

2:00pm Chardonnay Room Plenary Session

**1 Aortic/Great Vessel Injury in the Pan-scan Era**

Louis Yu MD MA University of California San Francisco; Robert Rodriguez MD University of California San Francisco/Zuckerberg San Francisco General Hospital; Ali Raja MD, MBA, MPH Massachusetts General Hospital/Harvard Medical School; Bill Mower MD UCLA; Mark Langdorf, MD UC Irvine.

Background: In the era of frequent head-through-pelvis CT scan for adult blunt trauma patient evaluation, we sought to update teachings regarding aortic/great vessel (A/GV) injury using the largest, prospectively derived database of adult blunt trauma chest injuries (the NEXUS Chest study database). Specifically, we sought to 1) define the incidence of A/GV injury in adult blunt trauma patients; 2) determine the prevalence of thoracic injuries associated with A/GV injury; 3) determine how often patients with A/GV injury have widened mediastinum and other traumatic abnormalities seen on chest x-rays (CXRs); and 4) determine whether NEXUS Chest clinical decision rule (CDR) criteria detected all A/GV injuries. Methods: We conducted this pre-planned analysis of patients prospectively enrolled in the NEXUS Chest studies at eleven Level 1 US trauma centers with the following inclusion criteria: age > 14 years, blunt trauma within 12 hours of ED presentation, and receiving chest imaging during ED trauma evaluation. A/GV (and other) injuries were defined according to CT reports. We followed subjects through their hospital course to determine clinical outcomes. Results: Of 24,010 enrolled subjects, 42 (0.2%) had A/GV injury. Their median age was 49 years; 76% were male; median Injury Severity Score was 29, and the most common mechanisms of injury were motor vehicle collision (55%), pedestrian struck by motor vehicle (19%), and motorcycle accident (14%). Most patients (57%) had surgical interventions (primarily endovascular repair) and 38 (90% [95% CI 78-96%]) survived to hospital discharge. 33 patients (79% [95% CI 64-88%]) had an associated thoracic injury, most commonly rib fractures (57%), pneumothorax (45%), pulmonary contusion (31%), hemothorax (24%), and sternal fracture (12%). The sensitivity (Sn) for A/GV injury of widened mediastinum on CXR was 54.8% (95% CI 40-69%); Sn of either widened mediastinum or other traumatic injury on CXR was 97.6% (95% CI 88-100%); and Sn of the NEXUS Chest CDRs was 100% (95% CI 92-100%). Conclusions: We found that A/GV injury is uncommon. After arrival to the ED, most patients with A/GV injury survived to hospital discharge. Most patients with (A/GV) injury had other thoracic injuries. Widened mediastinum on CXR is not an adequate screen for (A/GV) injury, but NEXUS Chest criteria detected all (A/GV) injuries.

**2 A Novel Risk Prediction Score for Emergency Department Patients with Pericardial Effusion**

Youyou Duanmu MD, MPH Stanford University School of Medicine; Daniel S. Choi MD Brigham and Women's/Massachusetts General Harvard Affiliated Emergency Medicine Residency; Sam Tracy Harvard University; Owen M. Harris MD Brigham and Women's Hospital/Harvard Medical School; Jessica Inge. Schleifer MD Massachusetts General Hospital; Farah Z. Dadabhoy MD, MSc; Justina C. Wu MD, PhD, Brigham and Women's Hospital/Harvard Medical School; Elke Platz MD, MS Brigham and Women's Hospital/Harvard Medical School.

Background: Pericardial effusions can vary widely in clinical importance when encountered in the emergency department (ED) and determining which patients require urgent intervention often remains challenging. The purpose of this study was to create a prediction score to risk stratify patients with pericardial effusion. Methods: This was a retrospective cohort study of adult patients who presented to an urban academic ED and were found to have a non-traumatic pericardial effusion  $\geq 1$ cm in diastole on comprehensive transthoracic echocardiogram (TTE). Electronic medical records and TTE images were reviewed blinded to in-hospital events. The primary outcome was a pericardial drainage procedure or death attributed to pericardial tamponade within 24 hours of ED arrival. The overall cohort was divided into a derivation and validation cohort and logistic regression was applied for the generation and validation of the risk score. Area under the receiver-operating characteristic curve (c-statistic) was used to assess the performance of the model in the derivation and validation cohorts. Results: Among 195 patients (mean age 60, 51% men, 81% White) who met the inclusion criteria, 102 (52%) experienced the primary outcome, none of whom died within 24 hours. Four

variables were selected for inclusion in the final model: systolic blood pressure < 100mmHg [1.5 points], effusion diameter category (1-2cm [0 points], 2-3cm [1.5 points], > 3cm [2 points]), right ventricular diastolic collapse [2 points], and mitral inflow velocity variation > 25% [1 point]. The risk of requiring pericardial drainage within 24 hours was stratified as low (< 2 points), intermediate (2-4 points) and high ( $\geq$  4 points), which corresponded to risks of 8.1% (95%CI 3.0-16.8%), 63.8% (95%CI 50.1-76.0%) and 93.7% (95%CI 84.5-98.2%) in the combined cohort. The derivation cohort had a c-statistic of 0.94 and the validation cohort had a c-statistic of 0.91. Conclusion: Among ED patients with moderate or large pericardial effusion, a simple prediction score consisting of systolic blood pressure, effusion diameter, right ventricular collapse, and mitral inflow velocity variation can accurately predict the need for urgent pericardial drainage. Prospective validation of this novel score is warranted.

### **3 Enforcement of the Emergency Medical Treatment and Labor Act (EMTALA) at Indian Health Services Hospitals**

Sophie Terp MD, MPH University of Southern California, Keck School of Medicine; Erica Kiemele MD LAC+USC Medical Center; Sarah Axen Ph.D. University of Southern California, Keck School of Medicine; Daniel A. Dworkis MD, PhD University of Southern California, Keck School of Medicine; Janisse Mercado BA University of Southern California, Keck School of Medicine; Chun Nok Lam MPH University of Southern California, Keck School of Medicine; Michael Menchine MD, MPH University of Southern California, Keck School of Medicine.

Background: The Emergency Medical Treatment and Labor Act (EMTALA) is an anti-dumping law intended to ensure access to emergency care. While most federal hospitals are exempt from EMTALA, Indian Health Service (IHS) hospitals with Medicare provider agreements must comply with EMTALA. Centers for Medicare and Medicaid Services (CMS) previously acknowledged EMTALA violations are a serious issue for IHS hospitals. This study compares EMTALA enforcement at IHS and non-IHS hospitals. Methods: A retrospective analysis of observational data on EMTALA enforcement at the hospital level. Multiple administrative databases were linked using facility-specific Medicare IDs to create a longitudinal file at the hospital-year level including information on facility characteristics and dates of EMTALA citations from 2005-2013. EMTALA citations per million ED visits were calculated by hospital type. Odds ratios for receipt of EMTALA citation by hospital type were calculated using multivariable logistic regression adjusting for critical access -, regional referral -, teaching -, metropolitan-hospital status, ED volume, hospital size and payer mix with fixed effects for year and CMS region. Results: Among 4916 unique hospitals, 1237 (25%) had at least one EMTALA citation during the study period. Of 35 IHS hospitals, we identified 12 EMTALA citations at 8 unique hospitals. Rates of EMTALA citation (per million ED visits) were highest among IHS facilities (2.70) compared with private for-profit (2.60), non-federal government (1.68) or private not-for-profit (1.24) hospitals. After adjusting for hospital features, increased odds of EMTALA citation were found at IHS hospitals (OR 2.86; 95% CI 1.29-6.38) and private for-profit hospitals (OR 1.59; 95% CI 1.31-1.92) compared with non-federal government-owned hospitals (control group). Conclusions: IHS hospitals have the highest rate of EMTALA citations per million ED visits. Adjusted odds of EMTALA citations at IHS hospitals are nearly three times higher than for other government-owned hospitals. Findings suggest that EMTALA violations are a serious issue for IHS hospitals, indicating the need to explore how additional financial, technological, and personnel support could improve emergency care at these facilities.

### **4 Elevated Cell-Free DNA as a Predictor of Admission Outcomes in Emergency Department Sepsis Patients**

Daniel Rogan MD MS Stanford Hospital and Clinics; Nadya Andini PhD Stanford Hospital and Clinics; Samuel Yang MD Stanford Hospital and Clinics; James Quinn MD MS Stanford University School of Medicine.

Background: Sepsis is an inflammatory infectious state with significant mortality and healthcare system burden. Early detection and management dramatically improves patient outcomes. As the entry point for many, emergency departments (EDs) are ideally placed to initiate sepsis treatment and determine admission need. Cell-free DNA (cfDNA) is a potential predictor of outcomes in ED sepsis patients; previous intensive care unit (ICU) studies have correlated high cfDNA with in-hospital mortality. Our goal was to use cfDNA to predict admission requirement, thus aiding in disposition

planning. Methods: During a 6 month study period at a large academic ED, 453 consecutive blood samples were collected prospectively from septic patients (study samples drawn as part of standard sepsis bundle), with additional retrospective chart review; of these, 140 patients met inclusion criteria (samples processed within 24 hours; no immunocompromise, no active cancer, no hospice status), had cfDNA extracted, and were risk-stratified to high (n=90) and low risk (n=50) based on disposition (high risk: admission  $\geq 24$  hrs). Variables were modeled by logistic regression. Scores from other illness prediction algorithms were modeled including qSOFA (Quick Sequential Organ Failure Assessment), REMS (Rapid Emergency Medicine Score), MEDS (Mortality in Emergency Department Sepsis), and CURB-65 (Confusion, Uremia, Respiratory rate, Blood pressure, age  $\geq 65$ ). Results: No single variable was a sound predictor of disposition, though a multivariate model including cfDNA (AUC 0.82) was better than other standardized models at predicting need for admission. Multivariate model: age  $\geq 55$  years; cfDNA  $\geq 80$  ng/mL; lactate  $\geq 2.2$  mg/dL; maximum heart rate  $\geq 120$  bpm. In comparison qSOFA had relatively strong predictive ability (AUC 0.76), while remaining models and algorithms fared poorly. Conclusion: A multivariate model may translate to a risk stratification score specific to disposition planning, rather than predicting in-hospital mortality as has been found in ICU studies. However, a decent scoring algorithm (qSOFA) already exists which does not require the time or expense of laboratory analysis. cfDNA is potentially an exciting marker of illness severity, but further evaluation is needed to determine if the additive clinical benefit of cfDNA above qSOFA justifies its use.

