

# **ABSTRACTS**

**INTERPROFESSIONAL RESEARCH DAY**



**NOVEMBER 2, 2018**

## **SCHEDULE:**

**8:00 - 9:00**

**Poster Viewing  
Atrium and Study Rooms 1-5**

**9:00 – 11:00**

**Student & Resident Oral Presentations  
Lecture Hall C**

9:00 – 9:15 am

Necrotizing fasciitis and Spinal epidural abscess unusual presentation  
Mohamed Saad eldin, MD, Ahmed Khalil, MD, Naidu Latasha, MD

9:15 – 9:30 am

An Unusual Presentation of Primary Aortic Mural Thrombus  
Ahmed Khalil, MD, Mohamed Saad Eldin, MD

9:30 – 9:45 am

Priming Increases Patient Willingness to Take Biologic Medications for Their Psoriasis: A  
Randomized, Double-Blind, Placebo-Controlled Trial  
Matthew C. Johnson, BS; Elias Oussedik, MD; Kritika Joshi, DO; Steven R. Feldman, MD,

9:45 – 10:00 am

Thyroid Storm Due to Abuse of Exogenous T3 and T4 for Weight Loss  
Timothy C. Howland, M.D., Gurdeep Singh, M.D.

10:00 – 10:15 am

Auditory midbrain hypoplasia and dysmorphology after prenatal valproic acid exposure.  
Yusra Mansour, Sarah Mangold, Devon Chosky, Randy J Kulesza Jr, PhD

10:15 – 10:30 am

Inpatient observation following a normal CT brain in patients with minor head injury on  
warfarin. Are sequential CT scanning truly warranted and can they be discharged home safely?  
Marcus Wilson OMS-4(Presenting author), Ronald Peirish OMS-4 ,Daniel Martin DO, Kaeli  
Freeborough OMS-4, George McKenny DO, Lauren Sciullo MS 4,Hina Dalal MS 4, Shruti  
Varma MS 4, Raahil Malhotra MS 4,Diane Vido Thompson MS. Saptarshi Biswas MD, FRCS

10:30 – 10:45 am

The Effect of Cinnamaldehyde Ointment on Prevention and Treatment of Staphylococcus aureus  
and Pseudomonas aeruginosa.

Robert Waters, MS\*, Daniel L. Austin, PharmD, Nancy Carty, PhD, Christopher C. Keller, PhD,  
FNAOME

10:45 – 11:00 am

Comparison of the Force Required for Dislodgement Between Secured and Unsecured Airways  
Curtis Davenport, DO; Christian Martin-Gill, MD, MPH; Henry E. Wang, MD, MS; James  
Mayrose, PhD; Jestin N. Carlson, MD, MS; Haley Prough, OMS-III

**11:00 – 12:00**

**Faculty Oral Presentations**

**Ping He**

**Chris Keller**

**Randy Kulesza**

**Leah Labranche**

**Diana Speelman**

**Lecture Hall C**

**12:00 – 1:00 pm**

**Lunch Break (on own)**

**Research at Millcreek Hospital: Q&A with Dr. Danielle Hansen**  
**Vora Lounge (bring your lunch)**

**1:00 – 3:00 pm**

**Poster Presentations**

**(Judging 1:00-2:00 pm)**

**Atrium, Study Rooms**

**3:00 – 4:30 pm**

**Teamwork time for Write-up of IPE paper**

**2nd year students in IPE course**

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Please allocate 10 minutes for the presentations, followed by 5 minutes discussion.

**Poster set up:** from 8:00 AM

**Poster presentation for judging:** presenters must be at their posters between 1:00-2:00 pm

Please don't remove the posters before 4:00 PM.

**[Click here for the 2018 Research Day Presentation Winners](#)**

**ABSTRACTS**  
**ORAL PRESENTATIONS**

# RESIDENT PHYSICIAN ORAL PRESENTATIONS

## 01. Mohamed Saad Eldin

### **Necrotizing fasciitis and Spinal epidural abscess unusual presentation**

Mohamed Saad eldin, MD, Ahmed Khalil, MD, Naidu Latasha, MD

**Abstract:** Introduction Necrotizing fasciitis (NF) is a rare but life-threatening infection that rapidly spreads to involve the skin, subcutaneous tissue and superficial fascia. Group A streptococcus is the most common organism implicated. Spinal epidural abscess (SEA) is a rare but potentially devastating suppurative infection between the spinal dura matter and vertebral periosteum. Case report A 59-year-old male with a past history of uncontrolled Diabetes Mellitus presented to the ED for evaluation of progressive left foot pain for 5 days. On exam, he was noted to have erythema, swelling and multiple purple blisters on the dorsum of the left foot (Figure 1). The patient denied having fever or trauma. Laboratory evaluation revealed a WBC of 27.6 with bandemia, anion gap lactic acidosis, and acute renal insufficiency. MRI showed left foot deep tissue abscess. The patient had severe back pain that started after hospital admission. MRI showed a very large epidural abscess extending from T8 to S1-S2 that ventrally displaced the spinal cord (Figure 2). The organism causing NF was identified as GBS by tissue culture and the SEA was caused by Methicillin Sensitive Staph Aureus (MSSA). These organisms were also identified in blood culture. The patient was treated with Ampicillin-Sulbactam and Clindamycin, wound debridement revealed severe necrosis of skin and subcutaneous tissues. The patient underwent left foot debridement 2 more times but unfortunately, below-knee amputation was eventually required to control the infection. He also underwent L1-S1 laminectomy with an evacuation of the epidural abscess.

## 02. Ahmed Khalil

### **An Unusual Presentation of Primary Aortic Mural Thrombus**

Ahmed Khalil, MD, Mohamed Saad Eldin, MD

Millcreek Community Hospital

**Abstract:** Aortic thrombi develop on top of an atherosclerotic aneurysm. Primary aortic mural thrombus (PAMT) can happen uncommonly in the absence of aortic aneurysm or atherosclerosis and is usually idiopathic. It is an unusual source of systemic non-cardiogenic emboli. Case presentation A 65 y.o. male presented to the ED with abdominal pain. His PMH is significant for HTN and CVA. On admission he was hypotensive with rt lower quadrant tenderness on physical exam. Laboratory evaluation showed WBC count of 27,000 with bandemia. CT abdomen and pelvis showed a large rim-enhancing fluid collection in right retroperitoneum with associated intramuscular hemorrhage in the right psoas and iliacus muscles and an abscess in the right pelvic region. 2 percutaneous abdominal drains were placed and the patient was started on broad spectrum antibiotics. However, his white cell count remained elevated with minimal improvement of clinical status and worsening shortness of breath. 3 days after admission, a repeat CT chest showed a thrombus measuring 4x2x2.4cm partially attached to the wall of the aorta, distal to the left subclavian artery. CT abdomen and pelvis showed the presence of a left kidney infarct as well as small splenic infarcts. TEE was negative for endocarditis, thrombi or vegetation. Antibiotics were continued and modified based on the culture results. IV heparin drip was started with warfarin overlap and target INR 2.5-3.0. Follow up CT showed marked decrease in the thrombus size. Discussion PAMT usually present with symptoms of acute limb ischemia or abdominal organ infarction. However,

our patient had an unusual presentation with symptoms of septicemia and septic embolization. Treatment options include surgical management with endovascular thrombectomy and embolectomy or medical treatment with anticoagulation. Our patient improved after anticoagulation with reduction of the thrombus size. The duration of anticoagulation after resolution of thrombus is still unclear.

### **03. Kritika Joshi**

#### **Priming Increases Patient Willingness to Take Biologic Medications for Their Psoriasis: A Randomized, Double-Blind, Placebo-Controlled Trial**

Matthew C. Johnson, BS; Elias Oussedik, MD; Kritika Joshi, DO; Steven R. Feldman, MD, PhD

**Abstract:** Background: The use of biologic medications for treatment of moderate to severe psoriasis is revolutionary with an excellent safety profile, yet there is still apprehension from patients to begin medication. To combat this issue, we hypothesize presenting the drug to patients via a priming technique, stating the treatment is acting on a natural pathway, to increase patient willingness to start medication. Objective: To assess patients' willingness to take a biologic medication (interleukin-23 inhibitor) for their psoriasis if primed on the natural mechanism of action of the agent. Methods: A total of 181 subjects not on an IL-23 inhibitor were recruited, 60 through the institution's dermatology clinic, and 121 through Amazon Mechanical Turk, an online crowdsourcing platform. The survey document was developed and piloted by the study team. Subjects were randomized in a 1:1:1 double-blind, placebo-controlled ratio. Scores on a 4-item Likert scale were evaluated using One-Way ANOVA. Results: Subjects primed with the natural mechanism of action of ustekinumab were more willing to take treatment than those not primed with ustekinumab's natural mechanism of action, notably when provided with four additional choices on how best to describe its mechanism of action ( $P = 0.011$ ). Subjects preferred the descriptor, "Stelara® makes psoriasis better by blocking the overactive signal that gets the immune system out of balance" as the best way to describe ustekinumab's mechanism of action. Limitations: Ethical considerations about knowledge manipulation must be factored in when influencing patients' treatment options. Conclusions: Priming psoriasis patients with the notion that ustekinumab has a "natural" mechanism of action is a simple and effective way to improve willingness to take treatment.

### **04. Lidianny Polanco, D.O., M.S.**

#### **Thyroid Storm Due to Abuse of Exogenous T3 and T4 for Weight Loss**

Lidianny Polanco, D.O., M.S, Timothy C. Howland, M.D., Gurdeep Singh, M.D.

Our Lady Of Lourdes Memorial Hospital

**Abstract:** Thyroid storm is a rare and lethal phenomenon with an overall incidence in the US of <10% and with a fatality of 80-100% without timely treatment. Thyrotoxicosis factitia, referring to the exogenous ingestion of thyroid hormone, leading to thyroid storm is an even rarer occurrence. This case report presents a 33-year-old male with a history of alcohol abuse who presented to the ED with worsening confusion, slurred speech, and tremors thought to be related to alcohol withdrawal delirium tremens. Hospitalization was complicated with further agitation and alterations in vital signs. Investigations revealed the patient had been misusing thyroid drugs for an unknown period, in the form of liquid liothyronine preparation with combination of levothyroxine, purchased online for the purposes of weight reduction and sports performance. This case report helps illuminate the importance between

reasonably presuming symptoms association to a particular diagnosis and thorough diligence to weeding out all alternatives. Thyrotoxicosis factitia leading to thyroid storm has been rarely documented in the US. These individuals are thought to have a background of psychiatric disease, most commonly paramedical personnel with access to thyroid hormone, or those who have previously been prescribed thyroid hormone. In this case, the patient does not fit the aforementioned classifications because he purchased thyroid products online with the intentions lose weight and help enhance sports performance. With the rise in the obesity epidemic coupled with the easy access of these thyroid preparations online, a health care provider can plausibly expect more patients in the future with similar presentations. In considering patients presenting to the hospital with acute alterations in mental status and delirium tremens, despite no history of thyroxine use, it is important to keep the possibility of thyroid storm secondary to the consumption of exogenous thyroxine use as part of the differential.

# STUDENT ORAL PRESENTATIONS

## 05. Yusra Mansour

### **Auditory midbrain hypoplasia and dysmorphology after prenatal valproic acid exposure.**

Yusra Mansour, Sarah Mangold, Devon Chosky, Randy J Kulesza Jr, PhD

LECOM Student

**Abstract:**Autism spectrum disorder (ASD) is a neurodevelopmental condition commonly associated with auditory dysfunction, ranging from deafness to hypersensitivity. In utero exposure to the antiepileptic valproic acid (VPA) is known to impart a significantly higher risk of ASD in humans. Using in utero VPA exposure as an animal model of ASD, we have recently demonstrated significantly fewer neurons in lower brainstem auditory nuclei, the cochlear nucleus and superior olivary complex. We have also shown that VPA exposure results in fewer neurons expressing the calcium binding proteins, calbindin and calretinin and reduced dopaminergic innervation to these hindbrain centers. Additionally, we have shown that VPA exposure results in gait ataxia, significantly smaller cerebellar Purkinje cells with shorter and less complex dendrites and reduced expression calbindin in the cerebellum. In the submitted manuscript, we extend our investigation of VPA exposure to the auditory midbrain, namely the nuclei of the lateral lemniscus and the inferior colliculus. In VPA-exposed animals, we find significantly fewer neurons, fewer calbindin-positive neurons and reduced dopaminergic terminals. These results suggest that VPA has a widespread impact on auditory brainstem centers and we believe these changes are the root cause of auditory dysfunction in VPA-exposed animals and in human subjects with ASD. We believe that these findings will help clarify the impact of neurodevelopmental disorders, such as ASD on neuronal circuits in the auditory brainstem.

## 06. Marcus Wilson

### **Inpatient observation following a normal CT brain in patients with minor head injury on warfarin. Are sequential CT scanning truly warranted and can they be discharged home safely?**

Marcus Wilson OMS-4(Presenting author), Ronald Peirish OMS-4 ,Daniel Martin DO, Kaeli Freeborough OMS-4, George McKenny DO, Lauren Sciuillo MS 4,Hina Dalal MS 4, Shruti Varma MS 4, Raahil Malhotra MS 4,Diane Vido Thompson MS. Saptarshi Biswas MD, FRCS, FA

LECOM Student

**Abstract:** Aim TBI is one of the leading cause of death and disability in the US irrespective of age, race, gender, ethnicities and economical status and imparts a paramount effect on health system. There are not sufficient data to conclude that mild TBI patients on oral anticoagulation with negative initial CT scans could be discharged safely. We tried to answer the question whether a repeat CT is warranted and whether these patients truly need admission. Methods We conducted a 4 year retrospective chart review study involving anticoagulated (on warfarin) patients who had sustained minor head injury at a level 2 community regional trauma center. Results 61 patients met our strict inclusion criteria which included Minor or minimal head injury with a GCS on admission 13-15, Blunt mechanism only, Injury sustained within 48 hours of admission, with no focal neurodeficit and/or no evidence of cranial fracture and all patients admitted for at least 24 hours observation with a repeat CT scan performed before discharge. Glasgow Coma Score was 14 in 13% of the patients (8/61) and 15 in 87% of the patients (52/61). All 61 patients were on Coumadin and only 15% of the patients (9/61) took aspirin as an additional anticoagulant. The first CT scan was negative in all 61 patients. The second CT scan,

performed at 6 hours, was negative in 93% of the patients (52/61) and positive in (3/61) of the patients. 98% of the patients (60/61) had no neurological deterioration during their hospital stay. Conclusion: We believe that with proper education and family support, patients that have a mild head injury, a therapeutic INR, and negative CT scan can be safely discharged home with close monitoring, provided they have stable family support, and detailed instructions on when to return.

## 07. Robert Waters

### **The Effect of Cinnamaldehyde Ointment on Prevention and Treatment of Staphylococcus aureus and Pseudomonas aeruginosa.**

Robert Waters, MS\*, Daniel L. Austin, PharmD, Nancy Carty, PhD, Christopher C. Keller, PhD, FNAOME  
LECOM Student

**Abstract:** Introduction: Staphylococcus aureus and Pseudomonas aeruginosa can cause a variety of skin infections. These bacteria are becoming more resistant to increasing numbers of antibiotics, leading to a need for new treatment options. In our previous studies, it was discovered that cinnamaldehyde (CA), the main active component of cinnamon bark oil (CBO), was just as effective as CBO in inhibiting both S. aureus and P. aeruginosa. The goal for this study was to determine if compounding CA into an ointment would have similar inhibitory effects against both bacteria. Methods: A 2% CA ointment with or without paraben was prepared and compared to 100% CA throughout the studies. For prevention studies, bacteria were grown on the plate and then ointment or CA was added. Plates were incubated for 24 hrs at 37°C, followed by measurement of the zone of inhibition (ZOI). For treatment studies, bacteria were incubated for 24 hrs, then ointment or CA was added. Plates were incubated for additional 24 hrs and ZOIs were measured. Results: For the prevention studies, there was no significant difference between the 100% CA or the CA ointments, however the 100% CA did trend slightly larger for all strains of S. aureus and P. aeruginosa. For the treatment studies, there was no effect on growth inhibition for all strains of S. aureus treated with 100% CA or the ointments. However, all strains of P. aeruginosa were inhibited by treatment with 100% CA and the ointments with larger ZOIs than observed in the prevention experiments. Conclusion: Results presented here demonstrate that a 2% CA ointment with paraben is as effective as 100% CA. Thus the 2% CA ointment preparation might be used as a preventative technique for skin infections in burn victims or for diabetic foot wounds. In addition, the ointment might also be used as a novel treatment for topical P. aeruginosa infections. Further studies examining the effect of CA ointment in toxicity studies and animal models are in preparation.

