were then taken with a digital caliper: (1) the most prominent part of the ASIS to the pin, and (2) the pin to the most prominent part of the pubic tubercle. Pearson correlation and t-test were utilized in the analyses.

Results: An insignificant, weak correlation was found between BMI and the bilateral distance from the ASIS to the lateral side of the femoral vein (left side $r=0.058$; $p=0.760$, right side $r=0.203$; $p=0.281$) and the lateral side of the femoral vein to the pubic tubercle (left side $r=0.041$; $p=0.831$, right side $r=-0.161$; $p=0.397$).

Conclusion: An increase in BMI shows no significant difference in the distance between the ASIS and the femoral vein, and the femoral vein and the pubic tubercle. Therefore, when placing a femoral CVC, traditional landmarks can continue to be consistently used to guide placement if ultrasound is not readily available.

**Abstract ID:** 333 **Research Category:** Medical Education

**Title**: Augmented and virtual reality simulation in medical and nursing education

**Presenting Author**: Michaela Tonsager

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**Co-Authors and Affiliation**: Jennifer Fugate, Ph.D- Kansas City University

**Location**: Kansas City Campus

**Abstract**

Embodied cognition is a psychological theory that understands thinking is represented within the sensorimotor systems of the body that are explicated by neural activity within the brain. Thus, we make meaning of the environment through our senses and the way in which we experience the environment shapes our knowledge. Derived from embodied cognition, embodied learning constitutes a contemporary pedagogical theory that emphasizes the body in educational practice, such that learning unfolds through a person's own actions with environmental affordances. Training through simulated environments (i.e., simulation-based education) plays an important role in many fields, including the health professions, and recognizes the importance of "action for doing." Multiple systematic reviews show that simulation-based education improves students' self-reported knowledge, students' perceived competency, students' attitudes, and patients' safety compared to traditional instructional methods. Yet, few systematic reviews exist across medical and nursing fields using newer virtual reality (VR) and augmented reality (AR) simulated techniques in the classroom in which the outcome is skill competency. Given the recent explosion of VR and AR devices in these fields, the purpose of this project is to complete a narrative review of studies which use AR and VR simulation to assess skill competency in medical and nursing students. We searched PubMed and Google Scholar from 2016-2023 using search terms, which included "medical or nursing education", and "simulation or simulated" or "virtual reality" or "augmented reality" and "compentenc* or skill*" for published peer-reviewed quantitative studies. We reviewed over 1000 articles. After removing duplicates and articles that did not meet search criteria, we were left with 105 articles in our review. Articles will be reviewed by two coders for sample size and demographics, intervention (e.g., AR, Google Glass), type of control group (e.g., VR, Oculus), study design (e.g., randomized with pre-test), area of knowledge (e.g., surgery), field of learning/procedure (e.g., catheter placement), skill measured and how it was operationalized (e.g., correct surgery movements), results (with effect sizes, when possible). We will present our findings in a table format and evaluate the state of AR and VR simulated based learning in medical and nursing education given the available data.