### **5 The effect of tranexamic acid on functional outcomes: an exploratory analysis of the CRASH-2 trial.**

Daniel K. Nishijima MD, MAS; Nathan Kuppermann MD, MPH; Department of Pediatrics, University of California Davis School of Medicine, Sacramento, California; Ian Roberts MB, BCh London School of Hygiene and Tropical Medicine; John VanBuren PhD Department of Pediatrics, University of Utah School of Medicine; Daniel Tancredi PhD Department of Pediatrics, UC Davis School of Medicine.

Background: Tranexamic acid (TXA) improves survival in severely injured adults. However, the effectiveness of TXA on overall functional outcome is unknown. We hypothesized that TXA improves overall functional outcome compared to placebo in severely injured adults. Methods: This was an exploratory analysis of the CRASH-2 study. We included injured adults randomized 3 hours or less from the time of injury. The primary outcome measure was functional status at hospital discharge, or on day 28 if the subject was still in the hospital. Functional status was measured with the Modified Oxford Handicap Scale, a 6-category ordinal functional outcome scale. We conducted three separate analyses using three different outcome measures to evaluate the effectiveness of TXA versus placebo on functional outcomes including: 1) the mean utility-weighted Modified Oxford Handicap Scale score (overall functional outcome), 2) the area under the curve (based on functional outcome and rate of recovery), and 3) a sliding dichotomy analysis (favorable versus unfavorable functional outcome) stratified by baseline mortality risk (stratified analysis). Results: There were 13,432 patients (6,679 randomized to placebo and 6,753 randomized to TXA) included in the study cohort. The mean utility-weighted Modified Oxford Scale score was 0.66 for patients randomized to TXA compared to a mean of 0.64 for patients randomized to placebo (mean difference 0.02 [95% confidence interval [CI] 0.01 to 0.03]). The area under the curve analysis demonstrated patients randomized to TXA had a higher 28-day mean utility-weighted Modified Oxford Scale score compared to placebo (mean score of 0.55 versus 0.53; mean difference 0.02 [95% CI 0.01 to 0.03]). The sliding dichotomy analysis demonstrated the overall proportion of patients with favorable functional outcomes was higher in the TXA group (5,360/6,753, 79.4%; 95% CI 78.4 to 80.3%) compared to the placebo group (5,174/6,679, 77.5%; 95% CI 76.5 to 78.5%); difference of 1.9% (95%CI 0.5-3.3%); number needed to treat=52. Conclusion: Across three exploratory analyses, severely injured adult patients randomized within 3 hours from the time of injury, demonstrated better functional outcomes with TXA compared to placebo. Future trauma trials that evaluate TXA use should also consider functional status as an important outcome.

### **6 Association of Suicide Attempt With Opioid Abuse in California Emergency Departments in 2011**

Soheil Saadat MD PhD UC Irvine; Nikhil Shah UC Irvine; Cassandra Saucedo; Tim Bruckner MPH PhD Parvati Singh; Jangho Yoon PhD; Lonnie Snowden MA PhD; Bharath Chakravarthy MD, MPH UC Irvine.

**Background:** A growing body of research has determined numerous physiological and social issues associated with Opioid Abuse (OA). While there have been general population studies showing that OA leads to various behavioral outcomes, analysis with respect to specific subgroups is not often conducted. This study will use data from Emergency Department (ED) visits across California to examine associations between OA and Suicide Attempt (SAT) in different population demographics and promote specialized public health intervention. **Methods:** We used the California State Emergency Department Database (SEDD) to obtain discharge information from 2011, the most recent data available. This dataset contains discharge information on all ED encounters that did not result in an admission to the same facility. SEDD includes uninsured patients along with those covered by Medicare, Medicaid, and private insurance. OA and SAT were identified by using the relevant ICD-9 codes. **Results:** The study included 10,124,598 patients referred to EDs in California in 2011. The prevalence of OA was 0.4%. The prevalence of SAT among ED patients was 0.3% for non-Opioid Abusers and 4.9% for OA (OR=18.02, 95%CI: 17.16-18.91). In a multivariable analysis, SAT was directly associated with OA and the number of chronic diseases. It was more frequent among females, whites, and younger age groups (10-30). Association of SAT with OA was stronger in female patients compared to males. **Conclusion:** OA is a strong risk factor for SAT. SAT prevention should target females, younger populations, and patients with chronic diseases. These characteristics are not modifiable and targeted psychosocial treatment to this population is required to decrease the risk of SAT. On the other hand, OA is a modifiable risk factor of SAT and its treatment may significantly decrease the risk of SAT, especially in female patients. Female gender is a risk factor of SAT by itself. Moreover, abusing opioids by females increases the risk of SAT more than males. Therefore, OA rehabilitation would have greater benefits for female Opioid abusers than for males in the context of suicide prevention.

## **7 Changes in Patients' MEWS Scores while in the ED Predict Mortality, ICU Admission and LOS**

Nick M. Levin, MD University of Utah; Devin Horton, MD University of Utah; Kencee Graves MD University of Utah; Matthew Sanford University of Utah; Joseph Tonna MD University of Utah.

**Background:** Modified Early Warning Systems (MEWS) scores offer proxies for morbidity and mortality, and are easily acquired by any healthcare provider. Composite scores >5 on hospital admission have been validated internally as associated with death and ICU admission. Changes in MEWS scores (delta MEWS) from ED to hospital have been studied, but the significance of changing scores within the ED remains poorly understood. Accordingly, we sought to examine the correlations between ED delta MEWS scores and in-hospital morbidity, mortality and length of stay (LOS). **Methods:** We performed a retrospective analysis on ED patients admitted to our institution between November 2017 and November 2018. To exclude scores clearly associated with trauma, physical injury or burns, we excluded patients admitted to the Trauma, Orthopedics or Burn services. Triage-to-Last delta MEWS (LdMEWS) score and Triage-to-Max delta MEWS (MdMEWS) were calculated among all scores obtained in the ED. Each score was correlated using parametric analysis to in-hospital mortality, ICU admission and LOS, after adjusting for sex, age, Charlson Comorbidity Indexes, and triage MEWS score. **Results:** Analysis included 8,171 ED patients, with an ICU admission rate of 17.3% and mortality rate of 2%. Using multivariate adjusted regression models, every point improvement in patients' LdMEWS score in the ED was associated with a reduction in all-cause mortality (OR 0.63, 95% CI 0.57 – 0.70), and in ICU admission (OR 0.68, 95% CI 0.65 – 0.71). Additionally, for every point increase in ED MEWS score after triage (MdMEWS), odds of mortality increased by 1.43 (95% CI 1.27 – 1.61), and ICU admission by 1.46 (95% CI 1.39 – 1.54). For survivors, every point improvement in LdMEWS score in the ED was associated with a 39% RR decrease in hospital LOS (95% CI -0.48 to -0.30), and every point increase in MdMEWS with a 31% RR increase in LOS (95% CI -0.22 to -0.41). **Conclusions:** Utilizing MEWS as proxy for a patient's morbidity and mortality upon presentation to the ED, we are beginning to examine the utility of changing ED MEWS scores during resuscitation. In this cohort, patients with improving ED MEWS scores

(LdMEWS) had a lower likelihood of in-hospital mortality, LOS and ICU admission, and every increase in MEWS score after triage (MdMEWS) was associated with increased mortality, LOS and ICU admission."

8:00am Pinot A Education 1

**150 Comparison of AAMC Standardized Video Interview (SVI) and the Electronic Standardized Letter of Evaluation (eSLOE)**

Laura R. Hopson MD; Linda Regan MD Johns Hopkins University School of Medicine; Michael C. Bond University of Maryland School of Medicine; Jeremy Branzetti; Elizabeth Samuels; Bobby Naemi Ph.D. AAMC; Dana Dunleavy; Michael A. Gisondi MD Stanford University School of Medicine.

Background: The authors analyzed the performance characteristics of the Electronic Standardized Letter of Evaluation (eSLOE), a widely used, structured, norm-referenced evaluation of emergency medicine residency applicants, and the AAMC Standardized Video Interview (SVI), a new tool designed to assess communication skills and professionalism knowledge. Methods: The authors examined correlations and group differences for EM residency applicants in the 2018 Match, including SVI scores and corresponding eSLOE ratings. The authors matched 3469 potential applicants with valid SVI scores to 3223 applicants with 7544 unique eSLOEs, resulting in a matched sample of 2884 applicants. Results: SVI and global assessment eSLOE ratings demonstrate small positive correlations approaching  $r = 0.20$ . eSLOE ratings are correlated higher with measures of academic ability (USMLE scores and academic honor society membership) than SVI scores. Group differences are minimal for the SVI, with the exception of applicant type, which favors MDs. There are small group differences in eSLOE ratings favoring women over men (approaching  $d = -0.20$ ) and white applicants over black applicants (approaching  $d = 0.40$ ). Conclusions: The small positive correlation between SVI and eSLOE global ratings, alongside varying correlations with academic ability indicators, suggest that these are complementary instruments. Findings suggest that the eSLOE is subject to similar sources and degrees of bias as other common assessment tools; group differences are not observed with the SVI. Further examination of both tools is necessary to understand their ability to predict future clinical performance.