## 08. Haley Prough

### **Comparison of the Force Required for Dislodgement Between Secured and Unsecured Airways**

Curtis Davenport, DO; Christian Martin-Gill, MD, MPH; Henry E. Wang, MD, MS; James Mayrose, PhD;  
Jestin N. Carlson, MD, MS; Haley Prough, OMS-III  
LECOM Student

**Abstract:** Airway device placement and maintenance are of utmost importance when managing critically ill patients. The best method to secure airway devices is currently unknown. We sought to determine the force required to dislodge 4 types of airways with and without airway securing devices. We performed a prospective study using 4 commonly used airway devices (endotracheal tube [ETT], laryngeal mask airway [LMA], King laryngeal tube [King], and iGel) performed on 5 different mannequin models. All devices were removed twice per mannequin in random order, once unsecured and once secured as per manufacturers' recommendations; Thomas Tube Holder for ETT, LMA, and King; custom

tube holder for iGel. A digital force measuring device was attached to the exposed end of the airway device and gradually pulled vertically and perpendicular to the mannequin until the tube had been dislodged, defined as at least 4 cm of movement. Dislodgement force was reported as the maximum force recorded during dislodgement. We compared the relative difference in the secured and unsecured force for each device and between devices using a random-effects regression model accounting for variability in the manikins. The median dislodgment forces (interquartile range [IQR]) in pounds for each secured device were: ETT 13.3 (11.6, 14.1), LMA 16.6 (13.9, 18.3), King 21.7 (16.9, 25.1), and iGel 8 (6.8, 8.3). The median dislodgement forces for each unsecured device were: ETT 4.5 (4.3, 5), LMA 8.4 (6.8, 10.7), King 10.6 (8.2, 11.5), and iGel 3.9 (3.2, 4.2). The relative difference in dislodgement forces (95% confidence intervals) were higher for each device when secured. When compared to secured ETT, the King required greater dislodgement force (relative difference 8.6 [4.5–12.7]). Compared with a secured device, an unsecured airway device requires only half the force to cause airway dislodgement. The secured King had the highest dislodgement force relative to the other studied devices.

**ABSTRACTS**  
**POSTER PRESENTATIONS**

## POSTERS IN THE ATRIUM

### A1. Dominique Baker

#### Comparison of Antibiotics and Essential Oil Preparations on Growth Inhibition of Methicillin Resistant *Staphylococcus aureus*

Dominique Baker\*, Robert Waters, MS, Kyle Scully, PhD, Christopher Keller, PhD, FNAOME, Nancy Carty, PhD

LECOM Student

**Abstract:** Introduction: Methicillin-Resistant *Staphylococcus aureus* (MRSA) is a gram positive bacteria that is the most common cause of cellulitis and folliculitis. Given the prevalence of MRSA in the community and its ability to acquire resistance via horizontal gene transfer, it is important to investigate potential novel therapies. Our previous studies have shown that essential oils, like red thyme oil, oregano oil, and cinnamon cassia oil, have greater inhibitory effects on the growth of MRSA than some antibiotic disks. Thieves oil, an anecdotal remedy for recurrent MRSA infections, is a blend of cinnamon cassia bark oil, eucalyptus oil, rosemary oil, clove oil, and lemon oil. In this study, we examined the effect of Thieves oil on inhibiting the growth of MRSA in comparison to pure essential oils and selected antibiotics. Methods: The Kirby-Bauer disk diffusion method was used to produce zones of inhibition (ZOIs) to compare the effect of 5 pure essential oils, 7 antibiotics, and the Thieves oil blend on the growth inhibition of MRSA lab strain BAA977. Results: The ZOI produced by Thieves oil was smaller than the ZOI of all the antibiotics except for penicillin. When comparing the pure essential oil ZOIs to that of Thieves oil, it was found that cinnamon cassia bark oil and rosemary oil had greater ZOIs while clove oil, eucalyptus oil, and lemon oil had smaller ZOIs compared to Thieves oil ZOI. Conclusion: Results presented here show that Thieves oil was less effective in inhibiting growth of MRSA than some of the component oils, suggesting that Thieves oil is not an appropriate antimicrobial for MRSA infections, despite anecdotal information. Future studies should be performed to compare the minimum inhibitory concentrations and the minimum bacteriostatic concentrations of the most effective oils, cinnamon cassia bark and rosemary oil.

### A2. Meghan Robinson

#### The relative frequency of neuronal perikaryal sizes differentiates five classes in higher-order nuclei of the human thalamus

Este Armstrong, Gizem Kahveci, Sarah Lago, Jennifer Lenchner, Meghan Robinson, Elizabeth Sever

LECOM Student

**Abstract:** The relative frequencies of neuronal perikaryal sizes were analyzed in different human thalamic nuclei. The data are from a normal human brain that is part of the Yakovlev Collection. Neurons were identified by their full, round nucleoli and an eye-piece micrometer measured two axes, the longest and the second at right angles to that. It is assumed that shrinkage is common throughout the thalamus and measurements were made systematically in all three dimensions of the nuclei. Although exact functional associations of soma size are not known, size is thought to reflect attributes of how information is delivered rather than of content. Higher-order thalamic nuclei; the pulvinar, the lateral posterior nucleus, and the medial dorsal nucleus, were characterized by having a population of small neurons (400-1200  $\mu\text{m}^3$ ) and a larger range of intermediate sized neurons (2000-6000  $\mu\text{m}^3$ ). There was a scattering of a few larger perikarya in all these nuclei (>5800  $\mu\text{m}^3$ ). All higher-order nuclei had very

few neurons in the size range (1200-2000  $\mu\text{m}^3$ ). The intermediate cell groups formed four distinct local maxima that overlapped each other, suggesting a concurrence of modulating properties for corticothalamic afferents. Despite their different content, each peak may form a single class. The limbic nuclei, anterior principalis and lateral dorsalis, resembled higher-order nuclei in having few neurons in the 1200-2000  $\mu\text{m}^3$  range, but differed, by having a single peak of intermediate sized soma. Sensory nuclei showed a different distribution. Intermediate sized neurons in the ventroposterior lateral and medial nuclei had a unimodal distribution, resembling those of motor nuclei, ventrolateral oralis and ventrolateral caudalis and medialis, but differ in having large neurons as well. Distributions in both geniculate bodies had local maxima and minima with little overlap, suggesting that geniculate neurons modulate according to local demands and do not form a single class.

### **A3. Ryan Zimmerman**

#### **Repeated prenatal exposure to valproic acid disrupts ascending projections to the central nucleus of the inferior colliculus**

Ryan S. Zimmerman M.Sc., Dr. Randy Kulesza, Ph.D.

LECOM Student

**Abstract:** Prenatal exposure to the antiepileptic valproic acid (VPA) is associated with an increased risk of autism spectrum disorder (ASD) in humans and is a validated and biologically relevant animal model of ASD. The majority of individuals with ASD exhibit some degree of auditory dysfunction, ranging from deafness to hypersensitivity. Animals exposed to VPA in utero have abnormal responses to sound and frequency maps in the cerebral cortex and hyperactivation, hypoplasia and abnormal neuronal morphology in the cochlear nuclei (CN), superior olivary complex (SOC), nuclei of the lateral lemniscus (NLL) and central nucleus of the inferior colliculus (NCIC). Further, our previous work provides evidence that GABAergic neuronal populations may be more severely impacted by in utero VPA exposure. However, the axonal projection patterns of brainstem nuclei to the CNIC have not been investigated. Herein, we use stereotaxic injections of the retrograde tracer Fast Blue to examine the proportions of neurons in the CN, SOC, NLL and contralateral CNIC projecting to the auditory midbrain. Our results indicate that not only are there fewer neurons in the auditory brainstem after VPA exposure, but that fewer neurons send axonal projections to the CNIC. Further, our findings support our morphometric analyses that VPA exposure has a preferential impact on GABAergic neuronal populations and that VPA exposure results in an imbalance in excitatory and inhibitory inputs to the auditory midbrain.

### **A4. Weam Altaher**

#### **Impact of Neonatal Excitotoxicity on the Auditory Brainstem**

Weam Altaher, M.S; Randy Kulesza, PhD

LECOM Student

**Abstract:** Glutamate is the most abundant excitatory neurotransmitter in the central nervous system and is stored and released by neurons and astrocytes. Neurons in the neonatal central and peripheral nervous systems are sensitive to glutamatergic excitotoxic effects. Excitotoxic events during the early neonatal period have resulted in near complete loss of retinal ganglion cells and concomitant loss of axons in the optic nerve (Foran et al, 2017). Results from our investigation of excitotoxicity revealed a significant loss of neurons and abnormal expression of calbindin in brainstem auditory neurons. These results suggest that the impact of neonatal excitotoxicity on the auditory system

originates from injury to neurons in the spiral ganglion. We examined the impact of neonatal exposure to monosodium glutamate on spiral and vestibular ganglia, the number of inhibitory terminals surrounding the superior olivary complex nuclei and the number of excitatory and inhibitory terminals surrounding globular bushy and medial nucleus of the trapezoid body cells. We exposed male rat pups to 4mg/g of monosodium glutamate from P4 - P10. On P28 the rats were sacrificed, and their brains were extracted for analysis. There was a significant decrease in density of neurons in spiral ganglia and an increase in cross-sectional area of MSG-exposed animals. A significant decrease in the number of excitatory terminals surrounding the globular bushy cells and cells of the medial nucleus of the trapezoid body was observed. A significant decrease in the number of inhibitory terminals surrounding globular bushy cells, medial nucleus of the trapezoid body and lateral superior olive nuclei was also observed. These results suggest that an early excitotoxic environment significantly impacts neurons in the central auditory system.

## **A5. Zackary M Birchard**

### **Meta-analysis of failure and comparison of bioabsorbable all-in suture anchors for rotator cuff repair and glenoid labrum repair vs. traditional screw-in anchors**

Zackary M. Birchard D.O., M.S.B.S. Kyle J. Holmberg, OMS IV, M.S.B.S. Steven Habusta, D.O., FAOAO, Med

Millcreek Community Hospital

**Abstract:** Objective: This paper was constructed to assess the continued use of bioabsorbable screws in rotator cuff and glenoid repair. Methods: Inclusion and exclusion criteria were developed and through a PubMed review of literature seven articles were identified. Data points were integrated into SPSS where a meta-analysis was completed. Results: When testing the minimal force needed to achieve failure in all recorded data points no difference was seen when assessing the glenoid verse metal group. Statistical difference was seen between the traditional metal verse bioabsorbable group. Conclusion: The use of bioabsorbable screws should remain the gold standard over traditional metal type anchors.

## **A6. Shauni Lee Bobbs**

### **Molecular Epidemiological Investigation of *Borrelia burgdorferi* in *Ixodes scapularis* Ticks Collected from Erie County**

Shauni Bobbs, Nancy Carty, Ph.D., Christopher C. Keller, Ph.D., FNAOME

LECOM Student

**Abstract:** Introduction: *Ixodes scapularis* ticks are the primary vector in transmission of *Borrelia burgdorferi*, the causative agent of Lyme disease (LD). Within the last 10 years, Erie County, PA has seen a dramatic increase in confirmed LD cases. The purpose of this study was to observe if fabric (or clothing) weight influences attachment of questing ticks on Presque Isle State Park (PISP), which could provide information on how to decrease LD transmission to humans. The percentage of *B. burgdorferi*-positive ticks collected at various Erie County locations during Fall 2017 was also calculated. Methods: *I. scapularis* ticks were collected from PISP trails using heavy (H), medium (M), and light (L) weight fabrics. Phenol/chloroform DNA extractions and PCR were used to determine the percentage of *B. burgdorferi*-positive ticks collected at three Erie County locations (PISP, Erie Bluffs State Park (EB), and Zuck Park (ZP)). To confirm proper DNA isolation, PCR was used to identify the *I. scapularis* mitochondrial 16S rRNA gene. A second PCR was performed to identify the *B. burgdorferi* 16S rRNA gene. Results: Ticks (n=208) were captured using H, M, and L weight fabrics. Although more ticks were collected with H fabric, the difference was not significant. During Fall 2017, 34% (83/245) of ticks collected were *B. burgdorferi*-

positive, however there was no significant difference in the number of positive ticks from PISP relative to EB and ZP. Conclusion: Results from this study suggest that clothing weight will not influence the probability of I. scapularis tick attachment. Because the percentage of B. burgdorferi-positive ticks found in Fall 2017 did not differ among Erie County locations, this study also suggests that location does not impact B. burgdorferi carriage rate. By adding to the growing body of LD research, it is hoped that the information in this study can be used to educate healthcare providers and the public on LD prevention.

## **A7. Jordan Bonier**

### **Patient Perceptions Regarding Viscosupplementation For Treatment of Osteoarthritis of the Knee**

JORDAN R. BONIER, D.O., M.S.; JEROME H. BONIER, D.O.

Millcreek Community Hospital

**Abstract:** Viscosupplementation as a treatment for knee osteoarthritis is widely used, though current literature is controversial regarding its efficacy. The purpose of this study was to evaluate patient perceptions regarding viscosupplementation as a treatment for knee OA. A questionnaire was administered randomly to 200 patients of a community-based orthopedic practice. Items focused on subjective patient outcomes in regard to their experience with viscosupplementation, as well as WOMAC symptom scores. One hundred and fifteen completed surveys were returned (response rate = 57.5%). Fifty-one patients (44.3%) reported some relief of symptoms and 18 patients (15.7%) reported large relief. Fifty-eight patients (50.4%) described their relief as lasting 1-4 weeks, with only 15 patients (13.0%) reporting 6 or more months of relief. Fifty-three patients (46.1%) stated they had more symptom relief with viscosupplementation when compared to corticosteroid injections. One hundred and ten patients (95.7%) had no prior surgery for knee OA. Ninety-two patients (80.0%) had not experienced any adverse effects. One hundred and eight patients (93.9%) stated they felt the treatment was worth the cost. One hundred and one patients (87.8%) said they would recommend viscosupplementation to another patient. Average WOMAC scores for patients who responded with no relief of symptoms was 80.4, while the average WOMAC score was 8.6 for those responding with complete relief. In conclusion, viscosupplementation has a positive treatment effect in a majority of patients, especially those with milder symptoms, and may provide improved symptom relief when compared to corticosteroid injections. More affordable viscosupplementation options must be investigated in the future.

## **A8. Patrick Bowers**

### **The Relationship Between Homeless Psychiatric Patients and Their Rate of Readmission**

Patrick Bowers, DO Supervisor: Mark Strazisar, DO

Millcreek Community Hospital

**Abstract:** Consistent repeated readmission and use of a psychiatric hospital as a primary source of care stresses a burdened system. It remains imperative for hospitals to appropriately identify risk factors for psychiatric patient readmission. Such populations can be targeted with focused inpatient and outpatient interventions in attempt to reduce hospital readmissions and improve patient care. Several studies have identified homelessness, a specific psychiatric diagnosis of mood disorder or schizophrenia, prior hospital admission, AMA discharge, and alcohol addiction as playing a key role in psychiatric hospital readmission rates. Likewise, each of these risk factors may easily be comorbid in psychiatric patients and potentially combine to exacerbate the rate of readmission. In-hospital efforts to reduce readmission may involve identifying preventable risk factors, improving communication with patients to change the perceived effort of care and reduce AMA discharge, and evaluating patients for alcohol

relapse prevention. Likewise, it may also be beneficial to address a patient's substance abuse, recognize psychological factors, and conduct motivational interviews with the patient. 3 Outpatient efforts to reduce readmission may involve following up with a patient's transition into the community, assisting patients with obtaining insurance, and possibly providing housing.

## **A9. Nicholas Callahan**

### **Self Reported Injury Patterns in Tough Mudder® Competitions**

Nicholas K. Callahan, DO, MS

Millcreek Community Hospital

**Abstract:** Purpose: Obstacle course competitions are an increasingly popular activity in the United States as well as internationally, the Tough Mudder® is one of the fastest growing of these. With this growth there are increasing activity related injuries. There is a dearth of information related to the injury profiles in these competitions with the published reports being serious, debilitating, or frightening injuries. Patients and methods: Observational study design completed via anonymous online questionnaire. A link to the survey was posted on social media websites. Any individual who participated in any Tough Mudder® competition was asked to fill out the survey regardless of injury status. Those who did not sustain an injury were encouraged to complete the survey as well. Results: 103 responses with nearly 1:1 male to female ratio, various injury patterns represented with the majority of participants uninjured. Of those that were injured the most common were minor injuries i.e. bruises, cuts, sprains for which they required minimal to no treatment. Conclusion: Despite the previously published reports of serious injuries, the majority of participants in Tough Mudder® events are uninjured with those that are only minor, self-limited injuries.

## **A10. Jonathan Callegari**

### **A retrospective analysis of upper extremity injuries sustained in pediatric soccer players**

Jonathan Callegari DO, Matthew Caid DO, Jae Chang DO, Kevin Little MD

Millcreek Community Hospital

**Abstract:** Introduction: Soccer is one of the most popular sports among children. There is plenty of data regarding the amount of lower extremity injuries sustained during soccer play. There is little data regarding the rate of upper extremity injuries in soccer players. This study will analyze the rate of upper extremity injuries sustained in pediatric soccer players seen over a 10 year period. Materials/Methods: A retrospective chart review was completed over a ten year period identifying all patients seen through the emergency room at a level 1 pediatric trauma center. ICD 9 and 10 codes were analyzed for all upper extremity injuries from the clavicle to the fingertip in pediatric patients aged 2-18. This data was recorded and stratified for age, sex, and type of injury. Results: A total of 3112 injuries were recorded. The most common injury sustained in pediatric soccer players were fractures at 50%, specifically of the distal radius. Distal radius fractures accounted for 39% of all fractures, followed by various phalanx fractures at 20%. The next most common injury pattern was sprains/strains at 10%. Discussion: Upper extremity injuries are a significant problem in soccer. Interestingly, the distal aspect of the limb was the most commonly injured, with a decreasing incidence as one travels up the extremity. The most common injury mechanism recorded was a fall. Males were the more common sex to be affected. Conclusion: This study is a large cohort that quantifies upper extremity injuries sustained in pediatric soccer. The occurrence of these injuries is higher than previously thought. While not as common as lower extremity injuries, these injuries can stop a player from participating and may cause significant morbidity to require a hospital stay or surgery.

## **A11. Jaewon Chang**

### **Posterior-lateral approach to the ankle for ankle fractures.**

Jaewon Chang D.O., Steven Habusta D.O.

Millcreek Community Hospital

**Abstract:** Ankle fractures are one of the most common orthopedic injuries in the world. Approximately upwards of 5 million ankle injuries occur in the US alone (Daly et al. 1987). Whilst most are non-surgical injuries, are surgical candidates and require surgery (Hughes et al. 1979, Broos and Bisschop 1991). The two most common approaches are the lateral approach and the posterior-lateral approach to the ankle (Minihane et al. 2006, Weber and Krause 2005). Both having different advantages and disadvantages (Wissing, van Laarhoven, and van der Werken 1992). The aim of this study is to assess if there is the advantage of the posterior-lateral approach to the ankle (Mason et al. 2017). This proposed review will be aimed to cover previous published articles of cases that have complications recorded using the posterolateral in comparison of other approaches (Talbot, Steenblock, and Cole 2005, Mingo-Robinet, Abril Larrainzar, and Valle Cruz 2012, Little et al. 2013, Lidder et al. 2014).

## **A12. Devon Chosky**

### **Nonuniform innervation of the inferior colliculus from the dorsal nucleus of the lateral lemniscus**

Devon E. Chosky, Jacob C. Mesiti, Randy J. Kulesza Jr.

LECOM Student

**Abstract:** The mammalian auditory system brainstem is a complex processing network and includes a number of nuclei that together function to encode sound source localization, temporal features of complex sounds, and even provide descending modulation to the receptor level. Sound source localization requires comparison of auditory information from both ears – this occurs initially in the superior olivary complex (SOC), the dorsal nucleus of the lateral lemniscus (DNLL), and again in the central nucleus of the inferior colliculus (CNIC). The DNLL is composed of an entirely GABAergic population of neurons that receive input from the cochlear nuclei and bilateral SOC. The main target of DNLL axons is the CNIC on both sides of the brain. These inputs are topographic and tonotopic and believed to arise from segregated neuronal populations. Herein, we use stereotaxic injections of the retrograde tract tracer Fast Blue in the right CNIC and FluoroGold in the left CNIC to examine the distribution of retrogradely labeled neurons in the ipsilateral and contralateral DNLL and also to examine for neurons that project bilaterally. Our results suggest that projections from the DNLL to the CNIC are not symmetric, and that neurons making these projections are not uniformly distributed in the nucleus. These results call into question current models of convergence of ascending inputs to the CNIC and sound localization circuits.

## **A13. Justin Cochrane**

Achieving cecal intubation in patients with prior incomplete colonoscopy via enteroscopy, over tube, pediatric colonoscope, or gastroscope.

Justin Cochrane, Christian Jackson FACP, Richard Strong, and Vincent Fierro

Other (please specify)

**Abstract:** A literature search was performed in July 2017 via electronic database PubMed, Scopus, the Cochrane Library and Google scholar. The initial search involved a core of Mesh terms colonoscopy, colonoscopes, and screening colonoscopy. Text terms were add using the Boolean 'AND' with text words

incomplete, failed, fail\*, difficult, repeat\*, and challenge\*. Second search included previous text words with new Mesh terms double balloon enteroscopy, single balloon enteroscopy, push enteroscopy, spiral enteroscopy, pediatric colonoscope, capsule colonoscopy, computer colonography, and gastroscope. Finally, original text words were combined with Boolean 'AND' to additional text terms colonic over tube, water immersion, pill, and fatigue. DBE performed on 494 ICC achieved cecal intubation in 477 (97%) with polyp or adenoma detection in 248 (52%). SBE performed on 244 ICC achieved cecal intubation in 235 (96%) with polyps or adenoma in 131 patients (56%). Two randomized controlled trials compared DBE versus SBE with cecal intubation rates (95% vs 100% OR 0.20 [0.01, 4.03] p = 0.31) Figure 1. Polyp and adenoma detection was similar (51% vs 58% OR 0.70 [0.27, 1.78] I2 19% p= 0.45). Push enteroscopy demonstrated improvement in cecal intubation rate of 89% (141 out of 158) with diagnosis of polyp or adenoma in 56 patients (35%). Over tube were utilized in 117 ICC achieving cecal intubation in 104 (88%) with polyps or adenomas in 36 patients (35%). Gastroscope was utilized in 83 ICC versus 292 ICC in the standard adult colonoscope group with cecal intubation in 62 patients (75%) versus 222 patients (76%) (OR 1.03 [0.59, 1.78] p= 0.92). Pediatric colonoscope utilized in 98 ICC and standard colonoscope 116. Cecal intubation achieved in 75 patients (77%) versus 94 in the adult colonoscope (81%) (OR 0.70 [0.35, 1.38] p= 0.30).

## **A14. Alexander Daves**

### **An ED-specific uncomplicated cystitis antibiogram**

Alex Daves, DO; Vince Peyko, RPh; Matthew Eggleston, DO

**Abstract:** Antibiotic resistance is a growing concern in urinary tract infection as well as many other settings. Uncomplicated cystitis is an infection affecting the urinary tract of immunocompetent women of childbearing age without anatomical anomalies or complicating comorbidities. Urinary tract infection account for two million emergency visits in 2011. Local, national, and international resistance data are used by healthcare providers to help guide treatment choices. Most sensitivity studies performed suffer from significant biases, incomplete data and generalizations. Our current antibiogram combines data from inpatients and outpatients in the treatment of UTIs, which likely results in decreased sensitivity for de-escalated empiric antibiotic regimens for patients discharged home. There are currently few studies that delineate resistance data between patients discharged home versus patients admitted or with antibiotic resistance risk factors. We retrospectively reviewed charts to identify patients with positive urine cultures, defined as greater than 100,000 colony-forming units. We then excluded presence of indwelling catheter, recent hospitalization or antibiotic use, being a nursing home resident, patients admitted to the hospital in order to identify specifically patients that were discharged home with uncomplicated UTI. We then compared the rates of antibiotic resistance in our selected population as compared to our hospital system-wide antibiogram previously used for antibiotic selection and found that 6 de-escalated empiric antibiotic choices had decreases in resistance rates that were statistically significant. We therefore concluded that patients discharged home with uncomplicated UTI are a separate patient population, and we must therefore recommend that their data is analyzed independently of the combined hospital data on a routine basis to create an effective antibiogram for uncomplicated UTI treated as an outpatient.

## **A15. Auryana DeChick**

### **Skeletal Muscle Abnormalities in a prenatally androgenized rat model for PCOS**

Auryana DeChick, M.Sc., Mary Petro, Jack Lee, Ph.D., and Diana Speelman, Ph.D.  
LECOM Student

**Abstract:** Introduction: Polycystic ovarian syndrome (PCOS) is a common endocrine disorder affecting ~10% of reproductive-aged women. This disorder impacts endocrine, reproductive, and metabolic function. Women with PCOS can have increased lower body lean muscle mass and altered skeletal muscle fiber composition. In this study, we analyzed the mass, structural, and functional characteristics of individual hindlimb skeletal muscles from control and prenatally androgenized (PNA) rats, a model for PCOS. Methods: Sprague-Dawley rats were prenatally androgenized (PNA) with 5 mg of testosterone on gestational days 16-19. At 15 weeks of age, exercise endurance on a rotarod was analyzed. At 16 weeks, extensor digitorum longus, soleus, and tibialis anterior muscles were weighed. Mitochondrial content and muscle fiber composition were analyzed using immunolabeled antibodies against ATP synthase or fast and slow myosin heavy chain, respectively. Results: PNA rats exhibited a significant increase in body weight, as well as in the weight of extensor digitorum longus, soleus, and tibialis anterior muscles. PNA rats also displayed a trend toward decreased rotarod time, increased ATP synthase immunofluorescence, and increased type II fiber composition in the gastrocnemius muscle. Conclusion: These results suggest that prenatal androgen exposure may alter skeletal muscle structure and function, favoring an increase in type II muscle fiber content. Higher proportions of type II muscle fibers are known to correlate with impaired physiological responses to aerobic capacity, increased serum androgen levels, measures of insulin resistance, and the development of type II diabetes mellitus.

## **A16. michael dobrowolski**

### **APL Distal Insertion Variability: Cadaveric Variation in Abductor Pollicis Longus Accessory Slip Insertion Site.**

Michael Dobrowolski D.O., MHSA Steven Habusta D.O.

Millcreek Community Hospital

**Abstract:** Fifteen cadaveric specimens were dissected to identify the insertion site(s) of Abductor Pollicis Longus tendon and accessory slips. Thirteen dissections revealed accessory slips with variable insertion sites leaving only two specimens with a single APL insertion. Eight dissections revealed three APL slips, three with three APL slips and two with four slips. APL slip insertion sites included: 20 slips inserting on the first metacarpal base, 13 slips inserting on the Trapezium and 2 on the Oppenens Pollicis. Variation was noted in both presents and number of accessory slips of the APL as well as accessory slip insertion sites. Keywords: Abductor pollicis longus, accessory slips, basal joint motion, cadaveric, carpometacarpal joint arthritis, basal joint arthritis, joint force

## **A17. Bryan Fiema**

### **Millcreek Community Hospital Sepsis Review**

Bryan J Fiema, DO

Millcreek Community Hospital

**Abstract:** In 2002, the newly formed Surviving Sepsis Campaign announced the Barcelona Declaration, a pledge to reduce the mortality rate in sepsis and septic shock by advocating for early detection, prompt treatment, and expansion of education and leadership in managing sepsis. Sepsis is an overwhelming systemic response by the body to infection with the propensity to lead to organ failure and ultimately, death. Based on the Rivers Trial released the previous year, the Surviving Sepsis Campaign sought to advance early treatment through consistent clinical protocols. Based on this research, the 2016 Surviving Sepsis Campaign Guidelines for the management of sepsis and septic shock recommends a prompt, protocolized approach to treatment. These guidelines endorse emergent obtainment of microbiological cultures, fluid resuscitation, and broad spectrum antibiotic therapy. Of

the patients involved in this analysis, seven succumbed to their illness giving a mortality rate of 30% which is lower than the mortality rate of 51% reported across multiple academic centers in previous studies. Prompt antibiotic treatment contributes greatly to the wellbeing of patients with sepsis, and all patients examined in this study received prompt treatment. Identification of causative organisms is critical to ensuring appropriate antibiotic therapy and providing treatment specific to the source of infection. With four patient who did not have blood cultures drawn before receiving antibiotics, this presents one area for improvement at Millcreek Community Hospital.

## **A18. Roger Gregush**

### **A patient survey of their perception of the care they received from osteopathic orthopedic residents as compared to their attending physicians.**

Roger Gregush, D.O., M.S. Orthopedic Surgery Resident PGY2 Affiliation: LECOM Health/Millcreek Community Hospital Email: roger.gregush@med.lecom.edu Work Phone: (814) 868-8206 Steven Habusta, D.O., FAOAO, Med LECOM Health Orthopedic Surgery Resid Millcreek Community Hospital

**Abstract:** Context: Residency training is the most crucial stage of a physician's academic career. Patient perception and understanding affects their willingness and comfort in having residents involved in their care. Objective: To assess patient comfort, perception and understanding of residency training and having osteopathic orthopedic residents involved in their care. Methods: This study was performed as a 17-question survey given to 135 orthopedic patients, 18 years or older, in outpatient orthopedic clinics attached to two community hospitals. Results: 76% of patients felt comfortable with having osteopathic orthopedic residents involved in their care and felt that residents were professional and attentive to their concerns. 74% of patients indicated that they would chose to have osteopathic orthopedic residents involved in their care in the future. 76% of patients found that having an osteopathic orthopedic resident involved in their care was a positive experience. 79% of patients indicated that they would like to contribute to resident training by having residents involved in their care. Additionally, most patients demonstrated poor understanding of physician academic training with only 27% of participants correctly indicating that an attending physician graduated from medical school and completed residency training, and 41% of participants correctly identified that a resident has obtained either a D.O. or M.D. degree. Conclusion: The study results were largely in line with prior studies demonstrating that most patients felt comfortable with having residents involved in their care. Most patients indicated that having residents involved in their care was a positive experience. Patients remain confused regarding residents' level of education and role in the medical team. Even so, most patients would choose to have residents involved in their care in the future and feel it is a valuable means to contribute to the education of future osteopathic orthopedic surgeons.