**183 Describing the Study Habits of Emergency Medicine Residents, a Two-Year Analysis**

Reese Dare MD University of Arizona College of Medicine; Gregory Ely MD; Tomas Nuno PhD University of Arizona College of Medicine; Robert Conley MD University of Arizona College of Medicine; Amanda Murphy MD; University of Arizona College of Medicine; Vivienne Ng MD, MPH.

Background: Physicians must be independent learners to mature into responsible practitioners. We previously reported that EM residents at a single institution used weekly conference lectures as the primary source of learning, followed by traditional (books, journals, question banks), then non-traditional resources (free open access medical education; FOAM). As the In-Training Exam (ITE) is predictive of first pass success on the ABEM Qualifying Exam (QE), we describe trends in study habits and ITE scores by following resident cohorts over time. Objectives: To describe study habit trends over time and identify correlates to ITE exam scores. Methods: Residents provided written consent and were de-identified. On a weekly basis, residents reported their study practices from the prior week. Data were collected for 104 weeks from February 2016 to February 2018 and included the number of hours spent using traditional and non-traditional resources, hours of didactic lecture attended, number of textbook chapters read, study questions completed, weekly study sessions, and scores from three ITE exams. Results: Seventy-nine of 129 eligible residents completed an average of 13 (range 1-84) weekly surveys. No statistically significant positive or negative change was found in the type of or time spent on a given study resource over time. However, trends were noted. Residents continue to primarily use weekly conference lectures for learning. Time spent on traditional resources dropped while that of non-traditional resources increased, especially for newer residents. Newer residents also used question banks more than previous classes, completing twice as many questions per week in year two than year one. Time spent in conference and on independent study did not change. ITE scores did not significantly change when stratified by class cohort. Conclusion: Two-year trends indicate that EM residents continue to rely on weekly conference lectures as their primary source of learning. Newer residents used FOAM and question banks more than traditional books, which may suggest a change in

study culture. Limitations include recall bias and highly variable participation rates despite incentives and regular progress reports on individual study participation and ITE performance. Cohort sizes were too small to correlate resource type to ITE likelihood to pass the QE on first attempt.

### **1382 Thinking Outside the (Cardboard) Box: A Low Fidelity Simulation Competition**

Devin Thompson MD University Medical Center - Las Vegas, NV; Jordana Haber MD University Medical Center - Las Vegas, NV; Brian Ault DO University Medical Center - Las Vegas, NV.

Background: Procedural training for low-frequency, high risk-procedures, poses a unique challenge in resident education. This study seeks to test the hypothesis that resident-designed, low-fidelity/low-cost simulation could improve procedural confidence as compared to baseline level in emergency medicine (EM) residents. Methods: 30 EM Residents at a single academic EM Residency were cluster randomized into groups with approximate equal training year distribution. The groups received uniform instructions to design and build a low-fidelity, task-specific simulation model within 30 days with a budget of \$100. They also created a training session and pre-post questions to assess procedural knowledge. Models included: Fiberoptics, cricothyrotomy, lateral canthotomy, Blakemore tube, and lumbar puncture. Inclusion criteria: EM residents present at conference. Exclusion criteria: incomplete/incorrectly completed quizzes. Participants completed a pre and post test which assessed procedural confidence on a 9-point Likert scale and procedural knowledge using (6-13) multiple-choice questions. Primary outcome measure: proportion of residents who self-assessed high procedural confidence in performing procedure without supervision before and after the training. Secondary outcome: change in procedural knowledge scores. Data were analyzed using Fisher's exact test and reported with p values and difference in proportions with surrounding 95% confidence intervals (95% CI). Results: 27 residents participated. There was equal distribution of PGY status amongst groups. Data are presented as high-rated confidence proportions pre-vs-post (difference in proportions [95% CI of difference]; p-value. Blakemore: 0% vs. 47.1% (47.1 [22.7-79.0]; p=0.001). Cricothyrotomy: 38.1% vs. 84.2% (46.1 [23.7-80.0]; p=0.004). Fiberoptic: 11.1% vs. 66.7% (58.0 [37.7-91.0]; p=0.0002). Lateral Canthotomy: 33.3% vs. 66.7% (33.3 [8.7-65.6]; p=0.038). Lumbar Puncture: 81.8% vs. 94.4% (12.6 [-0.12-39.4]; p=NS). Conclusion: There were significant increases in procedural confidence for the Blakemore, cricothyrotomy, fiberoptic and lateral canthotomy stations after completion of the simulations. This suggests that low-fidelity simulation is a cost-effective training modality for uncommon procedures.

### **284 Implementation of an Educational Dashboard and Financial Incentive Improves Faculty Participation in Evaluations**

Megan Fix MD; Andrew Pugh MBBS University of Utah School of Medicine; Troy Madsen MD University of Utah; Christine Carlson University of Utah Division of Emergency Medicine; Gerard Doyle MD University of Utah School of Medicine; Robert Stephen MD University of Utah School of Medicine; Susan Stroud MD University of Utah School of Medicine.

Background: The ACGME requires all EM training programs to evaluate resident performance and also requires core faculty to attend didactic conference. Assuring faculty participation in these activities can be challenging. Previously, our institution did not have a formal tracking program nor a financial incentive for faculty participation in these activities. In 2018 we initiated an Educational Dashboard which tracked and published all full-time university faculty conference attendance and participation in resident evaluations and other educational activities. We sought to determine if the implementation of a financially incentivized Educational Dashboard would lead to an increase in faculty conference attendance and the number of completed resident evaluations. Methods: We conducted a pre- and post-intervention observational study at our EM residency training program between July 2017-August 2018. Participants were 17 full time EM attendings at one training site. We compared the number of completed online resident evaluations by faculty (MedHub) and number of conference days attended (call-in verification) before and after the introduction of our Educational Dashboard, which included a financial incentive for faculty. The incentive required 100%

completion of resident evaluations and at least 25% attendance at eligible didactic conference days. We calculated pre and post intervention averages and comparisons were made using a chi square test. Results: Prior to implementation of the Educational Dashboard with a financial incentive, the 90-day resident evaluation completion rate by faculty was 72%. This increased to 100% after implementation ( $p < 0.001$ ). Faculty conference attendance prior to implementation was 42%, which remained unchanged at 42% after implementation ( $p = 0.920$ ). Conclusions: Attaching a financial incentive to a tracked Educational Dashboard increased faculty participation in resident evaluations but did not change conference attendance. This difference likely reflects the minimum thresholds required to obtain the financial incentive.

#### **423 Medical Student Perception of Cutting-Edge Ultrasound Technology During a Gamified Education Session**

Elaine Situ-LaCasse M.D. Banner University Medical Center; Josephine E. Valenzuela M.D. Banner University Medical Center; Nicholas C. Hernandez M.D.; Banner University Medical Center-Tucson; Jeanie K. Ringelberg M.D. Banner University Medical Center-Tucson; Mimi Bach M.D. Banner University Medical Center-Tucson; Richard Amini M.D. University of Arizona College of Medicine; Victoria Bain DO Banner University Medical Center-Tucson; Josie Acuña MD University of Arizona; Robert P. Jamplis University of Arizona College of Medicine.

Background: Cutting-edge ultrasound (US) technology is making US education more accessible. Hands-on US sessions can be resource-intensive, requiring trained instructors, expensive machines, and live models. With advances in US technology, novices can learn US with laptop-based simulation programs, virtual reality (VR) environments, and hone their skills with handheld ultrasound (HHUS) devices. Our objective is to evaluate novices' perceptions of new US technology after a gamified educational hands-on session. Methods: This is a prospective study at an academic center. Participants were third-year medical students (MS3s) who have had basic US training integrated into their first 2 years of medical school. Study took place 3 months into their 3rd (clinical) year. Subjects participated in a competition-style educational session in teams, designed to teach and review basic US applications. On the prior day, they received a 1-hour review session of the basic US applications they learned in their first 2 years. Ten teams rotated through 10 stations with unique challenges and with a VR US system, laptop-based US simulation system, and HHUS machines at various stations. At the end, students completed a survey. Descriptive statistics were used to summarize the data, and responses were reported as percentages of total respondents with 95% confidence intervals. Results: Total of 112 MS3s completed the survey. Before the session, majority of MS3s' confidence in performing basic US applications (eFAST, cardiac, peripheral nerves, biliary, ultrasound-guided IV placement, musculoskeletal, OB/GYN, and renal) exam category was low [1 (low) – 10 (high)], with 81.6% (95% CI 74.4-88.8%) rating their confidence  $\leq 5$ . After the session, 81.8% (95% CI 74.7-89%) rated their confidence  $\geq 5$  in each category. When they were asked if US VR systems improved their US knowledge and skills, 70.2% (95% CI 61.7-78.7%) agreed. Majority [78.6% (95% CI 71-86.2%)] rated the image quality of HHUS devices as good or better than cart-based systems. Over 84% [84.8% (95% CI 78.2-91.5%)] strongly agreed that this educational session allowed them to experience and use new technologies in US medicine. Conclusion: Medical students had positive perceptions of the new US technology for education, and the use of these tools increased their confidence in performing basic applications.