## **A19. Chrisalbeth J Guillermo**

### **Establishing a student-run clinic to boost confidence in osteopathic manipulative medicine**

Guillermo, Chrisalbeth J.; Thomas-Clark, G. Renee  
Millcreek Community Hospital

**Abstract:** Background: The first core competency of osteopathic medicine for medical students is osteopathic principles and practices (OPP). Within osteopathic training, there is a need to increase confidence in and utilization of OPP, as students transition into clinical practice. Furthermore, there is a need to educate and expose the general public to the benefits of OPP. The goal of this study is to assess whether a student-run OMM clinic would be of interest and need among osteopathic medical students'

and resident trainees. Methods: A review of the literature and examination of other medical schools that have established student-run OMM clinics were conducted. Communication was initiated with an osteopathic medical school that has begun the process of creating a student-run clinic. Contact was made with key personnel in the local osteopathic medical school and the community. A needs assessment questionnaire was drafted and data collected from osteopathic students and medical residents. Results: A total of 98 respondents, ranging from first-year medical student to fourth-year or higher. Training and education in OMM/OMT primarily included didactic learning and practice in the lab. Fewer respondents acquired experience through use in clinic or the hospital. Although a majority agree that OMM is a useful treatment modality (89.8%), only 58.17% show confidence in their knowledge of OMM. 86.73% believe that participation in a student-run OMM clinic would be beneficial. 74.49% would volunteer to practice at such a clinic, or serve as a patient on whom students and residents would practice. Discussion: Research has shown that medical students are more confident in their abilities and are more likely to perform OMT during clinical clerkships when they have more experience. Establishing a student-run OMM clinic will provide broad opportunities to practice osteopathic techniques in a formal setting.

## **A20. Abrar Haider**

### **Review of HER2 overexpression in malignant diseases outside of commonly diagnosed carcinomas**

Abrar Haider, James Henry, Barbara Landers, James Milstead, Dana Bacharach, Trey Aguirre, Eric Lemister, Olivia Napoli, Jenny Prochotsky, and Amitabha Ray  
LECOM Student

**Abstract:** The human epidermal growth factor receptor 2 (HER2 or neu) is one of many cell membrane receptors involved in growth signaling pathways. Like several other growth factor receptors, abnormal expression of HER2 perhaps is associated with the uncontrolled cellular growth/proliferation and cancer development. In general, abnormal HER2 expression has been documented to be connected with a number of malignancies of epithelial origin (i.e., carcinomas), particularly breast cancer. In breast cancer, overexpression of this growth factor receptor is considered as an important prognostic marker; and targeted therapy has been developed against this receptor. On the other hand, studies on rare cancers and tumor-tissues that derived from the mesoderm are sparse. In the present study, an attempt has been made to evaluate the overexpression of HER2 in this type of cancer tissues. For this purpose, HER2-overexpression has been assessed in various malignancies, e.g., brain tumors, hematological cancers, endocrine tumors, pediatric cancers, bone tumors, skin cancers, hereditary/familial neoplasms, and metastatic tumors.

## **A21. Michael Hankins**

### **Lymphangitis and Pain After Treatment of Plantar Warts with Cantharidin**

Michael Hankins, DPM \* Kristen Heard, DPM, MS (Med Ed.) # Jason Lee, DPM, MS (Med Ed.) @  
Millcreek Community Hospital

**Abstract:** Objective: To present an uncommon, but severe reaction to a commonly used topical medication for the treatment of plantar warts. Methods: PubMed and Ovid MEDLINE were searched from 1950 to 2017 using the following search terms: plantar warts, cantharidin, reaction, lymphangitis, and non-bacterial cellulitis. Relevant manuscripts were retrieved and the results were used for a brief review of the literature. Discussion: A single application of Cantharone PLUS to three plantar warts caused a severe reaction of pain, swelling and possible lymphangitis from the application site, to proximally up the foot. The reaction responded well to oral antibiotics and warm compresses. It

resolved, within a week, with no long-term adverse effects to the patient. Conclusion: Cantharidin, a topically applied vesicant, can be useful for treating plantar warts, but the possibility of a severe reaction must be considered and should be disclosed to the patient before application. It has been suggested that adjusting the length of exposure may reduce the severity of the reaction.

## **A22. MATTHEW HINTZ**

### **A Cadaveric Feasibility Study of Partial Joint Resurfacing for First Carpometacarpal Arthritis**

Matthew L. Hintz D.O. M.S., Minju Hwang OMS4

Millcreek Community Hospital

**Abstract:** Background Osteoarthritis of the first carpometacarpal (CMC) joint is a common diagnosis in orthopaedics. Traditionally, it has been managed progressively from nonsurgical options to operative treatment. Previous surgical options include: trapeziectomy with or without ligament reconstruction and soft tissue interposition, silicone based implants, total joint arthroplasty, and arthrodesis. This was a cadaveric feasibility study for the potential application of organic polymer-based partial joint resurfacing to manage first CMC joint arthritis. Methods 10 first CMC joint specimens were dissected and exposed. Articular surface dimensions were measured on each, and a 6mm cylindrical implant was introduced to the proximal articular surface of each first metacarpal with a prominence of approximately 2mm. Articular range of motion was evaluated before and after device implantation. The articular measurements, and approximate ratio of implant to articular surface dimensions, were also calculated. Results The mean articular surface area of the proximal first metacarpals examined was 251.25mm<sup>2</sup> +/- 81.59mm<sup>2</sup>. The mean ratio of the 6mm diameter articular implant compared to the articular surface of the 10 specimens was 0.12 +/- 0.3. The articular range of motion was examined before and after implant application. However, given the preserved state of the specimens, this could not be reliably measured. Conclusions It is feasible that partial joint resurfacing implants can be used within the proximal first metacarpal articular surface to manage osteoarthritis of the first carpometacarpal joint. This procedure is analogous to current surgical treatment options for first tarsometatarsal osteoarthritis. The next step would be to determine the optimal diameter implant in order to maximize the surface area, while decreasing the risk of fracture, and adapting the current foot and ankle designs to address the first carpometacarpal joint for the pursuit of human trials.

## **A23. Julie Hoang**

### **Correlation between glycosylated hemoglobin and triglyceride levels in type 2 diabetes mellitus through a retrospective analysis**

Julie Hoang

Millcreek Community Hospital

**Abstract:** Diabetes is rapidly become one of the most burdensome chronic diseases not only in the United States but the epidemic is increasing globally as well. It can lead to many complications including micro and macrovascular diseases affecting the heart, kidneys, eyes and nerves. It is not the disease that is deadly but the complications that ensue. The most common cause of death is cardiovascular disease. Dyslipidemia is also a risk factor for cardiovascular disease. The purpose of this study was to determine if there was a correlation between increasing glycosylated hemoglobin (HbA1c) and triglyceride levels in type 2 diabetes mellitus patients through a retrospective analysis study of patients admitted to Millcreek Community Hospital in Erie, PA from October 12, 2012 to October 12th, 2017. 207 patients were included in this study and certain demographic information were also collected including gender, age, tobacco use, alcohol use, history of coronary artery disease, arrhythmias,

peripheral vascular disease, dyslipidemia, and hypertension. An ANOVA statistical analysis was conducted and there was no significant correlation between triglyceride levels and HbA1c. the ultimate goal of this study was of this study was to increase awareness in the detecting dyslipidemia based on patients with poor glycemic control to help decrease the progression of the deadly complications of diabetes, one being cardiovascular disease. However, in this patient population, there was no significant correlation between high triglyceride levels and glycosylated hemoglobin.

## **A24. Don Jude Jayamaha**

### **The Effect of Carvacrol and Thymol on Growth Inhibition of Staphylococcus aureus and Pseudomonas aeruginosa**

Don Jude Jayamaha, MS\*, Robert Waters, MS, Erika Allen, PhD, Kyle Scully, PhD, Nancy Carty, PhD, and Christopher C. Keller, PhD, FNAOME \* indicates presenting author  
LECOM Student

**Abstract:** Introduction: Gram-positive Staphylococcus aureus and gram-negative Pseudomonas aeruginosa are pathogens responsible for numerous bacterial infections. The rising rates of infections caused by antibiotic resistant strains of these bacteria have necessitated development of novel therapeutic approaches. Our previous research found that oregano oil (OO) and red thyme oil (RTO) are two of the most effective oils against S. aureus, and also effective against P. aeruginosa. The goal of this study was to determine the effects of carvacrol and thymol, the major components of OO and RTO respectively, on S. aureus and P. aeruginosa growth inhibition. Methods: Kirby-Bauer disc diffusion method was used to determine the zone of inhibition (ZOI) of carvacrol and thymol individually against three strains of S. aureus and three strains of P. aeruginosa. ZOIs for carvacrol and thymol were acquired and compared to ZOIs obtained for OO and RTO. In separate experiments, carvacrol and thymol were combined to observe possible synergistic interactions, and ZOIs were compared to the ZOIs of OO and RTO. Results: Carvacrol and thymol produced larger ZOIs for S. aureus relative to P. aeruginosa. For S. aureus, there was no difference in ZOIs between carvacrol and OO or RTO, however ZOIs for thymol were significantly lower than ZOIs for RTO. For P. aeruginosa, both carvacrol and thymol produced significantly lower ZOIs compared to RTO. Combinations of carvacrol and thymol produced similar ZOIs as OO and RTO. Conclusion: Although carvacrol and thymol did have antimicrobial effects against S. aureus and P. aeruginosa, neither was more effective as the OO and RTO, and there was no synergistic activity between these components. Since RTO was most effective at inhibiting bacterial growth in the present study, it may be advantageous to explore the therapeutic potential from combinatory approaches involving RTO and other oils or their components.

## **A25. Kristin Juhasz**

### **TRIAD XI: Effect of Advance Directives and POLST Documents on Medical Resident and Staff Nurse Treatment Decisions During a Medical Crisis**

Ferdinando Mirarchi, DO, FACEP1; Brian Risavi, DO1; Timothy E. Cooney, MS1; Kristin Juhasz, DO1

**Abstract:** Objective: To assess the clarity of POLST or LW documents among nurses and residents during simulation laboratory sessions. Methods: Nurses and residents responded to emergency patient simulation scenarios accompanied by either POLST, LW, or no documents. Participants were randomized to receive documents with one of five different scenarios. Scenarios prompted a resuscitation decision and time to response. Results: In critically ill patient scenarios without documents, 100% of patients were resuscitated in ~20 seconds. In an otherwise healthy 61-year-old with LW who went into cardiac arrest, 1 (17%) participant did not resuscitate, and 5 (83%) responded in  $18 \pm 12.4$  seconds (n=6). In the

case of a 79-year-old with advanced Parkinson's Disease plus critical illness, 100% of participants did not resuscitate ( $71 \pm 63.9$  seconds,  $n=3$ ) given the LW. With a POLST specifying DNR/CMO or DNR/LTD, patients were resuscitated between 33% to 66% of the scenarios. In participants who resuscitated, the decision occurred between ~30 and 60 seconds. With a POLST indicating CPR/FT, 100% ( $n=6$ ) of participants resuscitated the patient in  $16 \pm 11.1$  seconds. The rate of resuscitation across all scenarios was 64% for physicians and 80% for nurses ( $p=0.208$ , Chi-Square). With a p-value of 0.179, overall difference in response times were  $17 \pm 15.9$  seconds with no documents,  $36 \pm 42.7$  seconds with LWs, and  $32 \pm 25.0$  seconds with POLST documents. Conclusion: Despite small sample size, simulation offers a unique opportunity to educate providers on EOL concerns and document interpretation. As the scenarios illustrate, document clarity was rarely evidenced, and time to resuscitation was delayed by provider confusion surrounding document interpretation. Mock scenarios involving simulation and debriefing sessions reveal life-like opportunities to improve patient safety and ensure patient wishes to receive or forego life-saving treatment.

## **A26. Stephanie Landreth**

### **Benefits and Harms of Treating Asymptomatic Bacteriuria**

Stephanie Landreth, DO

Millcreek Community Hospital

**Abstract:** Asymptomatic bacteriuria is defined as bacteria being present in a noncontaminated urine sample collected from a patient without signs or symptoms related to the urinary tract. Asymptomatic bacteriuria can be differentiated from a urinary tract infection if symptomology of the urinary tract is present. The prevalence of asymptomatic bacteriuria in men over 65 is 17-50% and 6-34% in women (Zhanel,1990). The idea of whether treating asymptomatic bacteriuria provides any benefit to a patient has been explored throughout the years. Many articles agree that only certain patients meet the criteria for needing treatment of asymptomatic bacteriuria. It has been determined that treatment of asymptomatic bacteriuria in hospitalized and institutionalized patients have no benefit and can potentially cause harm to the patient.

## **A27. Amanda Marker**

### **Drug Overdose-Related EMS Incidents in Southwest Pennsylvania: An Approach for Public Health Surveillance of the Drug Epidemic**

Michael Couser, Amanda Marker, Bianca Radut

LECOM Student

**Abstract:** The current opioid crisis crippling the United States requires a robust public health response. Measuring the extent of the opioid epidemic is a dynamical system limited to statistical sources surveilling only pieces such as coroner reports, police reports, or hospital records that miss survivors that are not arrested or hospitalized. In contrast to these traditional sources, we employ emergency medical system (EMS) patient care reports (PCRs) from a non-profit ambulance service in southwest PA during the years of 2008, 2012, and 2016 to describe a retrospective, multi-year cross-sectional study of opioid overdose. Analysis of these EMS PCRs reveal demographic information, clinical outcomes, and scene information of patients who overdosed on any substance. The data collected reflects trends confirming national data including substantial increases in total overdoses, as well as similar trends in types of drugs used. In addition, data from EMS PCRs uniquely demonstrate a shift from overdoses in private to public locations. Showing how our data bridges the void in current studies, we reveal how overdose deaths do not adequately show the entire picture of the current epidemic, nor

is tracking only naloxone use a sensitive or specific marker of overdoses in the population. These findings argue that the use of EMS data can fill a known void in the current public health monitoring of this crisis.

## **A28. John D. McCarthy**

### **Psoriasis as a Side Effect of Anti-Tumor Necrosis Factor Alpha Treatment**

John McCarthy PGY-2, Family Medicine  
Millcreek Community Hospital

**Abstract:** Anti-TNF alpha medications diminish immunologic function by design, and in so doing incur a wide variety of possible side effects that are highly dependent on the patient's health profile. This literature review attempted to estimate the prevalence of anti-TNF A induced psoriasis, summarize possible mechanisms for disease development, and provide management options to healthcare providers of afflicted patients. By collating existing opinions and observations, consensus was established to help providers anticipate, recognize, and address psoriasis in patients taking TNF-antagonist medications.

## **A29. Jacob C Mesiti**

### **ASYMMETRY OF ASCENDING INPUTS TO THE INFERIOR COLLICULUS FROM THE LATERAL SUPERIOR OLIVE**

Jacob C. Mesiti, Devon E. Chosky, Randy J. Kulesza Jr.  
LECOM Student

**Abstract:** The mammalian auditory system is complex and utilizes numerous brainstem neuronal populations to encode sound source localization, temporal features of sound, and even provide descending modulation to the organ of Corti. Sound source localization requires a convergence of auditory information from both ears to be integrated by neurons in the superior olivary complex, nuclei of the lateral lemniscus, and central nucleus of the inferior colliculus (CNIC). Specifically, neurons in the lateral superior olive (LSO) receive input from both the ipsilateral and contralateral cochlear nucleus. The LSO is composed of two major neuronal populations: glutamatergic neurons that send axons to the contralateral CNIC, and a population of glycinergic inhibitory neurons that send axons to the ipsilateral CNIC. Previous research suggests that these populations project symmetrically to the CNIC and that they are uniformly distributed within the LSO. Herein, we use stereotaxic injections of the retrograde tract tracer Fast Blue in the CNIC to examine the distribution of retrogradely labeled neurons in the ipsilateral and contralateral LSO. Our results suggest that projections from the LSO to the CNIC are not symmetric and that neurons making these projections are not uniformly distributed in the nucleus. These results call into question current models of convergence of ascending inputs to the CNIC and sound localization circuits.

## **A30. JAMES NEMUNAITIS**

### **Multimodal Pain Management in Total Joint Arthroplasty, A Review of Literature and Meta-analysis**

James Nemunaitis, DO; Ryan Hirst, MS3, Joshua Tuck, DO  
Millcreek Community Hospital

**Abstract:** Pain management following total joint arthroplasty has been a challenging issue due to rising health care costs and changes in reimbursement. Furthermore, the opioid epidemic has recently focused more attention on alternatives to the use of opioids in the management of pain. Historically, the

use of opioid medications for postoperative pain management was the standard. Presently, research efforts have been accelerated to identify alternatives in the management of post-operative pain to reduce the morbidity and mortality associated with the use of opioid medication, reduce cost and accelerate the recovery. Multimodal pain management is the current approach to post-operative pain. The purpose of this review is to identify the latest scientific evidence for alternatives to the management of post-operative pain to reduce opioid consumption, control pain, and augment recovery.

### **A31. Morgan Nickerson**

#### **Analysis of the types, causation, and subsequent management of patella fractures following a total knee arthroplasty**

Morgan Nickerson, D.O. Kevin Lyon, MS-III  
Millcreek Community Hospital

**Abstract:** Fracture of the patella after total knee arthroplasty (TKA) is an infrequent complication, with a reported prevalence of 0.05% in unresurfaced patellae and 0.2% to 21% in resurfaced patellae<sup>1</sup>. This article review investigates the types of patellar fractures that occur after TKA, the causation of these fractures, and their subsequent management. Articles were selected from reputable journals and contained up to date information to ensure the accuracy and future utility of this study. This article review reveals several risk factors which significantly increased the prevalence of patellar fractures following TKA; such as male sex, osteoarthritis, patellar resurfacing, lateral release, and revision TKA. Although the overwhelming majority of articles found high complication rates with operative treatment of patellar fractures after TKA, we feel that it may be inappropriate to treat all type I fractures (Implant/Extensor mechanism intact) non-operatively, and instead should consider open reduction internal fixation among those with good remaining bone stock. Primary repair following extensor mechanism disruption has consistently resulted in poor outcomes, and therefore other surgical options such as extensor mechanism reconstruction using allograft, autograft, and gastrocnemius rotational flaps have gained favor. Recent research into the use of synthetic materials for extensor mechanism reconstruction offers promise, but further studies are needed to establish the efficacy of these materials.

### **A32. Robert Puckett**

#### **Rates of OMT usage among Millcreek Community Hospital Internal Medicine and Family Medicine Residents in continuity clinics**

Robert A. Puckett D.O.  
Millcreek Community Hospital

**Abstract:** One of the major tenets of an osteopathic residency program is the use of Osteopathic Manipulative Medicine (OMM). There have not been many studies done to investigate the rates of usage of OMM among residents in their continuity clinic in comparison to their stated interest in using OMM in their future careers. The goal of this project was to compare OMM usage rates and the stated interest level in using OMM in future careers between Internal Medicine and Family Medicine residents at a small community hospital. A survey of Internal Medicine (IM) and Family Medicine (FM) residents at a small community hospital was conducted to determine their rates of use and attitudes towards OMT as a therapeutic modality within the continuity clinics. The survey was conducted using SurveyMonkey with the collection of IP addresses disabled. The results indicated that utilization of OMT within the clinic was more likely among FM residents. The primary reason given by IM residents for not using OMT was a lack of time to do so.

### **A33. John Shafik**

#### **Physician Text Messaging Utilization and View of Effectiveness**

Steven G. Ward, DO, MS Steven Habusta, DO John Paul Shafik DO, Katherine A. Stephens, David Kowalski, Jarret Koper

Millcreek Community Hospital

**Abstract:** Texting has become a common form of communication throughout the world. Physicians have been using it at the same rate as the general population. Beyond texting for social reasons, it has entered the workforce as a valuable tool for communication. This survey was designed to assess physicians usage of texting and their perceived benefits of it. Method A survey was sent to physicians of LECOM consortium via a mass email with a link to an anonymous survey containing ten questions regarding their texting habits as well as how they perceived the usefulness of texting in different common medical scenarios. Data was collected by Google forms. A second email was sent out 3 months later with a total of 206 physicians responding. Results There were a total of 206 responses over a period of 3 months. Of the respondents, there were 8 attendings (3.9%), 10 fellows (4.9%), 27 PGY-5 (13.1%), 15 PGY-4 (7.3%), 46 PGY-3 (22.3%), 34 PGY-2 (16.5%), and 66 interns (32%). There were ten questions that were asked that assessed physician texting use, their knowledge of HIPAA policy, and their impressions of the effectiveness of texting. Conclusion Texting is an efficient way of communicating that physicians can learn to use as an effective tool to help them be more efficient and care for patients in a safe and secure manner. HIPAA compliance is crucial to keep patient information safe and the physician in line with protocol. With proper communication and attention to detail text messaging has the potential to improve quality of patient care, patient satisfaction, and physician satisfaction

### **A34. Robert Waters**

#### **The Effect of Potential Confounding Variables on the Detection of *Borrelia burgdorferi* in *Ixodes scapularis* ticks.**

Robert Waters, MS\*, Nancy Carty, PhD, Christopher C. Keller, PhD, FNAOME

LECOM Student

**Abstract:** Introduction: *Ixodes scapularis* ticks are the vector for transmission of *Borrelia burgdorferi*, the causative agent of Lyme disease (LD). In Erie County, the incidence of LD cases has increased by 300% in the last four years. Our previous studies examined carriage rates of *B. burgdorferi* in ticks found in Erie County. Our lab receives ticks in varying storage conditions and different stages of desiccation. In this study we examined the effects of decapitation during tick removal, desiccation, and engorgement on detecting *B. burgdorferi* DNA. This study also examined different ways to reduce the time of the current protocol. Methods: DNA was extracted by crushing individual ticks with a mortar and pestle followed by chloroform/phenol extraction. For each tick tested, presence of tick and *B. burgdorferi* DNA was determined with specific PCRs. The effect of desiccation was tested by drying ticks for varying times. To test if *B. burgdorferi* is detectable in decapitated ticks, the head and torso were separated and tested individually. Engorged ticks were tested by cutting the torso and draining the blood before washing. Lastly, the protocol was shortened by reducing the incubation time and freeze time. Results: All variables tested displayed tick DNA bands except for the heads. *B. burgdorferi* was detectable after 96 hours of desiccation. Following decapitation, *B. burgdorferi* was detected in all tick torsos, but only one head. *B. burgdorferi* was visualized in engorged ticks. The shortened protocol successfully isolated tick and *B. burgdorferi* DNA. Conclusion: *B. burgdorferi* DNA was detected in

desiccated, decapitated, and engorged ticks, thus showing that ticks received in a variety of conditions can be analyzed for the presence of *B. burgdorferi*. In addition, by reducing the protocol time, we can report PCR results in a single day. These findings will allow us to possibly accept ticks from the public or healthcare professionals for detection of *B. burgdorferi* DNA.

### **A35. Nathan C. Weaver, D.O., M.S.**

#### **Correlation between PVD and knee OA: a retrospective review of medical comorbidities in cases of knee osteoarthritis which required total knee arthroplasty at a community hospital.**

Nathan C. Weaver, D.O., M.S., Steven F. Habusta, D.O., M.Ed.

Millcreek Community Hospital

**Abstract:** Knee osteoarthritis is one of the most commonly treated medical diagnoses in clinics throughout the United States. Patients who fail conservative management eventually end up obtaining surgical treatment in the form of total knee arthroplasty. These patients' hospital courses are complicated by many other medical comorbidities. While these other issues may appear to be unrelated to the osteoarthritis of the knee, many of them may have led to osteoarthritis or contributed to its natural history. Obesity is one such medical comorbidity that is a known risk factor to osteoarthritis and there are many studies which point to physiologic processes found in obesity which link it to the development of osteoarthritis. One other medical comorbidity which could lead to or worsen degenerative joint disease, or osteoarthritis, is that of peripheral vascular disease with its resultant venous insufficiency and venous reflux disease. These entities, coupled with congestive heart failure, which results in a build-up of fluid in the interstitial spaces, lead to the poor transport of metabolic waste produced by the body during regular aerobic and anaerobic metabolism and could potentially accelerate the pathophysiologic processes involved in the development and progression of knee osteoarthritis. This makes definitive total knee arthroplasty much more likely. It is plausible, therefore, that closer coordination between surgeon and primary physician could delay or even halt progression of knee osteoarthritis if it were possible to gain better control of these seemingly unrelated medical comorbidities.

### **A36. David Zupruk, DO**

#### **Incidence of surgical complications resulting in reoperation following primary intramedullary nailing of extracapsular hip fractures**

David Zupruk, DO

Millcreek Community Hospital

**Abstract:** The rate of reoperation after hip fracture surgery has been demonstrated to be 9-11%. Prior studies examining this topic have not been sufficiently powered to determine exact incidences of specific post-surgical complications requiring revision surgery. Prior research at our institution shows that we have collected a significant number of treated hip fracture patients within our trauma registry. Over a seven year period 848 patients received were treated with cephalomedullary nails for hip fractures. Overall reoperation rate was found to be 4.36% including all periprosthetic fractures, infection, implant failure, conversion to arthroplasty, hardware exchange and intraoperative fracture. This study demonstrates that revision surgery after cephalomedullary nailing may be lower than previously documented in the literature.

### **A37. Syed Ahmed**

#### **The Impact of Maternal Inflammatory Responses on Structure and Function of the Cerebellum**

Syed Ahmed, MS; Kaitlyn Blackburn, DO; Randy Kulesza, PhD  
LECOM Student

**Abstract:** Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by deficits in verbal and nonverbal communication, motor coordination, and restricted and repetitive behaviors. While still largely considered idiopathic in nature, the cause of ASD has been linked to genetic and environmental factors. Inflammatory responses during pregnancy have been linked to ASD in addition to various neurodegenerative disorders. Lipopolysaccharide (LPS), a component of gram negative bacterial cell walls, can be used to induce an inflammatory response. In this study, pregnant rats were exposed to a repeated dose of LPS on embryonic days 8, 10, and 12. Then we used behavioral tests and investigated the structure and function of the cerebellar vermis to identify if ASD-like deficits were induced in male offspring. Rats exposed to inflammation performed significantly worse in the accelerating rotarod motor task. Morphological analysis revealed that Purkinje cells were significantly smaller in multiple lobules of the cerebellum and the expression of the calcium binding protein calbindin was reduced in lobules VIII and IX. Dysplasia and ectopic neurons were also observed. These results suggest that repeated embryonic exposure to LPS-induced maternal inflammation induces cerebellar dysmorphology and dysfunction.

### **A38. Eric Buza, M.Sc.,**

#### **Effects of Rat Estrous Phase on the Structure and Function of Visceral Adipose Tissue**

Eric Buza, M.Sc., Mikaela Wadding, Caitlin Reilly, and Diana Speelman, Ph.D.  
Lake Erie College of Osteopathic Medicine, Erie, PA

**Abstract:** Visceral adipose tissue has been shown to be a better indicator of metabolic profile rather than total body fat, in that as visceral adipose tissue mass increases so does the risk of type 2 diabetes, cardiovascular disease, and other obesity-related diseases. Visceral adipose accumulation has been shown to have differences between males and females, suggesting that female reproductive hormones may have an effect on visceral adipose tissue. In this study, 16-week-old rats' parametrial adipose tissues were dissected during the four different phases of the estrous cycle: proestrus, estrus, metestrus, and diestrus. The structure and function of visceral adipose tissue was examined during each phase. Parametrial adipose tissue mass and adipocyte size were examined, and diestrus was found to have significantly larger adipocyte cross-sectional area compared to proestrus. Expression of hormone-sensitive lipase and lipoprotein lipase were also examined, and no significant differences were found. Finally, expression of adiponectin and its receptors were examined in parametrial adipose tissue. Adiponectin receptor 2 expression was significantly higher in diestrus compared to proestrus. Overall, this study found that during proestrus, parametrial adipocyte cross-sectional area was decreased, and adiponectin receptor 2 expression was decreased compared to diestrus. This indicates changes in parametrial fat during the estrous cycle, and suggests that estradiol may influence these changes. Further studies are needed to assess the specific effects of the sex hormones on this adipose depot.

### **A39. Isaac Nivar, OMS-III**

#### **Skeletal Muscle Fiber Alterations in a Prenatally Androgenized Rat Model for Polycystic Ovary Syndrome**

Isaac Nivar, OMS-III, Auryana DeChick, M.Sc., and Diana Speelman, Ph.D.  
Lake Erie College of Osteopathic Medicine, Erie, PA

**Abstract:** Polycystic ovary syndrome (PCOS) is a common endocrine disorder associated with hyperandrogenemia and hyperinsulinemia. Skeletal muscle tissue is sensitive to both of these hormones. The goal of this study was to determine the changes in hindlimb skeletal muscles that occur in the prenatally androgenized (PNA) rat model for PCOS compared to controls. Pregnant rats were injected with 5 mg testosterone (PNA) or sesame oil (control) on gestational days 16-19. At 16 weeks, gastrocnemius, tibialis anterior and soleus tissues were collected. We studied the fiber type composition of these muscle tissues by immunolabeling cross-sections for the fast and slow isoforms of myosin heavy chain. In addition, expression of the androgen receptor (AR), insulin receptor (IR) and lipoprotein lipase (LPL) were examined by immunolabeling and correlated with fiber type. Lastly, expression of AR, IR and LPL in gastrocnemius tissue were quantified by western blot analysis. No readily observable qualitative changes in fiber composition or expression of AR, IR or LPL were noted on immunofluorescence. On western blot quantification, we found a significant increase in expression of LPL in PNA rat gastrocnemius tissue ( $p = 0.0286$ ) and a trend towards increased expression of AR and IR ( $p = 0.2000$  and  $0.3429$ , respectively). These data are evidence of muscle fiber dysfunction in the setting of dysregulated insulin and androgen levels in a PNA rat model for PCOS.

## **A40. Sarah Mangold**

### **Auditory midbrain hypoplasia and dysmorphology after prenatal valproic acid exposure**

Sarah Mangold, Devon Chosky, Yusra Mansour, Randy J Kulesza Jr, PhD

LECOM Auditory Research Center

**Abstract:** Prenatal exposure to the antiepileptic valproic acid (VPA) is associated with an increased risk of autism spectrum disorder (ASD) in humans and is used as an animal model of ASD. The majority of individuals with ASD exhibit adverse reactions to sensory stimuli and auditory dysfunction. Previous studies of animals exposed to VPA reveal abnormal neuronal responses to sound and mapping of sound frequency in the cerebral cortex and hyperactivation, hypoplasia and abnormal neuronal morphology in the cochlear nuclei (CN) and superior olivary complex (SOC). Herein, we examine the neuronal populations in the dorsal, ventral, and intermediate nuclei of the lateral lemniscus in animals exposed in utero to VPA. We used a combination of morphometric techniques, histochemistry and immunofluorescence to examine the nuclei of the lateral lemniscus (NLL). We found that the VPA exposure resulted in larger neurons in the dorsal nucleus of the lateral lemniscus (DNLL) however, it did not impact the size of neurons in the ventral nucleus of the lateral lemniscus (VNLL). VPA exposure also had no significant impact on the distribution of cell body morphologies in the VNLL. However, we found that there were significantly fewer neurons throughout all nuclei examined in the auditory brainstem of VPA-exposed animals. Additionally, we found significantly fewer calbindin-immunopositive neurons in the DNLL. VPA exposure had no impact on the proportions of perineuronal nets in the NLL. Together, these results indicate that in utero VPA exposure significantly impacts structure and function of nearly the entire central auditory pathway.