#### **430 Emergency Medicine Residents' Perception of Virtual Reality Ultrasound Systems**

Elaine Situ-LaCasse M.D. Banner University Medical Center; Martin Dufwenberg University of Arizona College of Medicine; Srikar Adhikari MD, MS University of Arizona College of Medicine.

Background: Emergency Medicine (EM) residency programs are required to train their residents in bedside ultrasound (US), and with this ever-growing base of learners, the challenge is the paucity of qualified teachers. Not only this, but learners cannot learn pathology on normal, live training models. Thus, virtual reality (VR) ultrasound systems are being developed to fill this need. Our objective is to evaluate Emergency Medicine residents' perceptions of the virtual reality ultrasound system for eFAST ultrasound training. Methods: This is a prospective study at an academic center. Study participants were Emergency Medicine residents from three programs: 2 categorical EM programs and one combined



EM/Peds program. All residents tried the VR ultrasound system, wearing the VR headset and immersed in a VR emergency department taking care of a trauma patient. Residents were able to see examples of both normal and abnormal eFASTs with the VR system. After their VR session, they completed a survey. Descriptive statistics were used to summarize the data. Survey responses were reported as percentages of total respondents with 95% confidence intervals. Results: Total of 37 residents (PGY 1-4) completed the survey. Only 8.1% (95% CI -0.69-16.9%) have ever used a VR US system prior to the session. On a scale of 1 (low) to 10 (high) to rate realism of the VR experience to live model scanning, majority [80.6% (95% CI 67.7-93.5%)] gave the VR system a rating 5 or higher. However, 45.9% (95% CI 29.6-62.2%) disagreed that the VR system can replace live model scanning. Three-quarters [75% (95% CI 60.9-89.1%)] of the subjects agreed that the VR US system augments psychomotor skills for US performance, and 86.5% (95% CI 75.5-97.5%) agreed the VR system augments their understanding of sonographic anatomy. Most residents [89.2% (95% CI 79.2-99.2%)] agreed that VR US simulators are a good adjunct to learning how to perform eFAST on live models. Conclusions: Although EM residents reported that the VR US system is realistic and can augment psychomotor skills and understanding of sonographic anatomy. They also reported that VR cannot replace live model scanning, but it can serve as a good adjunct.

#### **542 Residents as Teachers: A Novel Curriculum to Increase Resident Confidence in Public Speaking**

Jaymin Patel M.D. University of California, Davis, School of Medicine; Samuel Clarke MD, MAS, FACEP University of California, Davis, School of Medicine.

Background: Residents endorse varying degrees of comfort with giving a lecture in front of faculty and peers. As part of a focused needs assessment of the residency curriculum by our program leadership in 2016, we identified a desire to promote resident-led teaching. Based on this gap in the curriculum we piloted a novel “visual diagnosis” series in 2017. PGY-1 residents developed and delivered 10-minute lectures around clinical images relevant to the practice of Emergency Medicine. Residents received formative feedback on their slides prior to and after presenting their talk. In order to strengthen this experiential learning intervention, we introduced an orientation lecture on lecture planning, design, and delivery in 2018. We theorized that a program focused on developing teaching and presentation skills to residents in their PGY-1 year will translate to increased confidence preparing and delivering didactic presentations to groups of peers and faculty. Methods: After each resident had completed the project, they were surveyed using Likert scale questions about how comfortable they were with the three main aspects of academic presentations: planning, designing and delivering. Their responses were grouped into categories and analyzed to see if there was any change from baseline. Results: A total of 21 PGY-1 residents participated in the survey (response rate 53.8%). 74.6% of residents felt slightly more to much more confident in planning a lecture. Confidence in designing and delivering a lecture increased by “slightly more” to “much more” in 57.1% and 66.7% of residents, respectively. Taken in total, confidence across the aforementioned three aspects increased in by “slightly more” to “much more” in 65.2% of residents. Also taken in total, 31.9% of residents reported no more or no less confidence and 2.8% of residents stated they felt slightly less confident. Conclusion: When residents are exposed to and given direction for giving an academic lecture early in their PGY-1 year, it leads to increased confidence in their ability to plan, design and deliver a presentation in front of an audience of peers and faculty. We hope the “visual diagnosis” lecture series will continue forward as a staple element to the residency curriculum, aiming to increase resident confidence in public speaking.

#### **575 Comparison of the Standardized Video Interview and Interview Assessments**

Laura R. Hopson MD; Michele Dorfsman Emergency Medicine University of Pittsburgh; Jeremy Branzetti MD New York University/Bellevue; Michael A. Gisoni MD Stanford University School of Medicine; Danielle Hart MD, MACM Hennepin County Medical Center; Jaime Jordan UCLA Department of Emergency Medicine, Los Angeles, CA; James A. Cranford University of Michigan, Department of Emergency Medicine; Sarah Williams; Linda Regan MD Johns Hopkins Emergency Medicine Department.

Background: The AAMC Standardized Video Interview (SVI) was recently added as a component of Emergency Medicine (EM) residency applications to provide additional information about knowledge of Professionalism (PROF) and Interpersonal Communication Skills (ICS). Objective: Our objective was to ascertain the correlation between the SVI and residency interviewer assessments of PROF and ICS. Secondary objectives included examination of (a) inter- and intra-institutional assessments of ICS and Prof; (b) correlation of SVI scores with Rank Order List (ROL) positions; and (c) the influence of gender on interview day assessments. Methods: We conducted an observational study using prospectively-collected data from seven EM residency programs during 2017-2018 using a standardized instrument. Correlations between interview day PROF / ICS scores and the SVI were tested. A one-way ANOVA was used to analyze the association of SVI and ROL position. Gender differences were assessed with independent-groups t-tests. Results: A total of 1,264 interview-day encounters from 773 unique applicants resulted in 4,854 interviews conducted by 151 interviewers. Both PROF and ICS demonstrated a small positive correlation with the SVI score ( $r_s = .16$  and  $.17$ , respectively). ROL position was associated with SVI score ( $p < .001$ ), with mean SVI scores for top-, middle-, and bottom-third applicants being 20.9, 20.5, and 19.8, respectively. No gender bias was identified on assessments of PROF or ICS. Conclusions: Interview assessments of PROF and ICS have a small, positive correlation with SVI scores. These residency selection tools may be measuring related, but not redundant, applicant characteristics.

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**8:00am**      **Pinot B**      **Cardiovascular I**

**176 Cannabis Use and Acute Coronary Syndrome: A Systematic Review**

John Richards; Mary L. Bing MD UC Davis Health System; Aimee Moulin MD; Joshua W. Elder MD, MPH, MHS University of California, Davis; Robert Rominski MD; Phillip Summers MD; Erik Laurin MD UC Davis.

Background: Cannabis smoking results in elevation of heart rate and blood pressure immediately after use, possibly from sympathetic nervous system stimulation and parasympathetic nervous system inhibition. Vascular inflammation, platelet activation, and carboxyhemoglobin generation have also been proposed as potential side effects of cannabis smoking. As such, an association between cannabis use and acute coronary syndrome (ACS) has been postulated. The objective of our study was to systematically analyze the medical literature pertaining to this putative association. Methods: PubMed, Google Scholar, and OpenGrey were queried using a unique search string. Results were reviewed for relevance. Clinical trials, observational studies, retrospective studies, case series and reports were graded using Oxford Centre for Evidence-based Medicine guidelines. Results: There were 5 Level I systematic reviews, 14 Level II studies with 83,961 subjects, and 14 Level III studies with 457,495 subjects. Conclusions from all but 5 studies highlighted an increased risk of ACS from cannabis use. The exceptions were a systematic review reporting limited and weak evidence for the association, another systematic review that was inconclusive, 2 longitudinal prospective studies and a retrospective review concluding cannabis users had lower post-ACS mortality. There were 50 case series (Level IV) and reports (Level V) with 56 subjects. Six cases were female (11%). Average age was  $30.0 \pm 10.8$  years, reported maximum heart rate was  $87.7 \pm 21.3$  bpm, systolic blood pressure was  $122.3 \pm 30.2$  mmHg, and diastolic blood pressure was  $78.7 \pm 15.5$  mmHg. ST-segment elevation was documented on 36 (64%) electrocardiograms, and the most common angiographic finding was left anterior descending coronary arterial occlusion and/or stenosis in 19 (34%) patients. Concomitant cardiomyopathy was described in 18 (32%) cases. There were seven (13%) deaths attributed to cannabis-induced ACS. Conclusion: Cannabis smoking is associated with increased risk of ACS. Clinicians and nurses should inquire about cannabis use by their patients presenting with chest pain, dysrhythmia, and/or unexplained syncope. Information regarding this deleterious association should be imparted to patients who are chronic or occasional users of recreational or medical cannabis.

**238 Clinical Utility of Routine Lab Testing in a Medium Risk Syncope Population**

Andrew B. Moore MD Oregon Health & Science University; Erica Su; Robert E. Weiss PhD Department of Biostatistics, University of California, Los Angeles, CA, USA; Susan Malveau Oregon Health & Science University; Marie-Annick

Yagapen MPH Oregon Health & Science University; Marc Probst MD, MS Mount Sinai Medical Center; Benjamin Sun MD, MPP Department of Emergency Medicine University of Pennsylvania; David Adler MD, MPH University of Rochester; Christopher Baugh MD, MBA Department of Emergency Medicine.