## POSTERS IN STUDY ROOMS 1-5

### **S1. Michael Coulter**

#### **DESIGNING A CURRICULUM IN PEDIATRICS FOR PRE-PROFESSIONAL PHARMACY STUDENTS**

Michael Coulter  
LECOM Student

**Abstract:** The Accreditation Council for Pharmacy Education (ACPE) has set forward the minimum standards for any institution intending to offer professional degree programs in pharmacy; the Doctor of Pharmacy (PharmD). While the minimum standards are updated periodically to reflect the changing needs of new graduates, the most recent edition, released in 2015, offers the most direction for programs. While the design of different curricula are extensive, the standards of required coursework are left vague so as to allow schools to mold a cohesive structure for both students and faculty members alike. This ambiguity that has led to a decrease in the number of graduating pharmacists that are comfortable in treating pediatric patients or recognizing potential errors in pediatric medication orders. In response to this ambiguity and due to pediatric patients representing nearly 25% of the U.S. population, a curriculum capable of addressing the special population needs to be further examined.

### **S2. Janet Grotticelli, D.O., M.B.A.**

#### **A Faculty Development Curriculum for Medical School Educators**

Janet Grotticelli, D.O., M.B.A.  
Other (please specify)

**Abstract:** The author purposes a 10-month curriculum consisting of five workshops for a faculty development program for medical educators. This interactive instructional course includes the basics of adult learning and innovative educational methods. Medical students in today's academic environment are able to gain information online in a way that was not possible until the past decade. The learners are privy to lectures and information given by the best possible teachers. Not only can they assess the information, they can do it from anywhere, at any time. With the medical school's ultimate goal of ensuring that graduating students meet the American Association of Colleges of Osteopathic Medicine and the Association of American Medical Colleges' Entrustable Professional Activities, the learners must be able to work independently and apply critical thinking to the information they collect. The question becomes: how can effective teaching methods be instituted and how do they become successful? This curriculum incorporates five workshops that focus on learning theories, educational methods, innovative teaching strategies, and self-reflection. Additionally, the outcome of this program will enhance not only the student's knowledge but provide the academic faculty continued education which results in greater job satisfaction

### **S3. Robert Hostoffer**

#### **Failure in Retention of Anaphylaxis Therapeutic Knowledge After Educational Tool Necessitating the Implementation of an Order Set**

Robert Hostoffer, DO  
LECOM Student

**Abstract:** Background: Anaphylaxis is a life-threatening allergic reaction. It is often under treated in the hospital setting. Objective: We hypothesize that a pre-test, learning tool, and post test will

enhance knowledge in community-based medical professionals leading to improved recognition and management of anaphylaxis. Methods: Settings: University Hospitals Cleveland community hospitals  
Subjects: 189 subjects from the University Hospitals system completed the initial questionnaire and educational tool. 77 participants completed the 6-month follow up retention assessment.  
Interventions: 189 subjects completed a questionnaire consisting of nine multiple-choice questions and one fill in the blank question pertaining to anaphylaxis identification, management and treatment. The subjects were then given an educational tool in which a power point presentation reviewed anaphylaxis and the answers to each question from the questionnaire The participants were immediately given a post educational tool questionnaire which covered the same questions from the initial questionnaire. Six months after the initial questionnaire, participants were tested again with the same questionnaire to assess knowledge retention. Results: Participant scores improved from 62% to 94% correct in the short-term. The 6-month post-test revealed a return to near baseline (65%) medical knowledge regarding anaphylaxis. Conclusion: There is a knowledge deficit for the identification and management of anaphylaxis. A brief, educational tool did improve knowledge of anaphylaxis in the short-term. However, the implementation of an educational tool did not lead to improvement in retained knowledge for anaphylaxis. An anaphylaxis order set is necessary to improve patient care and has now been approved for us at University Hospitals.

#### **S4. Michael Valentim**

##### **Bilateral pulmonary air embolism . A rare complication of Cardio Pulmonary Resuscitation(CPR)**

Saptarshi Biswas Michael Valentim

LECOM Student

**Abstract:** Complications to CPR include pneumothorax, hemopericardium, cardiac contusions, hemorrhage from rib fractures, sternal fractures, chest wall hematoma, and hepatic lacerations. However, CPR causing bilateral pulmonary air embolisms, are rarely reported in literature. A 72-year-old female initially presented with nausea, vomiting, and hypoxia. She quickly deteriorated to respiratory distress and PEA cardiac arrest. EMS arrived, initiated CPR, followed ACLS protocol and obtained ROSC. The patient was intubated in the Trauma bay, and resuscitated. EKG displayed sinus tachycardia and ST segment depression in anterior leads without changes from June 2018 EKG. ABG showed respiratory acidosis. CT Pulmonary Angiogram showed multiple bilateral rib fractures and acute bilateral pulmonary air embolism of the upper lobe pulmonary arteries. Very little neurological improvement was made after 5 days of care in the ICU, and the decision was made to make her CMO after palliative care spoke with family. A case of Bilateral pulmonary air embolism secondary to CPR, to the best of our knowledge has not been reported in the literature. Iatrogenic complications, such as surgery, fluid infusion, central venous catheter insertion, pacemaker insertion, positive pressure ventilation as well as blunt and penetrating trauma are the common attributed causes for pulmonary air embolisms. Isolated case reports of pulmonary air embolism have been reported in the pediatric population after insertion of IO- venous lines. Air embolism in our case resulted from multiple rib fractures following the resuscitation process. In the ICU, this patient underwent cardiovascular supportive care. Interventions for air embolism include, hyperbaric oxygen, lateral decubitus position, Trendelenburg position, left lateral decubitus head down position, aspiration of embolized air from the right ventricle, and cardiac massage. We discuss relevant literature and describe etiology, mechanism and treatment options.

## **S5. David Wilhelm**

### **A Case of Traumatic Splenic Laceration in a Division II Football Player: Advisable Versus Safe Return to Play Considerations**

James N. Cornwell, D.O.; David Wilhelm, O.M.S. III; Patrick F. Leary, D.O., FAOASM

LECOM Student

**Abstract:** A 19-year-old freshman division II football player presented to the athletic training staff at a local university with dyspnea, left-upper quadrant abdominal and left-sided chest pain, vomiting, diaphoresis, and left shoulder pain two days following a hit to the abdomen during practice. At the direction of the sports medicine physician, the training staff arranged for transport of the athlete to a local hospital for evaluation. CT scan showed a grade IV splenic laceration with perisplenic hematoma and free blood seen in the abdomen and pelvis. Labs and vitals were stable. Given the delayed bleed and large hemoperitoneum, splenic arteriography with transcatheter coil embolization was performed. The purpose of our research was to perform a comprehensive literature review to assess the current guidelines and recommendations for return to play following splenic injury. We also wanted to investigate the time required for splenic healing and whether follow-up CT scan is necessary to make return to play decisions. What we found is that return to play decisions are very difficult to generalize and should be considered on a case-by-case basis. Return to play decisions depend on the severity of splenic injury with recommendations being anywhere from six weeks to three months for lower-grade injuries and anywhere from two months to six months for higher-grade injuries. Time required for splenic healing is also dependent on the severity of splenic injury with healing occurring as quickly as just a few weeks for milder injuries to as long as 20 or more weeks for severe injuries. Most studies indicated that clinical judgement was the primary factor in making return to activity decisions, but studies have also acknowledged that follow-up imaging should be used more frequently as the severity of injury increases and for those who are at a greater risk of complications, such as contact sport athletes.

## **S6. Timothy Chung**

### **Warm and Cold Autoimmune Hemolytic Anemias as the Primary Presenting Pathologies of AIDS in a Previously Undiagnosed Patient**

Timothy Chung, Joanna Israel, DO, Benson Babu, MD

LECOM Student

**Abstract:** While anemia is known to be the most common hematologic pathology associated with HIV infection, autoimmune hemolytic anemia (AIHA) is rarely associated with the disease. Even among cases of reported autoimmune hemolytic anemia in HIV patients, only typical warm antibody autoimmune hemolytic anemia is often described. A case of warm and cold antibody autoimmune hemolytic anemias as the presenting diagnoses in a newly diagnosed AIDS patient is presented. The patient was treated with highly active antiretroviral therapy (HAART) and systemic steroids throughout the hospital course, with significant improvement of the anemia. As anemia is present in 60-80% of patients with late stage HIV infections, it is possible that autoimmune hemolytic anemia is underdiagnosed among the myriad of etiologies for HIV associated anemia. Given the nature of this case, it is essential to consider both warm and cold antibody autoimmune hemolytic anemias in newly diagnosed HIV/AIDS patients presenting with anemia in order to accurately diagnose the underlying cause of anemia and to quickly initiate the appropriate therapy.

## **S7. Marlow Easterling**

### **The Impact of ADHD on the Development of Dental Caries in the Child/ Adolescent Population**

Marlow Easterling M.D., M.BA, M.H.A.

Millcreek Community Hospital

**Abstract:** Attention Deficit Hyperactivity Disorder (ADHD) is one of the most common neurobehavioral disorders of childhood and adolescents, that is also not uncommonly seen in the adult population. Multiple studies have showed a direct correlation with those suffering from the disorder in the pediatric population, tend to have the disorder continue on into their adult years. Studies have also shown that there is a prevalence of approximately 4.4 percent in the United states, and a 3.4 percent internationally (10) ADHD is characterized by a inattention and or hyperactivity. Issues with impulsivity, and hyperactivity There is a general census across the dental community that, not only the symptoms of ADHD, but also the medications used to treat the disorder, lead to an increase in dental carries in this specific demographic. The point of this review is to determine the correlation between ADHD and dental carries, if a true correlation does exist. There is an array of factor and variables being measured, to show the correlation between ADHD and dental caries. The overall general census in the dental community is that there is an increase in DMFS ( Decayed ,Missing or Filled Surfaces)/DMFT( Decayed, Missing or Filled, Teeth) scores in the ADHD population in comparison to control groups.

## **S8. Zachary Egidi**

### **Understanding the Diabetic Patient's Psyche: Fears of Patients with Diabetic Foot Infections**

Zachary Egidi DPM

Millcreek Community Hospital

**Abstract:** What do diabetics with foot infections understand about their disease? What are their biggest fears associated with diabetes? There is an epidemic of uncontrolled and non-compliant diabetics with foot infections that lead to amputations. What makes them non-compliant when their foot is physically declining and they risk losing life or limb? It is my honest belief that we can not begin to understand a patient's condition or their reaction to their condition without patient involvement. Diabetics must deal with a list of complications that have serious and life changing consequences. As a podiatrist, I see most patients with complications related to the lower extremity. A combination of neuropathy and microvascular disease can prove to be deadly to a diabetic patient. Compliance with medication and treatment therapies for diabetes can greatly reduce the risk of developing major complications. Non-compliance with medications has been well documented in the literature. Depression and other psychological issues affect the lives and treatment compliance of our diabetic patients. This research paper will attempt to answer all of these questions by surveying diabetic patients with foot infections. The survey outcomes prove that diabetics are truly uneducated on their disease and do not understand the implications of being non-compliant with treatments. The survey also shows that most patients will be affected in some way by depression due to their diabetic condition.

## **S9. Patrick Fessler**

### **Total Joint Arthroplasty in a Third World Country: A Honduran Experience**

Patrick F. Fessler, DO, MS(med), Stephen M. Sweeney MPAS, PA-C, Patrick Laird, Peter Daily, MD

Millcreek Community Hospital

**Abstract:** Honduras is the 2nd most populated country in Central America as well as the 2nd poorest country only to Nicaragua. According to the World Bank, 62.8% of Hondurans live in poverty and 6 out of 10 of households earn less than \$2.50 per day. The country has been further handicapped

by falling prices of its major exports. Its healthcare system also suffers. “The reasons for healthcare limitations in Honduras are multiple, including inadequate numbers of physicians, variable medication supplies, gaps in infrastructure, financial constraints, and sociopolitical factors”. There are 57 physicians per 100,000 Hondurans, which is significantly less than the 937 physicians per 100,000 Americans. In Honduras, physicians are primarily trained in trauma and fracture care. Hondurans only receive triaged medical attention if their medical problem is considered life threatening. As a result, many Hondurans suffer from debilitating joint pathology that would otherwise benefit from the joint care we are accustomed to in the U.S. The Holy Family Surgery Center was founded by Dr. Peter Daly, in 2004. The surgery center became operational in 2008 located just outside Honduras’s capital city. The volunteer run surgery center has since added an overnight stay unit, three state of the art operational rooms, a dental and an ophthalmology clinic to the original 5,000 square foot structure. In early 2016 the surgery center completed its first outpatient total knee surgery. Because of the underlying socio-economic problems and access to medical care, the question has to be asked if outpatient total joints at the Holy Family Surgery Center achieve acceptable outcome and satisfaction scores similar to those in the United. The hypothesis therefore is made that total joints at the Holy Family Surgery Center can achieve acceptable outcome and satisfaction scores similar to those in the United States despite socioeconomic differences.

## **S10. Connor Grant**

### **Bowel Preparation for Bowel Endoscopy: A Systematic Review**

Connor Grant

Millcreek Community Hospital

**Abstract:** The goal of this review is to determine optimal bowel preparation regimen prior to endoscopy or colonoscopy. Improved bowel cleanliness before endoscopy/colonoscopy leads to better health outcomes and lower costs for patient and provider alike. Controversy exists about the best protocol and it is likely to continue given the development of new purgatives and the wide variety of patients’ medical comorbidities and preferences. However, the medical community must come together to standardize preventative measures and combat colorectal cancer, the third leading cause of death among men and women in the United States of America, through better screening methods. The BBPS should be used in a clinical manner. Split Dose 4 L polyethylene glycol (PEG) gives the most significant benefits. However, SPMC gives a better side effect profile with less nausea and lethargy. Patients are more willing to repeat their regimen with SPMC compared with PEG regimens. In healthy, young patients without multiple medical comorbidities and a higher education, split dose PEG is the most effective regimen along with water immersion in preventing development of colorectal cancer. If a patient is diabetic or elderly, adjusting the regimen to reduce the amount of fluid from 4L to 2L can be almost as effective, but with significantly less side effects for these populations. Research needs to continue in the direction of other factors that can influence bowel preparation such as the colonoscope used, patient risk factors such as those with chronic kidney disease, coronary artery disease and chronic obstructive pulmonary disease, as well as the dietary regimen in the days preceding the endoscopy.

## **S11. Ashley Graziano**

### **Carotid Cavernous Fistula: An Easily Missed Complication of Head Trauma**

Ashley Graziano, OMS4; Saptarshi Biswas, M.D.; Arpit Amin, M.D.

LECOM Student

**Abstract:** A Carotid Cavernous Fistula (CCF) is an abnormal vascular connection between the carotid arterial system and the cavernous sinus. Traumatic head injury, particularly basilar skull fractures, can result in a Type A CCF. Type A CCFs are direct, high flow shunts between the Internal Carotid Artery and Cavernous Sinus. Significant neuro-ophthalmologic sequela can result from such connections, including visual loss, proptosis, and chemosis. These fistulas are commonly missed on the routine imaging completed following head trauma. If suspected, a cerebral angiography is the gold standard imaging modality, with endovascular coiling being the preferred treatment. Physicians should have a high index of suspicion for carotid cavernous fistulas in trauma patients presenting with basilar skull fractures. Prompt recognition and treatment can resolve symptoms and prevent permanent sequela. In this report, we present a case of traumatic carotid cavernous fistula in a 26-year-old female with a basilar skull fracture.

## **S12. Ashley Graziano**

### **“Battlefield Brain” resulting from a civilian gas plant explosion. A case report and discussion of blast injury of the brain.**

Ashley Graziano, OMS4; Saptarshi Biswas, M.D.