**Background:** Syncope is a common chief complaint in the emergency department (ED) among older adults and routine laboratory testing is often a part of the work up. We assessed the frequency of abnormal laboratory results in older adults presenting to the ED with syncope. **Methods:** This is a secondary analysis of a prospective, observational study at 11 EDs in adults 60 years or older who presented with syncope or near syncope. We excluded patients lost to follow up. We used institutional clinical laboratory guidelines for identification of critical lab results. Abnormal ranges were determined utilizing the National Institute of Medicine and prior literature. We determined the percentage of critical, abnormal, and normal laboratory results assessed at the primary presentation for syncope. **Results:** The study cohort included 3557 patients of whom 51.6% were male. 154 (4.3%) patients had at least one critical lab result, 3,080 (86.6%) patients had at least one abnormal, but no critical lab findings, and 323 (9.1%) patients had normal lab results. The most frequent abnormal lab findings were elevated glucose (72.9%), elevated BUN (44%), and elevated creatinine (28%). The most frequent critical lab tests were creatinine (2.5%), potassium (1.0%) and hematocrit (0.4%). **Conclusions:** In a cohort of older adult patients presenting to the ED with syncope, although critical lab results were uncommon, abnormal lab tests were common. Routine ED lab testing in older patients may identify lab abnormalities requiring hospital admission.

### **592 Practice Gap in Atrial Fibrillation Oral Anticoagulation Prescribing at Emergency Department Discharge**

Bethany Waites BA, MCR Oregon Health & Sciences University; Amber Lin MS Oregon Health & Science University; Niroj Ari Portland State University; Benjamin Sun MD, MPP Department of Emergency Medicine University of Pennsylvania; Merritt H. Raitt MD Knight Cardiovascular Institute, Oregon Health & Sciences University; Division of Electrophysiology, Department of Cardiology, Portland VA Medical Center; David R. Vinson MD The Permanente Medical Group, Oakland, CA, USA; Bory Kea MD, MCR Oregon Health Sciences University.

**Background:** Current cardiology guidelines recommend oral anticoagulation (OAC) to reduce stroke risk in selected patients with atrial fibrillation (AF), but no formal AF OAC recommendations exist to guide emergency department (ED) clinicians in the acute care setting. Thus, we sought to characterize ED OAC prescribing practices after an ED AF diagnosis. **Methods:** This retrospective study included index visits for OAC-naïve patients  $\geq 18$  years old who were discharged home from the ED at an urban, academic tertiary hospital with a primary diagnosis of AF (ICD-9 427.31) from 2012-2014. Five hypothesis-blinded chart reviewers abstracted data from patient problem lists and medical history to assess stroke (CHA2DS2-VASc) and bleeding risk (HAS-BLED). The primary outcome was the provision of an OAC prescription at discharge in patients with high stroke risk. Descriptive statistics and multivariable logistic regression assessed associations between OAC prescription and patient characteristics. Results are reported as adjusted odds ratio (aOR) with 95% confidence intervals (CI). **Results:** We included 138 patient visits in our analysis, of whom 39.9% (n=55) were low stroke risk (CHA2DS2-VASc=0 in males and 1 in females), 15.9% (n=22) were intermediate-risk (CHA2DS2-VASc=1 in males), and 44.2% (n=61) were high-risk (CHA2DS2-VASc $\geq 2$ ). Of patients with high stroke risk and low-intermediate bleeding risk (n=57), 80.7% were not prescribed an OAC at discharge. Predictors of an ED provider prescribing an OAC to an OAC-naïve AF patient at ED discharge included a cardiology consultation (aOR 12.5, CI 1.5-100.5) and female sex (aOR 2.9, CI: 1.0-8.5). Stroke risk (CHA2DS2-VASc score) was not a statistically significant predictor of prescribing. **Conclusion:** In OAC-naïve patients discharged home from the ED with a primary diagnosis of AF, cardiology consultation and sex were predictive of OAC prescription. Our findings suggest that access to expert opinion improves provider comfort with OAC prescribing and highlight the need for improved guidelines specific to ED management of AF.

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**8:00am Pinot C Ultrasound I**

**182 Single Versus Double Tourniquet Technique for Ultrasound-Guided Intravenous Catheter Insertion**

Jacob Price MD Oakland University William Beaumont School of Medicine; Jane Xiao MD Oregon Health & Science University; Katie Tausch MD Oakland University William Beaumont School of Medicine; Amit Bahl MD Oakland University William Beaumont School of Medicine; Bophal Hang MD Oakland University William Beaumont School of Medicine.

**Background:** U/S-guided IV access is frequently required for difficult access emergency care patients. Establishing an IV can be challenging and involve significant time, multiple attempts, and delays in care. The double tourniquet technique is a method that distends the vein and may improve first-stick insertion success. **Methods:** This was a prospective, randomized comparative evaluation of difficult access ED patients requiring U/S-guided IV catheter placements. Patients were randomized to receive a single tourniquet proximal to needle insertion site or a double tourniquet proximal and distal to the needle insertion site. The primary outcome was first-stick success. Data collection included: provider type (faculty or non-faculty: resident, nurse, technician), patient characteristics (medical history, body mass index) and insertion characteristics (access site, vein depth and diameter). Statistical comparisons were made using Chi-squared tests and Fisher's exact test. All tests of statistical significance were two-sided with a p-value < 0.05 indicating significant difference. **Results:** 100 patients were enrolled based on feasibility with 50 patients in each group. Ultimately 40 patients in the single tourniquet group and 43 patients in the double tourniquet cohort were included in the data analysis. Seventeen patients in the original enrollment were lost due to malfunction of U/S equipment data storage. First-stick success was 77.5% in the single tourniquet group and 76.7% in the double tourniquet group. (p=0.93). Faculty first stick success for either technique was 94.7% compared to 62.2% for non-faculty first stick success (p Conclusions: Use of single versus double tourniquet technique does not impact first-stick success for U/S-guided IV insertion. Faculty inserters had higher overall first-stick success compared to non-faculty inserters independent of tourniquet method utilized.

#### **1127 Randomized Trial of Ultrasound Guided Forearm Blocks for Hand Injuries Over the 4th of July**

Michael Vrablik DO Harborview Medical Center/University of Washington Medical Center/University of Washington School of Medicine; Arvin R. Akhavan MD Harborview Medical Center/University of Washington Medical Center/University of Washington School of Medicine; David Murphy MD Harborview Medical Center/University of Washington Medical Center/University of Washington School of Medicine; Alexandra Pulst-Korenberg MD, MBA Harborview Medical Center/University of Washington Medical Center/University of Washington School of Medicine; Caitlin Schrepel MD, MHS Harborview Medical Center/University of Washington Medical Center/University of Washington School of Medicine; Kennedy Hall M.D., M.H.S. Department of Emergency Medicine, University of Washington School of Medicine.

**Background:** Hand blast injuries from firework detonation present to emergency departments frequently. Pain secondary to blast injuries typically is managed with systemic opioids, which may be inadequate and with significant side effects. To our knowledge, no randomized trial has looked at the effectiveness of US guided forearm blocks vs. opioid pain control in these patients. Our study aimed to compare pain control with US guided forearm nerve blocks to systemic opioids in patients with hand blast injuries. **Methods:** We performed a non-blinded, consecutive, randomized pragmatic trial of forearm nerve blocks using a medium active and long active anesthetic vs. usual care for a 5-day period around July 4th, 2017, based on prior data suggesting a high frequency of this injury during this period. Adults 18 year or older who sustained a traumatic or blast injury of their hand injury distal to the wrist were considered. Consecutive patients were enrolled by study team members performing the blocks. After consent, the patient was randomized using computer generated assignments at time of enrollment into a study group (nerve block) and control (standard care). The study group received an US guided forearm nerve block using 50/50 mix of 1% lidocaine and 0.5% bupivacaine. The primary outcome was median pain scores via visual analog scale at 15 minutes, 1 hour and 2 hours with respect to the baseline pain score using a Wilcoxon signed-rank test. The secondary outcome was mean morphine equivalents administered, which was compared for the control vs. intervention group. **Results:** Median pain reduction at each time point the intervention group was -35 (IQR=10), -30 (IQR=50), and -20 (IQR=70), on a 100-point scale, versus -5 (IQR=10), -20.5 (IQR=20), -20 (IQR=70) in the control group. Patient-reported pain was significantly decreased over

baseline in the intervention group at 15 min, 1hr, and 2hr ( $p=0.03$ ,  $0.05$ , and  $0.04$ , respectively). There was no difference in mean morphine dose equivalents administered in the control vs. intervention group ( $p=0.58$ ). No adverse events were reported. Conclusion: The use of US guided forearm nerve blocks in this patient population was safe and resulted in improved and more rapid pain control.

### **658 Comparison of Common Bile Duct Measurement by Point-of-Care Ultrasound to Radiology-Performed Ultrasound**

Gregory Gaskin MD University of Arizona College of Medicine; Bailey Lynn M.D. Banner University Medical Center Tucson / University of Arizona; Brittany Ortega DO University of Arizona; Elaine Situ-LaCasse M.D. Banner University Medical Center; Josephine E. Valenzuela M.D. Banner University Medical Center.

Background: Exact incidence of common bile duct (CBD) stones is not known, but they have been found in 10-18% of patients undergoing cholecystectomies. They are associated with significant morbidity, resulting in pancreatitis or cholangitis if left untreated. Unfortunately, physical exam and lab tests are unreliable in detecting CBD stones. Limited data exists evaluating the use of point-of-care ultrasound (POCUS) in the Emergency Department (ED) to evaluate for CBD stones. Our objective was to evaluate the accuracy of CBD diameter measured on POCUS compared to radiology-performed ultrasound. Methods: In this retrospective chart review of one academic medical institution, we analyzed 4.5 years of POCUS data to find all cases where CBD dilation was measured by an Emergency Physician in a POCUS report. We compared these results to radiology-performed ultrasound results of those same patients and compared the two values using paired Student's T-test to test for significance, mean absolute error (MAE), and Pearson's correlation coefficient. Results: A total of 126 potential cases of CBD dilation were identified based on POCUS reports that had CBD dilation recorded. Of these, 53 (42%) had radiology imaging studies performed. Thirty-nine (74%) of those included were female. The mean CBD diameter on POCUS was 7.61mm (range: 1.3-16.8mm). The mean CBD diameter on formal radiology studies for these same patients was 7.34mm (range: 1.0-16.0mm). The two means were not significantly different by paired Student's T-test ( $p = 0.63$ ). However, mean absolute error between the two samples was 2.73mm. Pearson's correlation coefficient was 0.27 (with +1/-1 indicating perfect correlation). Conclusion: While there was not a significant difference between the two samples' means, there was poor agreement between POCUS and formal radiology US in the evaluation of CBD diameter. We cannot conclude that the two modalities are equivalent in their ability to accurately measure CBD diameter at this time. Limitations of this study include: retrospective chart review with small sample size and no standardization in the qualifications of the physicians performing the POCUS. Future work should include prospective cases and explore how ED providers who receive standardized POCUS training perform versus radiology-performed US for the measurement of CBD diameter.

### **977 Assessing Correlations between Alcohol Consumption and Liver Ultrasound Findings in the Emergency Department**

Wirachin Hoonpongsimanont MD University of California, Irvine School of Medicine; John C. Fox MD University of California Irvine Department of Emergency Medicine; Shadi Lahham MD University of California Irvine Department of Emergency Medicine; John Moeller MD University of California Irvine Department of Emergency Medicine; Chanel Fischetti MD University of California Irvine Department of Emergency Medicine; Eric Abrams MD University of California Irvine Department of Emergency Medicine; Soheil Saadat MD University of California Irvine Department of Emergency Medicine; Sonia Lee MD University of California Irvine Radiology; Ghadi Ghanem University of California Irvine School of Medicine; Christine Louis University of California Irvine School of Medicine; Abdullah Arif B.A. University of California Irvine School of Medicine; Preet Kaur K. Sahota MS University of California Irvine School of Medicine.

Background: Alcoholic liver disease (ALD) occurs as a result of excessive alcohol consumption. The ALD diagnosis ranges from fatty liver, alcoholic hepatitis, to cirrhosis, and typically requires a liver biopsy. As early-stage ALD can be reversible, prompt detection of the disease and a change in drinking behavior can prevent morbidity and mortality. The Alcohol Use

Disorders Identification Test (AUDIT) is an instrument developed by the World Health Organization that assesses alcohol consumption behaviors and identifies harmful alcohol use. We aimed to assess the correlations between AUDIT scores and liver ultrasound findings. Ultimately, we hope to identify a cutoff score that indicates when the liver begins to demonstrate anatomical changes as a result of ALD. Methods: We conducted a prospective study at a university-based, level-one trauma emergency department (ED) from June 2018 to December 2018. Each patient privately completed an AUDIT survey. Afterwards, trained research associates performed liver ultrasounds. A board certified diagnostic radiologist graded the ultrasound images by liver echogenicity, parenchymal texture, surface, and size. The research associates and radiologist were blinded from the AUDIT scores when obtaining and interpreting the ultrasonographic results, respectively. The AUDIT scores were categorized into four groups: 0-7 (low-risk of alcohol dependence), 8-15 (risky alcohol use), 16-19 (high-risk of alcohol dependence) and > 20 (almost certainly dependent on alcohol). We used descriptive statistics, Independent-Samples Mann-Whitney U tests, and Independent-Samples Kruskal-Wallis tests to analyze the data. Results: Our preliminary results from 62 patients showed no statistical differences in liver echogenicity (p-value = 0.63), texture (p-value = 0.89), surface (p-value = 0.78), and size (p-value = 0.72) between the four different AUDIT groups. The average AUDIT score was 4.18 (standard deviation 8.70). Conclusions: This preliminary data did not show significant correlation between AUDIT scores and sonographic grading of the liver. This may be related to small sample size or confounding factors such as metabolic disorders of obesity or diabetes.

#### **984 Tricuspid Annular Plane Systolic Excursion Assessment in Septic Cardiomyopathy**

Maxwell Thompson MD; Chanel Fischetti MD; John Moeller MD; John C. Fox MD; Shadi Lahham MD; Eric Abrams MD; 1University of California, Irvine; Department of Emergency Medicine; Joseph Bui; Li Wang University of California, Irvine.

Background: The purpose of this study is to assess the relationship between right ventricular (RV) dysfunction in patients with sepsis and their clinical outcomes by evaluating a tricuspid annular plane of systolic excursion (TAPSE) measurement in patients with sepsis. Methods: We prospectively enrolled adult patients in the Emergency Department (ED) who screened positive for severe sepsis/septic shock. Patients underwent imaging within one hour of diagnosis. Imaging of the tricuspid annular plane of systolic excursion was obtained, along with additional data points and lab values from their ED visit and hospitalization. Both short term and long-term outcomes were measured. Results: A total of 20 patients have been enrolled in the study. 16 patients were included in data analysis. Of those enrolled, 15 were ultimately diagnosed with severe sepsis or septic shock. 4 patients were found to have significant right ventricular dysfunction- as defined as a measurement of 18mm or less, for an average TAPSE value of 13. 1mm. Those determined to have normal TAPSE measurements (n=11) had an average of 22. 4mm. None of the four patients had a lactate greater than 4 (average of 2. 8). The average lactate for the normal TAPSE population was 2. 8. For the group with positive TAPSE findings (n=4) patient length of stay was 162. 7 hours compared to the group with negative TAPSE findings (n=11) who had an average hospital length of stay of 138 hours. Conclusions: Thus far, our data suggests that there is no correlation between lactate and the measured TAPSE values. In contrast, the data also demonstrates that positive TAPSE findings are associated with longer courses of hospital stay. Additional patients will need to be enrolled in the study to identify where TAPSE can be useful for risk stratifying patients with suspected right heart failure.

#### **2004 Accuracy of Point-of-Care Ultrasound by Emergency Physicians in Diagnosis of Diastolic Cardiac Dysfunction When Compared to 2D Echocardiogram by Cardiology**

John Moeller, MD University of California, Irvine, Department of Emergency Medicine; Chanel Fischetti, MD University of California, Irvine, Department of Emergency Medicine; Inna Shniter, MD University of California, Irvine, Department of Emergency Medicine; John C. Fox, MD University of California, Irvine, Department of Emergency Medicine; Shadi Lahham, MD University of California, Irvine, Department of Emergency Medicine; Eric Abrams, MD University of California, Irvine, Department of Emergency Medicine; Maxwell Thompson, MD University of Alabama, Department of Emergency Medicine, Birmingham, AL, USA; Tien To University of California, Irvine School of Medicine.

Background: Identifying diastolic heart failure is important for the management of patients with congestive heart failure. This study aims to compare the diagnostic accuracy of a point-of-care ultrasound (POCUS) performed in the Emergency

Department (ED) to a comprehensive echocardiogram (ECHO) interpreted by a cardiologist, which is the gold standard for diagnosis of diastolic dysfunction. Methods: This is a prospective, observational study on adult patients presenting to the ED with a diagnosis of acute decompensated heart failure or unspecified syncope, chest pain or shortness of breath. A POCUS was performed by an emergency physician (EP) to evaluate for the presence of diastolic dysfunction using pulsed wave and tissue doppler measurements as well as the left ventricular (LV) systolic function. Results were compared to the ECHO interpreted by a blinded cardiologist. Results: 14 of 24 (58.4%) patients were evaluated for diastolic dysfunction by POCUS, with 10 exclusions because a formal ECHO was not performed. 8 of 14 cases were correctly diagnosed as positive for diastolic dysfunction (100% specificity). Of the remaining 6 cases recorded as negative for diastolic dysfunction, 4 were misdiagnosed when compared to the formal ECHO while 2 cases were correctly identified as negative (66.7% sensitivity). In addition, EP diagnosis of LV dysfunction has a specificity and sensitivity of 100% and 58.3% respectively. Conclusions: Based on preliminary data, POCUS is specific, but not sensitive for the diagnosis of diastolic heart failure. Thus, EP performed limited echocardiogram may be useful to quickly identify patients with diastolic heart failure.

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**8:30am**      **Pinot B**      **Health Policy I**

**92 Rural/Urban Patients With Traumatic Brain Injury Utilizing Level 1/non-Level 1 Trauma Centers in Arizona**

Daewon Kim MD Banner University Medical Center; Tomas Nuno PhD University of Arizona College of Medicine.