LECOM Student

**Abstract:** Although well documented in combat situations, blast is becoming an increasingly common mechanism of injury in civilian life. Because of the ongoing war on terror, blast injury has reached a new level of importance, and includes a wide spectrum, ranging from mild to severe. Despite an increase in associated research in recent years, the pathophysiology of blast-induced TBI (bTBI) remains poorly understood and is complicated by a number of factors such as repetitive exposures and superimposed polytrauma. It is known, however, that severe bTBI is a major cause of immediate/early mortality in blast injuries. Blast injury is a multi-system disease, often including extracerebral trauma such as extensive extremity injuries, deep burns, and inhalation injuries. Currently, there are no evidence-based recommendations for the use of neuroprotective agents in bTBI patients, but early surgical intervention, including decompressive craniectomy, has become a major factor in improving outcomes and survival. In this report, we present a case of severe blast Traumatic Brain Injury (bTBI) in a firefighter.

## **S13. Jessica Grimes**

### **Correlation between Nicotine Dependence and Schizophrenia**

Jessica Grimes, DO

Millcreek Community Hospital

**Abstract:** Any Physician who has treated a significant number of Schizophrenics has most likely incidentally noted the large number of Schizophrenics who smoke. In fact, if one takes a moment to consider their Schizophrenic patients, I am quite sure it would be difficult to think of even a few schizophrenic patients who did not smoke at one point during their lifetime. This research sought to better understand this correlation. The following questions were to be answered: Is there an organic explanation for why such a large amount of Schizophrenics smoke? Is it their anatomy of their brain which predisposes them to smoke or is it from a secondary reason such as a side effect of the medications in which they take? What do recent research studies have to say on this correlation between nicotine and schizophrenia?

## **S14. Aaron Leininger DO**

### **A Literature Review of Locked Versus Compression Plating of Distal Fibula Fractures**

Aaron Leininger DO, Aaron Sop DO, Shawn Storm DO, Audis Bethea PharmD  
Millcreek Community Hospital

**Abstract:** Currently, multiple options are available for the treatment of distal fibula fractures. This injury has been traditionally treated with a compression plating technique. However, with the advent of locking plate technology some surgeons have shifted away from compression plating, utilizing this new treatment option. Cost difference associated with these two modalities is significant and yet clinical data regarding differences in outcomes is limited.

## **S15. Marcus Lyon**

### **Cardiopulmonary Resuscitation Complicated by Traumatic Hepatic Laceration: A Case Report and Review of Literature**

Saptarshi Biswasa, Allisa Alpert, Marcus Lyon, Christoph R. Kaufmann

**Abstract:** We present an interesting case of a 63-year-old patient who was having lunch with friends in a restaurant when, suddenly, bystanders witnessed him “seize” for 1- minute, after which he became he had a 1-minute witnessed “seizure” followed by unresponsive and pulseless. Cardiopulmonary resuscitation (CPR) was initially performed by these bystanders at the scene, and then subsequently by EMS personnel, who achieved return of spontaneous circulation (ROSC) in the field. The patient was emergently transferred to the hospital where he remained hemodynamically unstable requiring multiple pressors. Due to an acute drop in hematocrit, along with metabolic acidosis, a computed tomography (CT) scan of the abdomen and pelvis was performed. which The scan revealed a large volume of intraperitoneal hemoperitoneum which was largely attributed to CPR. The patient He underwent an exploratory laparotomy during which and the hepatic laceration was repaired and the abdomen was packed. Intraoperatively and postoperatively, the patient remained hemodynamically unstable developing multi-organ failure and requiring multiple products including fresh frozen plasma, packed red blood cells, and cryoprecipitate. Electroencephalogram (EEG) results were consistent with anoxic brain injury and the patient’s family opted for comfort care measures only and he expired the next day. Although CPR induced injuries to hepatic structures have scarcely been reported in the literature, this may underestimate their true incidence given the high mortality rate of sudden cardiac arrest requiring CPR. Our case demonstrates that intra-abdominal trauma following CPR, though rare, must needs to always be considered taken into account. and a Importantly, a high index of clinical suspicion is often necessary to make an early diagnosis of liver trauma as a potential life-threatening complication of CPR.

## **S16. Marcus Lyon**

### **Nutritional Science in Primary Care: What the Physician Needs to Know**

Cassie Tran, MD; Jared Ramsey, DO; Marcus Lyon, DO

**Abstract:** A perceived lack of nutritional education and low confidence to provide nutritional counseling to patients in a cohort of family medicine residents was confirmed by self-reported survey data. A structured educational lecture series given by a group of the peer family medicine residents was implemented. Participation was validated with graded assessments following each lecture. Self-reported survey data post intervention showed statistically significant improvements in the perception of family medicine residents’ nutritional education, as well as improved confidence in providing nutritional

counseling to their patients. These findings were independent of year in training, prior nutritional education, or number of lectures attended.

## **S17. Francis Matuszak**

### **Persistent anterograde amnesia following recreational benzodiazepine use: case report**

Francis Matuszak, DO, Michael Flowers, OMS-IV, Odalys Frontela, MD

**Abstract:** A 33-year old woman presented to the hospital for persistent memory deficits following recreational abuse of benzodiazepines. She was accompanied by her family who reported that she had been exhibiting inability to recall the details of her daily life. Her history was significant only for a vacation 18 days prior during which she reported heavy use of alcohol and benzodiazepines. Mental status examination revealed deficits in her working memory and difficulty with cognitive tasks. Laboratory assessment and imaging performed were unremarkable barring presence of oxazepam, a benzodiazepine metabolite, on urine drug screen, the results of which were confirmed with LC-MS. Benzodiazepines are hypnotic agents which act through activity on the GABAA receptors resulting in anxiolytic and hypnotic effect. At high doses, benzodiazepines induce anterograde amnesia. This amnestic syndrome is well-known and is utilized to cause periprocedural sedation in medically supervised. It has appeared in case reports as causing brief amnesia in cases of accidental overdose or recreational abuse of benzodiazepines. However, while many cases have described a similar amnestic syndrome following benzodiazepine use, this case is notable for the severity and continued persistence of the symptoms. Additionally, the patient in question is an otherwise healthy young woman with no other medications or medical history. This case suggests some patients may be exceedingly vulnerable to the amnestic syndrome caused by benzodiazepines which may persist for weeks following discontinuation of the medication.

## **S18. Patrick McNerney**

### **Pseudoaneurysm of the profunda femoris artery following blunt trauma treated by endovascular coil embolization: Review of 2 cases and relevant literature.**

Saptarshi Biswas MD, FRCS; Patrick McNerney MS4; Paul Kiproff MD Department of Trauma and Acute Care Surgery, Department of Interventional radiology, Forbes Regional Hospital, Allegheny Health Network. PA

**Abstract:** Profunda femoris artery (PFA) pseudoaneurysm after blunt trauma without associated femur fracture is a rare occurrence. Most of the reported cases of PFA pseudoaneurysm in English literature developed after penetrating trauma, surgical procedures and femur fractures. We present two such cases following blunt trauma and without any associated long bone injury. After initial imaging failed to show any long bone fracture, CT angiography confirmed pseudoaneurysm of the branch of the PFA. Both patients were then treated with emergent coil embolization of the bleeding vessel. Pseudoaneurysms typically present late and signs of persistent hip pain, thigh swelling, presence of a pulsatile mass, and even unexplained anemia all may suggest the diagnosis. Recognition of PFA pseudoaneurysm requires high index of suspicion and often difficult to diagnose clinically because of its location.

## **S19. Michael Meinhold**

### **The Length of Time Analysis Between First Imaging And Surgical Intervention of Osteoarthritis of the Knee and Hip**

Michael Meinhold DO Bryan Hooks DO

Millcreek Community Hospital

**Abstract:** Abstract: do we tend to use more x-ray and advanced imaging modalities in the non-operative treatment of osteoarthritis of the knee than that of the hip? This study will take a retrospective analysis of the past five years for three orthopedic surgeons in a community hospital setting. The original dates of x-rays as well as the date of surgery for patients undergoing total knee arthroplasty and total hip arthroplasty were analyzed. Although the time from original x-rays to date of surgery on average was larger for TKA than THA the difference was not statistically significant.

## **S20. James Nemunaitis**

### **MHSA Capstone Experience Case Study 5 - Memorial Health System**

James Nemunaitis

Millcreek Community Hospital

**Abstract:** Memorial Health system is an integrated health system in Baton Rouge, Louisiana composed of 357 bed hospital with most specialties represented. In addition, it has a 160-bed nursing home, an ambulatory surgery center, and seven physician practices owned by the hospital. There are 386 physicians on staff, 46 that strictly practice at hospital owned practices and the other 340 that split their practice between Memorial and St. Mary's, another hospital in town. Several Memorial Health board members are concerned the hospital has been "going downhill" for the last several years and that relationships with the medical staff are "at an all-time low". Hospital admissions have been declining at 5-6% per year over the last 3 years. With the current trend, it is expected to result in an overall decline in admissions of approximately 22% over the past four years. To make things worse, four critical events have occurred in the last year. For this capstone case study, the hospital Chairman of the board has hired myself as an independent contractor to evaluate the recent adverse events, as well as related problems with the medical staff, media, and hospital employees at Memorial Health system. The Chairman is most concerned with the loss of medical staff confidence in the hospital as well as its loss of trust in both the board of directors and management. Using clinical knowledge and MHSA leadership skills, the Chairman would like a written report with an independent assessment of the hospital completed within the next thirty days. Following completion of the written assessment, the chairman would like a written report of the findings and conclusions with options to improve the system two weeks after submission of the assessment.

## **S21. Phuoc Nam Van Nguyen**

### **Subclinical Hypothyroidism and its relation to Dyslipidemia**

Phuoc Nam Nguyen, DO

Millcreek Community Hospital

**Abstract:** Subclinical Hypothyroidism is prevalent in almost 4-9% of the general population and likely to be undiagnosed as the majority present with no signs or symptoms. The lack of presenting symptoms and not clearly defined studies make it also difficult to determine replacement therapy and its effects on a person's overall health. We know there is a clinical correlation between overt hypothyroidism and dyslipidemia. Even though the correlation has been established with multiple articles, it is among one of the unclear topics in regards to treatment and management. This literature

review attempts to gather information in regards to subclinical hypothyroidism and its role in dyslipidemia and determine what the best recommendations are. There has not been a general consensus or established study that demonstrates benefit with treatment for subclinical hypothyroidism. There are recommendations for a select population of subclinical hypothyroidism and the decision to treat patients if they are is based on a variety of factors that include age, gender, and if they are experiencing symptoms. The recommendations are to treat patients younger than 65 and having symptoms or if they have an elevated TSH greater than 10 mIU/L even without symptoms. There are groups of high-risk patients that would require further monitoring and further evaluation for symptoms.

## **S22. Haley Prough**

### **Case Report: Small Bowel Diverticulitis**

Haley Prough, OMS-III ; Sarah Jaffe, OMS-III ; Brain Jones, MD  
LECOM Student

**Abstract:** Cases of small bowel diverticulitis, excluding Meckel's diverticulitis, are rare. Small bowel diverticular disease has been reported in approximately 0.3-1.3% cases of post mortem studies (1) and 0.5 -1.9% of contrast media study cases (2) Diverticula located within the small bowel may have presentations and complications similar to that of colonic diverticular disease. However, there is no consensus for the management for small bowel diverticulitis. Given that small bowel diverticulitis, like a colonic diverticulitis, can cause an acute abdomen, surgical intervention may be required. In this particular case, a patient presented with symptoms of lower abdominal pain, nausea, and fever. Following an x-ray and CT scan, the patient underwent an open laparotomy and small bowel resection of the jejunal segment that contained the symptomatic diverticula.

## **S23. Heidi Storer**

### **A Paravertebral Abscess Masquerading as Lymphoma**

E. Josan, H. Storer, P. Sankhyan, C. Racedo-Africano  
Other (please specify)

**Abstract:** Case: A 58-year-old female with reported multiple myeloma was seen for progressive stabbing pain within the upper thoracic spine. She denied weakness, numbness, tingling or any other neurological problems. An MRI of the spine showed a 7cm right paratracheal mass with invasion of the adjacent ribs, vertebral bodies and right lateral epidural space with mild cord compression. CT angiography of the chest revealed a large, partially necrotic right paramediastinal mass with erosion of the adjacent vertebral bodies T5-T7, highly suggestive of plasmacytoma, lymphoma, and less likely lung cancer. Due to evidence of cord compression radiation therapy was started and neurosurgical intervention was deferred due to anticipated radiation sensitivity of the tumor. CT-guided percutaneous biopsy was negative for malignancy and primarily consisted of fibrotic tissue with vascularization and a mixture of acute, chronic and histiocytic inflammation which stained positive on CD68. Negative pan-cytokeratin and CD138 suggested lack of metastatic carcinoma or plasmacytoma and indicated reparative change. Moreover, the biopsy aspirate and blood cultures demonstrated heavy growth of methicillin-sensitive staphylococcus aureus, suggestive of paravertebral abscess with erosion into surrounding structures. Discussion: Vertebral osteomyelitis is more often due to hematogenous seeding than direct inoculation, usually from staph aureus (less commonly streptococcus, pseudomonas, or tuberculosis). An abscess usually presents with back pain. Febrile illness is only noted in 50% of cases, with or without leukocytosis, making the diagnosis challenging. Clinical and radiographic findings may be

supportive, positive biopsy aspirate cultures are definitive. Initial detection rates have been reported as low as 20%. The diagnosis in this case was missed due to incorrect history taking as the patient did not have multiple myeloma. Correct diagnosis is critical due to high morbidity and mortality rates.

## **S24. Meseret Tesfamariam**

### **Medical Curriculum Narrows the Gap in Disparities in Access to Healthcare in the USA**

Meseret K Tesfamariam

LECOM Student

**Abstract:** The subject of disparities in access to healthcare in the United States is a very broad and complex topic. With the advent of the Affordable Care Act (ACA) signed into law by President Barack Obama in 2013, the healthcare industry was forced to take a long, second look at access and inequality in delivery of care. In answering the call to narrow gaps in healthcare disparities, medical researchers, as well as leaders in medical education, have taken the reins to examine who, what, and how they are preparing contemporary medical professionals to adequately engage in this issue. The medical community has recognized that this disparity in access to healthcare has not been adequately addressed in American medical institutions and calls for immediate action. The following curriculum project is proposed to adequately prepare emerging medical professionals to successfully interact with target populations through knowledge and expertise in the behavioral and social sciences. How can medical institutions help facilitate continued and lasting effectiveness in the issue of disparities? Should the healthcare industry rely on government intervention to narrow gaps in access to affordable healthcare? Or, should the medical profession lead the way in tackling this issue, partnering with funding agencies, government agencies, legislative bodies, and community leaders to provide funds for medical personnel and healthcare agencies? The best choice is clearly the latter, and the foundation of this implementation lies in the development of standardized curricula to equip existing and newly practicing medical professionals with the skills and desire to engage populations with traditionally limited access to healthcare. Several studies suggest that medical schools align their curriculum with the nation's health priorities through inclusion of cultural competency knowledge and skills necessary to effectively interact with patients.

## **S25. Jeffrey Uselman**

### **Sessile serrated adenoma of the appendix and perforated cecal lymphoma in a nonagenarian on novel anticoagulant (NOAC) undergoing emergent surgery**

Saptarshi Biswas MD, FRCS, FICS, FACS (1); Shekhar Gogna MD (2), Jeffrey Uselman MS(3)

LECOM Student

**Abstract:** A 92-year-old male with significant past medical history of atrial fibrillation, congenital heart disease, CAD, DVT, HLD, HTN, MI, and peripheral vascular disease presented to Emergency Department (ED) with shortness of breath and right sided chest pain. He was hypotensive and tachycardic with right upper and lower quadrant tenderness on clinical examination. Initial PE protocol CT scan was negative for pulmonary embolism but revealed a large 13 cm mass in RLQ with adjacent free peritoneal air and fluid, suspicious for perforated cecal neoplasm or abscess. He received activated PCC for emergent reversal of Apixaban and taken emergently for exploratory laparotomy, where he underwent an extended right hemicolectomy with end ileostomy and a long Hartmanns. The ileocecal lesion was large and extended from the terminal ileum to almost the hepatic flexure. Histopathology revealed high-grade B-cell lymphoma involving the terminal ileum, cecum, ascending colon, appendix, and mesenteric lymph nodes. The specimen also contained a serrated sessile appendicular adenoma.