Background: Traumatic brain injury (TBI) is a significant cause of mortality and morbidity. Studies have shown significant state by state variation in per-capita rates of TBI among rural and urban populations. Patient outcomes depend on adherence to evidence based guidelines established by the American College of Neurosurgeons including admission to designated high acuity trauma centers. For patients in rural areas, access to high acuity centers may be a barrier to standards of care available to other patient populations. The purpose of this study was to compare mortality and length-of-stay (LOS) between rural/urban patients with severe TBI admitted to Level 1/non-Level 1 trauma centers in Arizona. Methods: This retrospective study utilized hospital discharge data from the Healthcare Cost and Utilization Project. Data for this project included the Arizona 2012 and 2013 State Emergency Department Database (SEDD) and State Inpatient Database (SID). The SEDD captures emergency visits at hospital-affiliated emergency departments (EDs) that do not result in hospitalization. Information about patients initially seen in the ED and then admitted to the hospital is included in the SID. Cases in this study included all patients diagnosed with severe TBI as defined using a validated ICD-9-CM algorithm. Results: Preliminary results showed that 2,960 cases of severe TBI were identified, of which 2,333 utilized non-Level 1 trauma centers and 647 utilized Level 1 trauma centers. Of these, 2,098 were urban residents, and 412 were rural residents. Among urban residents, 1,606 used non-Level 1 trauma centers and 492 used Level 1 trauma centers, of which, respectively, 45 (2.8%) and 36 (7.3%) died. Among rural residents, 347 used non-Level 1 trauma centers and 65 used Level 1 trauma centers, of which, respectively, 7 (2.0%) and 4 (6.2%) died. Among inpatients, LOS was highest among rural patients that used Level 1 trauma centers (=6.8 days, SD=7.4), followed by urban patients at Level 1 trauma centers (=6.3 days, SD=8.6), urban patients at non-Level 1 trauma centers (=4.8 days, SD=6.0), and rural patients at non-Level 1 trauma centers (=4.8 days, SD=3.4). Conclusion: A large percentage of patients in Arizona with severe TBI are seen at non-Level 1 trauma centers, with a higher percentage among rural patients. Despite this, clinical outcomes were fairly similar among urban and rural patients.

**2003 Callback Champions: Utilization of a Patient Callback System to Improve Patient Satisfaction and Identify Areas for Improvement in a Large, Tertiary Pediatric Emergency Department**

Kristy Schwartz, MD, MPH; Kathryn A. Hollenbach PhD, MPH; Ana Morales Lucia; Seema Shah, MD; Keri Carstairs, MD  
Rady Children's Hospital San Diego

Background: Patient satisfaction is significant to Emergency Department (ED) outcomes and reimbursement. Identifying limitations to patient satisfaction may guide further interventions to improve ED care. Sufficient evidence supports improved patient satisfaction in adult post-discharge emergency and inpatient care with patient callback systems using physicians, mid-level providers, nurses, or assistants. A recent nurse-based system reported good success at a children's hospital. To date, no assistant-driven process has been instituted in a pediatric ED. To evaluate the effectiveness of an ED Quality Improvement (QI) initiative designed to improve patient satisfaction in a large, tertiary pediatric ED and identify patients who require further information from clinicians. Methods: Callback Champions, a brief telephone survey was specialized to include patient satisfaction markers similar to established satisfaction tools for our institution, Professional Research Consultants, Inc. (PRC, PRCCustomResearch.com). Reported measures included likelihood to refer, overall perceived quality, and identified exceptional and disappointing characteristics of the ED visit. In addition, calls targeted medication comprehension, interpretation of discharge instructions, challenges in obtaining follow-up care, perceptions of lab/imaging results, and understanding of return to ED precautions. Data abstracted from the medical record included date and time of visit, acuity, length of stay, time to pain assessment/medication, and insurance status. Randomly selected patients were identified and called by a research assistant. If a parent/guardian did not answer, a message was left indicating they would attempt a second call and, if needed, a second attempt was made. Calls were made in English or Spanish and took approximately 8-10 minutes to complete. Data were entered into a de-identified database for statistical comparisons. Results: Over 5 months, 270 parents/guardians were randomly selected from all patients seen within 3 days of ED visit, when assistants were available to make calls: 130 did not answer on either phone call attempt, 140 had contact and 128 surveys were completed (47.4%). Of the twelve who had some contact but did not complete the survey, 8 refused, 3 had no answering machine and did not answer, and 1 reported a wrong number. Twenty-five percent (n = 32) required a physician follow-up call. Patient satisfaction on a likert 10 point scale was very high (median = 10; 25th, 75th percentiles = 9, 10) and was not associated with patient acuity, ED length of stay, or insurance. Those rating their overall care as excellent was significantly higher than that received by PRC during the same time period (p = 0.008). Negative or positive feedback about time spent in the ED was not associated with overall patient satisfaction but was significantly associated with length of ED stay (z = 3.42; p = 0.0006). Conclusion: Cost-effective, assistant-driven follow-up calls led to high patient satisfaction scores and identified 25% of patients who required further information/assurance. We propose that similar programs may increase patient satisfaction and identify areas for improvement at other institutions.

## **672 The Impact of Presidential Anti-Immigrant Rhetoric on Latino Patients Presenting to the Emergency Department**

Jesus R. Torres MD, MPH University of California San Francisco; Robert Rodriguez MD University of California San Francisco/Zuckerberg San Francisco General Hospital; Breena Taira MD, MPH, CPH, UCLA David Geffen School of Medicine Olive View-UCLA; Luis M. Lovato MD UCLA School of Medicine; Carolina Ornelas MSII University of California San Francisco; Mayra Cruz MD University of California San Francisco; Angela Wong University of California San Francisco; Jennifer Sun Highland Hospital-Alameda Health System; Harrison Alter MD, MS.

Background In 2011, our group demonstrated that the perceived threat of being identified as undocumented is an influencing factor for undocumented Latino immigrants (UDLI) presenting to the emergency department (ED). We conducted a follow-up study in the new anti-immigrant political climate. Methods We conducted a cross-sectional study from June 2017-December 2018 at three county EDs, enrolling a convenience sample of adult subjects UDLI, Legal Latino Resident (LLR) and non-Latino US citizens (NLUSC). We excluded minors, critically ill, incarcerated, intoxicated, altered mental status, psychiatric holds and those arriving by ambulance. Results Of the 1,513 subjects approached, 1,327 (87.7%) consented, with 456 (34.4%) classified as UDLI, 476 (35.8%) as LLR and 395 (29.8%) as NLLR, with 51.5% male. Spanish was the primary language in 97% of the UDLI group with 77.6% reporting understanding "a little or none" for their English proficiency. Living in the US for less than 1 year was reported by 5.1% of UDLI, while 8.9% reported 1-5 years and 86% greater than 5 years. Nearly all UDLI knew who the president is and had heard anti-immigrant statements from the president (99%: 95% CI = 97.7% to 99.7%) and (95%: 95% CI = 92.6% to 96.9%), respectively. With NLUSC as the



control group, UDLI had greater rhetoric recall on the following statements: building a wall (92.7% vs 77.0%,  $P < 0.0001$ ), deporting immigrants (92.7% vs 76.2%,  $P < 0.0001$ ), denying services (87.2% vs 62.8%,  $P < 0.0001$ ), preventing from working in the US (86.8% vs 58.4%,  $P < 0.0001$ ) or from getting health care (78.9% vs 52.1%,  $P < 0.0001$ ). More UDLI believed that some or all of these are currently occurring (53.1% vs 40.8%,  $P < 0.0001$ ) and more UDLIs and LLR expressed feeling worried or unsafe living in the US (75.0% vs 38.5%,  $P < 0.0001$ ) and (52.6% vs 38.5%,  $P < 0.0001$ ), respectively. Furthermore, more UDLI expressed fear in presenting to the ED (26.5% vs 3.5%,  $P < 0.0001$ ). UDLI and LLR reported similar rates of knowing people who did not come to the ED out of fear of discovery, 20.9% and 22.9%, respectively – both significantly greater ( $p < 0.0001$ ) than the rate reported by NLUSC (12.7%). Conclusions: The majority of UDLI have heard presidential anti-immigrant statements. This has resulted in UDLI and LLR living with fear in the US, being afraid to come to the ED for emergency care and knowing people that were deterred from presenting.

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**9:00am**      **Pinot A**      **Education 2**

### **733 Retention of Musculoskeletal Training After Sports Medicine/Orthopedic Rotation in Emergency Medicine Residents**

Kelcy Higa MD Banner Health/University of Arizona College of Medicine; W. Bryson Bendall MD Banner Health/University of Arizona College of Medicine; Allison Lane MD Banner Health/University of Arizona College of Medicine; Anna Waterbrook MD Banner Health/University of Arizona College of Medicine.

Background: The purpose of this study is to examine the retention of musculoskeletal knowledge in the years following Sports Medicine and Orthopedic Surgery rotations completed during intern year of Emergency Medicine residency programs. A previous study demonstrated increase in knowledge after both rotations. Methods: A validated, open-ended, short answer exam, composed of 25 questions designed to assess fundamental musculoskeletal knowledge, was administered to Emergency Medicine residents enrolled in two categorical Emergency Medicine programs and one Emergency Medicine/Pediatrics (EM/PEDS) combined residency program. Interns were assessed before and after four-week rotations in either Sports Medicine or Orthopedic Surgery. Juniors and seniors were assessed in the Fall. Two independent evaluators coded the responses based on a pre-determined rubric. The rubric was used by a third evaluator to grade the assessments used in the t-test statistical model. Results: Seventy-two interns completed post-rotation assessments from 2016 – 2018. Thirty-four junior and senior residents completed the assessment in Spring 2018. There was a statistically significant difference between the mean scores of these two groups (73 vs 67, respectively,  $p=0.02$ ). Mean scores on intern post-rotation assessments met the minimum standard passing score of 73 while the junior and senior resident assessments did not. Conclusion: There is a statistically significant difference between the mean scores of interns who had just completed their Sports Medicine or Orthopedic Surgery rotations and junior and senior residents in the spring of their respective years. Retention of musculoskeletal knowledge appears to decline following the end of the rotation. Competency in musculoskeletal medicine is a consistently reported shortcoming in undergraduate and graduate medical education in many specialties. This study demonstrates the need to focus not only on knowledge obtained during a rotation, but also the retention and reinforcement of that knowledge in the years following musculoskeletal-focused rotations.