We discuss urgent/emergent surgeries in nonagenarians with multiple comorbidities on NOAC as well as the indications of palliative surgery in these patient groups. We also discuss synchronous serrated adenoma along with the perforated high grade lymphoma in the same patient.

## **S26. Gina Vernace**

### **PATIENT PREFERENCE OF PHYSICIAN CHARACTERISTICS IN HOSPITAL VS CLINIC**

Gina Vernace, DO

Millcreek Community Hospital

**Abstract:** Beauty is in the eye of the beholder, but does that ring true with a doctor-patient relationship? Do physicians really know what patients need from them? In this study, we search for what it is exactly that patients crave from their physicians to achieve the ultimate doctor-patient relationship. It is known that stronger relationships with patients equates to better compliance. 1 As physicians, we could get one step closer to compliance by figuring out what is needed from us, and most of the time, it is non-medical. We will see how physical attributes, like height and clothes play a role, as well as humanistic attributes like compassion, collaborative, humble, professional. Ultimately, as a physician, I want my patients to listen to what I have to say more than I want them to be my friend. But that line is getting more blurred and research is showing that better compliance leads to better outcomes. Additionally, nonadherence to treatment plans can cause detrimental effects, like worsening illness or even death. It will not be a surprise to find that patients will expect and come to need different attributes based on what setting we find them in, whether that be in the hospital, general clinic, urgent care ect. This study will compare, and contrast patients' needs based on two different settings: Hospital and Clinic.

## **S27. Chad Walls**

### **Patellar Sleeve Avulsions in the Pediatric Population**

Chad Walls, D.O., MS Med ed

Millcreek Community Hospital

**Abstract:** Patellar sleeve avulsion are rare injuries that occur almost exclusively in the skeletally immature. They tend to occur in late adolescence and most commonly result from an indirect injury with eccentric contraction of the quadriceps. Radiologic evaluation of these injuries may reveal only subtle findings, and ultrasound and MRI may be needed to fully appreciate the extent of injury. Non-operative treatment consists of immobilization for minimally displaced fractures. Multiple surgical treatments for displaced fractures have been described and include tension banding, trans-osseous sutures, cerclage wires, and suture anchor. Outcomes for all constructs have shown good results with early treatment. Delayed treatment, however, has been associated poor functional outcomes with few surgical techniques described. Because of the subtle radiographic findings and poor outcomes with delayed treatment, the examiner must have a high index of suspicion based on mechanism of injury and exam.

## **S28. Sara Wemlinger**

### **Prone to Pronator Syndrome: The Role of Electrodiagnostic Studies in Diagnosis of Bilateral Proximal Median Nerve Entrapment**

Sara Wemlinger

Other (please specify)

**Abstract:** Proximal median nerve entrapment is a rare cause of hand and forearm weakness, paresthesias, and pain. This case report describes the clinical presentation and EMG findings of a patient with bilateral proximal median nerve entrapment. Although carpal tunnel syndrome is the most common type of median nerve entrapment, pronator teres syndrome (PTS) and anterior interosseous nerve syndrome (AINS) should both be included in the differential diagnosis when a patient presents with signs or symptoms of median nerve injury. Electrodiagnostic studies are useful tools for diagnosing the degree and level of median nerve compression. They should be strongly considered for any suspected median nerve injury prior to definitive management, such as surgical intervention.

## **S29. Ryan Ziegler**

### **Necrotizing Fasciitis**

Ryan Ziegler D.O. Douglas Chonko D.O.

**Abstract:** Necrotizing fasciitis is a rare but life-threatening soft tissue infection involving fascia and surrounding tissue. While trauma is the inciting event in most infections, a significant number of cases have no known source. Numerous bacterial and fungal species have been implicated in the disease process with Group A Streptococcus being the most well known. It is imperative that physicians recognize and diagnose the condition in a timely fashion as the single most important variable affecting mortality is time to surgical debridement. A high degree of clinical suspicion is often needed as initial presentation can be devoid of classic signs and symptoms, especially in early presentations. Immunocompromised individuals may be more susceptible to infection, although nearly half of cases involve previously healthy individuals. Due to the rapidly spreading nature of the infection, a missed, or delayed diagnosis could result in potentially devastating consequences for the patient. Prompt diagnosis, early surgical intervention, antibiotic therapy, and supportive medical management are key elements of the treatment process to reduce morbidity and mortality.

## **S30. Olivia Hallas**

### **Patient Characteristics and Population Differences Freestanding and Hospital-based Emergency Departments**

Erin L. Simon, Sunita Shakaya, Olivia Hallas, Seth Podolsky, Rakesh Engineer, Courtney Smalley, Baruch Fertel

LECOM Student

#### **Abstract:**

**Background:** The number of freestanding emergency departments (FEDs) is increasing at a rapid pace. Previous research has compared outcomes and services provided by FEDs and hospital-based EDs (HBEDs), but little is known about differences in visit clinical characteristics. The objective of this study was to compare clinical demographics, method of arrival, acuity level, patient disposition and ED length of stay (LOS) for visits to FEDs vs. HBEDs.

**Methods:** Electronic health information was collected for ED visits from 1/1/2016 – 12/31/2017 within a large health system using data from 5 FEDs and 16 HBEDs (this includes Avon ED in FSED as well as in HBED). The system serves an urban-suburban mix with a metropolitan area population over 2,058,844. Frequency differences between FEDs and HBEDs for categorical variables were tested using Chi squared. For continuous variables, mean [standard deviation (SD)] was reported and Student's t-test was used to assess the difference in mean score received from FED vs. HBED patients. Significance of the test was determined using  $\alpha = 0.05$  as a cutoff. Multivariable linear regression analysis model was used to assess the association between type of ED facility patients chose and ED LOS.

**Results:** Total sample size of this study was 326,356 patients (10 % FED patients and 90% HBED patients). Mean age of the patients was 43 years [Standard deviation (SD): + 24] and was same for both ED facilities ( $p= 0.2976$ ). When comparing FEDs to HBEDs the racial mix was: Caucasian (78.2% vs. 62.6%), Black (16.2% vs. 32.4%), Asian 1.4% vs. 0.9%), other (4.1% vs. 4.1%) which was overall significantly different between facilities ( $p<0.001$ ). FEDs compared to HBEDs saw females 55.7% vs. 54.9% and males 44.3% vs. 45.1% respectively, which was significant ( $p=0.009$ ). Insurance status at the FEDs compared to HBEDs was: Medicaid 24.6% vs. 27.4%, Medicare 14.2% vs. 15.4%, Private 53.6% vs. 49.4%, Self Pay 6.8% vs. 7.1% and Veterans Administration/Tricare 0.8% vs. 0.7% respectively ( $p<0.001$ ). We found mode of arrival at the FEDs vs. HBEDs was: ambulance 11.5% vs. 25.6%; car 85.1% vs. 63.8%; walk-in 2.7% vs. 10.3% and overall these were significant ( $p<0.001$ ).

Average ED LOS for all patients was 215 minutes (SD: + 227), 158 minutes (SD: + 102) for FED patients and 221 minutes (SD: + 236) for HBED patients. The difference in ED LOS between FEDs and HBEDs was significant ( $p <0.001$ ). FEDs saw 0.1% patients of acuity level 1 and HBED saw 0.4%. ESI level 2 at the FEDs was 5.6% and 11.5% at the HBED. More than half of the patients seen by FEDs (58.6%) and HBEDs (57.9%) were emergency severity index (ESI) level 3. ESI level 4 was 33.8% at the FEDs and 27.9% at the HBEDs. FEDs saw less ESI level 5 at 1.9% compared to 2.2% at the HBEDs. The difference between the ESI levels for FEDs and HBEDs was  $p<0.001$ . For FED patients, 15% got admitted and 83% got discharged. Of the HBED patients, 24% got admitted to hospital and 75% got discharged. Left without being seen rates were 0.01% at the FEDs and 0.1% at the HBEDs ( $p<0.001$ ).

Multivariable linear regression explained 31% of variance in ED LOS for patients (R square: 0.3060). On average HBED patients had 1.2 minutes longer ED LOS compared to FED when adjusted for potential demographic and clinical confounding factors ( $p <0.001$ ).

Stratified analysis by admitted patients versus discharged patients, the average ED LOS of among HBED patients when compared to FED was similar (1 minute longer than FED patients)

**Conclusion:** Average ED LOS for all patients was significantly less for FED patients vs. HBED patients. FED acuity levels, insurance status, method of arrival, and patient disposition were significantly different compared to HBEDs.

### **S31. Abid Farooq**

#### **Surgical Intervention in Patients with SBO and Diabetes Mellitus**

Abid Farooq

Millcreek Community Hospital

**Abstract:** Surgical Intervention in Patients with SBO and Diabetes Mellitus Abid M. Farooq, DO Department of Medicine, Millcreek Community Hospital June 2018 Abstract Background Diabetes Mellitus has shown to effect the autonomic nervous system and cause those diagnosed to often acquire decreased gastrointestinal motility. Aim It is the aim of this study to investigate the effects of diabetes mellitus on the management of adult patients diagnosed with Small Bowel Obstruction. Methods A retrospective study was conducted using the patient record database at Millcreek Community Hospital with the study consisting of the comparison of diabetic and nondiabetic patients diagnosed with SBO in respect to treatment via surgical intervention versus conservative management. Results Diabetic patients of the female sex who were diagnosed with SBO were shown to require surgical intervention more often than their diabetic male counterparts. Conclusions Research efforts should be placed in the areas which investigate the rate of autonomic deterioration in respect to concentrations of sex hormones.

### **S32. Ashley Green**

#### **Primary Bladder Amyloidosis: A Case Report**

Ashley Green

Lake Erie College of Osteopathic Medicine, Erie, PA

**Abstract:** Primary amyloidosis of the bladder is a protein deposition disorder reported in approximately 200 cases worldwide. Although rare, the symptoms may mimic bladder malignancy and thus it is important to include in the differential diagnosis. We present a case report of primary bladder amyloidosis in an 82-year-old male with dysuria and atraumatic gross hematuria. Multiple erythematous bladder tumors were identified and biopsied, and amyloid was identified via Congo red staining with confirmation by liquid chromatography tandem mass spectrometry. Systemic amyloidosis was excluded through further workup. We conclude that this patient has primary bladder amyloidosis and discuss further management of this uncommon condition.

### **S33. Albert Addai**

#### **Cannabinoid For Migraine: Does it Work?**

Albert Addai, Dr. Thomas Corso PhD.

Lake Erie College of Osteopathic Medicine, School of Pharmacy

**Abstract:** This literature review focused the use of Cannabinoids for Migraine and other various comorbid conditions including headache, chronic pain, arthritis and their cannabis use for treatment. A summary of important findings include: For migraine patients, 43.3% substituted current opioid medication for cannabis but the research did not establish a statistical treatment correlation between migraine patients and their cannabis use. The different cannabis strain choices among the patients could affect the survey outcome, as the research could not standardize the various cannabis plant species, different environmental conditions for cultivation, different purification standardization as well as other varied in-vitro pharmacokinetics. Migraine patient's preference for cannabis can be subjected to several interpretations besides medical benefits. Due to the limited available clinical trials, limited data of cannabis chemical composition and reproducibility, safety, drug class schedule and efficacy, a multicenter placebo controlled double-blinded clinical trials and case surveys must be performed to establish a clinical and therapeutic correlation between cannabis use and migraine treatment.

### **S34. Lois Anti**

#### **Cannabinoid As A Therapeutic Agent For Dental Pain**

Lois Anti, Dr. Thomas Corso PhD.

Lake Erie College of Osteopathic Medicine, School of Pharmacy

**Abstract:** Marijuana has been used to alleviate pain for decades, but its analgesic mechanism or property is still not fully understood in dental pain especially in neuropathic orofacial pain which consist of BMS, PIFP and TN. Analgesia is one the principal therapeutic targets of the cannabinoid system and although many studies have demonstrated the efficacy of cannabinoid compounds in the treatment of chronic pain, there is limited research on the efficacy of cannabis on dental pain. This review is to investigate the possible use of cannabinoids as a therapeutic agent for the treatment of neuropathic orofacial pain symptoms.

### **S35. Oyi Amasiani**

#### **Efficacy and Tolerability of Cannabinoid in the Prevention of Cancer Induced Nausea and vomiting (CINV)**

Oyi Amasiani, Dr. Thomas Corso PhD.

Lake Erie College of Osteopathic Medicine, School of Pharmacy

**Abstract:** Nausea and vomiting are significant adverse drug effects of chemotherapy medications. Despite progress in anti-emetic treatment, many patients still suffer from chemotherapy-induced nausea and vomiting (CINV). Nausea and vomiting have not responded appropriately to conventional antiemetic medications. Thus, there are views to use cannabinoids to treat nausea and vomiting. This review assesses tolerability, preliminary efficacy, pharmacokinetics and adverse effects of cannabinoids and its effectiveness in treating cancer induced nausea and vomiting. Three articles were reviewed, and results suggest that rapid titration of a cannabinoid-based medication (CBM) appeared to be well tolerated by most patients and efficacious in reducing the incidence of CINV.

### **S36. Linh Nguyen**

#### **Cannabis to Treat PTSD & Chronic Pain: What Have Been Done and What Will Be Done?**

Linh Nguyen, Dr. Thomas Corso PhD

Lake Erie College of Osteopathic Medicine, School of Pharmacy

**Abstract:** The purpose of this review is to find out whether cannabis works to treat PTSD patients. There are over 28 states approved the use of cannabis for medical purposes and PTSD is among the common indications. There were studies showing the correlation between the cannabiniol and low level of endocannibin level in PTSD patients. There were studies that showed the benefits of using synthetic cannabis (Nabilone) in elevating symptoms of PTSD. Some systemic reviews (usually retrospective or observational studies) showed that there is insufficient evidence regarding the benefits and harms of plant-based cannabis use in patients with PTSD. There is one important on-going RCT evaluating benefits and harms of cannabis therapy for PTSD using different types of cannabis and one crossover RCT of PTSD patients using different amount of THC and cannabidiol to compare PTSD, mental health and physical health outcomes. These studies would be so valuable to evaluate cannabis use in PTSD population.

### **S37. Olivia Mann**

#### **An Investigation of Pol IV-Pol III Interactions in *E. coli***

Olivia Mann and Dr. Mark Sutton

University of Buffalo

**Abstract:** DNA Polymerase IV (Pol IV) is one of five Pols in *Escherichia coli*. Its primary function is to allow for damage tolerance during replication by a process termed translesion DNA synthesis (TLS). When a lesion is present in the DNA, the replication fork stalls because Pol III is unable to replicate past the lesion. Pol IV is recruited to this lesion following activation of the SOS stress response, which ensures viability of the cell following DNA damage. SOS activation facilitates displacement of Pol III on beta processivity clamp with Pol IV for TLS. The access of Pol IV to the replication fork, like the other *E. coli* DNA Pols, also requires its interaction with the beta clamp. The *E. coli* strain bearing the *dnaN159*-encoded mutant beta clamp is exquisitely sensitive to SOS-induced levels of Pol IV. Previous research determined that the T120P mutation in Pol IV alleviated this lethality by disrupting specific Pol III-Pol IV interactions. This project was focused on the creation of 50 Pol IV mutants targeting residues near T120 as part of an effort to map interaction surfaces between Pol IV and Pol III using a genetic assay. Twenty of the 50 mutants have been genetically characterized and the results thus far are discussed.