### **755 Prevalence of Bedside Teaching in an Urban Academic Emergency Department**

Randy Bess MD University Medical Center of Southern Nevada; Jenny Novoa MD, MACM, FACEP University Medical Center of Southern Nevada; Jenny A. Navoa University Medical Center of Southern Nevada.

Background: Bedside teaching is recognized as a critical modality to teach a variety of clinical skills, including communication, professionalism, and aspects of patient care. Recent literature indicates that the proportion of bedside teaching during clinical education has decreased from a 75% to an estimated 9-19%. There is a paucity of data investigating quantity and quality of bedside teaching in the emergency department. Methods: A prospective, observational study was performed in an urban academic emergency department to compare time spent by the

attending physician directly providing clinical teaching at the bedside to time spent teaching away from the bedside. Themes that occurred during each teaching encounter were categorized. Proceeding conclusion of all quantitative data collection, observers were interviewed and surveyed to provide qualitative information about their experience that might not have been captured in the primary data collection table. Results: 7369 minutes (123 hours) were spent observing clinical teaching in an academic emergency medicine department from November 2017 to February 2018. 176 of the 627 minutes (28% of time spent teaching) and 2.4% of total time observing was spent bedside teaching. The most notable theme observed was that the majority of bedside teaching involved teaching of procedures. Learner presenting to an attending physician, reviewing results, and discussion of differential and management most often took place away from the bedside. Research observers commented on the paucity of bedside teaching observed and the value of professional and communication skills that was transferred during bedside teaching when it did occur. Conclusion: Bedside teaching is a valuable form of clinical education. At our urban academic center, bedside teaching is significantly less frequent than non-bedside teaching. Bedside teaching is preferred to teach profession skills, communication skills, and clinical presentations. Future studies should focus on how to best increase time and quality of bedside teaching.

### **857 Using electronic health records to assess emergency medicine trainees independent and interdependent performance**

Stefanie Sebok-Syer PhD Stanford - Emergency Medicine; Lisa Shepherd MD, MHPE Western University; Adam Dukelow MD Western University; Rachael Pack PhD Western University; Allison McConnell MD Western University; Robert Sedran Western University; Lorelei Lingard PhD Western University.

Background: Competency-based medical education (CBME) requires that trainees receive timely assessments and effective feedback about their clinical performance. To meet this goal, we investigated how data collected by the electronic health record (EHR) might be used to assess emergency medicine (EM) trainees' independent and interdependent clinical performance and how such information could be represented in an EM trainee report card. Methods: Following constructivist grounded theory, individual semi-structured interviews were conducted with 10 EM faculty and 11 EM trainees across all postgraduate years. In addition to open questions, participants were presented with the current list of EM faculty performance indicators and asked to comment on how valuable each would be in assessing trainee performance, and the extent to which each indicator captured independent or interdependent performance. Data collection and analysis were iterative; analysis employed constant comparative inductive methods. Results: Participants refined and eliminated faculty performance indicators and created new indicators specific to trainees. We present a catalogue of clinical performance indicators from the EHR database at the study site organized on a spectrum of independent and interdependent EM trainee performance. For instance, independent indicators include number of patients seen and interdependent indicators include length of stay. Conclusion: Our findings document a process for developing EM trainee report cards that incorporate the perspectives of clinical faculty and trainees. We also present our prototype trainee report card. This work has important implications for capturing trainees' contributions to EM clinical performances, and distinguishing between independent and interdependent indicators in this collaborative work setting.

### **2008 SAFER Sign-Out: Resident transitions of care in the Emergency Department**

Camille Enriquez, MD., Robert Granata, MD., Lori Winston, MD Kaweah Delta

Background: There are limited studies on resident to resident transitions of care ("TOC") in the emergency department ("ED"). Consequently, there are few validated tools to assist in this process. A TOC template, derived from the acronym SAFER (subjective, signs, symptoms; actions and anticipated disposition; follow-up; evaluation of comprehension; reassessment) was proposed as an intervention to improve the process. The purpose of this study was to determine if the use of the SAFER template, which functions as a standardized electronic checklist embedded in the patient's electronic health record, would improve the transfer of information during resident to resident TOC. Methods: This was

an IRB approved retrospective study evaluating resident to resident TOC in the ED before and after implementation of the SAFER template. Data previously obtained by the Quality Improvement Committee was analyzed, and 140 resident to resident TOC were included in this study. Three key metrics were then evaluated: discussion of abnormal vital signs, anticipated issues and evaluation for comprehension. A composite outcome, the proportion of satisfactory handoffs, was also examined. Proportions of handoffs satisfying each metric were independently compared before and after the implementation of SAFER template using Fisher's Exact test. Results: Residents rotating in the ED were included in the study. Midlevel providers and nursing staff were excluded. 17.1% of TOC were unsatisfactory based on the data collected prior to intervention. This improved to 5.7% after the intervention ( $p=0.063$ ). Evaluating for comprehension increased from 84.3% to 97.1% ( $p=0.020$ ). No statistically significant changes in communication of anticipated problems ( $p=1.00$ ) or discussion of abnormal vital signs ( $p=0.612$ ) were found due to the intervention. Conclusion: There was a statistically significant increase in checking for comprehension after the implementation of the SAFER template, while discussion of abnormal vitals and anticipated issues did not improve significantly. There was a trend toward significance in the composite outcome, proportion of satisfactory handoffs, although there was insufficient power to reach statistical significance.

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**9:00am**                      **Pinot C**                      **Ultrasound 2**

**1074 Dynamic Cardiopulmonary Ultrasound Changes During Sepsis Resuscitation: A Prospective Observational Case Series**

Nikolai Schnittke MD, PHD University of Wisconsin School of Medicine and Public Health; Umang Barvalia MD Santa Clara Valley Medical Center; Jessica Schmidt MD, MPH University of Wisconsin School of Medicine and Public Health; Pierre Kory MD, MPA University of Wisconsin School of Medicine and Public Health; Sara Damewood MD University of Wisconsin School of Medicine and Public Health.

Background: Serial ultrasound assessment of cardiopulmonary function during resuscitation of patients with septic shock is recommended by Surviving Sepsis Campaign guidelines. However, ultrasound findings and their significance have yet to be characterized. In this study we hypothesize that cardiopulmonary ultrasound (CPUS) may change during the course of septic shock resuscitation. We also examine whether these changes could reflect the need for more aggressive level of care, use of vasopressors, or need for respiratory support. Methods: We included a convenience sample of ED patients with hypotension AND an infection suspected by the treating clinician who performed a CPUS study (to evaluate Left Ventricular (LV) function, Right Ventricular (RV) function, RV size, and B-lines on lung ultrasound (LUS)) at two time points: within one hour of IV fluid initiation and again prior to disposition from the ED. Outcomes were: level of care, need for vasopressors, and need for advanced respiratory support (ARS) (high-flow nasal cannula or positive pressure ventilation). Statistical analysis was deferred due to the small sample size. Results: 13 patients were enrolled. 10/13 (78%) demonstrated changes in at least one CPUS parameter. 6/13 (46%) patients had worsening LV or RV function: all required the intensive care unit (ICU) and vasopressors, and 5/6 required ARS. 2/13 patients developed RV dilation without any change in RV function and both patients did not require ICU, vasopressors, or ARS. 3/13 patients did not meet any of the outcome criteria. These were the only patients who had unchanged normal or hyperdynamic RV and LV function without B-lines. 7/13 patients had persistently normal LV function: 4/7 required ICU, 3/7 required vasopressors, and 5/7 required ARS. Conclusions: In this small cohort we found that CPUS findings change in a majority of patients with suspected septic shock. Deteriorating RV and LV function may signal the need for aggressive intervention. Our data support the use of CPUS in monitoring of sepsis resuscitation, but more investigation is needed to better understand the significance and pattern of these changes.

**873 Point-of-Care Ultrasound in the Diagnosis of Necrotizing Fasciitis**

Inna Shniter MD University of California, Irvine; Chanel Fischetti MD University of California, Irvine; John Moeller MD John Fox MD; Shadi Lahham MD; Eric Abrams MD University of California, Irvine; Rana Andary; University of California Irvine Health; Monica Desai University of California, Irvine; Rana Andary University of California, Irvine.

**Background:** The purpose of this study is to determine if necrotizing fasciitis can be accurately diagnosed using point-of-care ultrasound (POCUS). **Methods:** We prospectively enrolled adult patients in the Emergency Department (ED) who were suspected of having necrotizing fasciitis. This included patients presenting with signs of severe soft tissue infection who would be getting a surgical consult and/or CT scan as part of their evaluation. All patients enrolled in the study received a point-of-care soft tissue ultrasound performed by the ED physician. An ultrasound fellowship-trained ED physician who was blind to the clinical data later reviewed and interpreted the ultrasound clips as concerning for necrotizing fasciitis or not concerning for necrotizing fasciitis. This determination was based on the presence or absence of gas in the tissue. The gold standard for confirming the diagnosis was surgical exploration. **Results:** Ten patients have been enrolled in the study. Nine patients were used for data analysis. Three patients were diagnosed with necrotizing fasciitis perioperatively, all of which had ultrasounds that were interpreted as concerning for necrotizing fasciitis. Two patients had perioperative diagnoses of non-necrotizing infections and three patients were diagnosed with cellulitis based on Computed Tomography (CT) scan only. These five patients had ultrasounds that were interpreted as not concerning for necrotizing fasciitis. **Conclusions:** Our preliminary data suggests that POCUS can be used to aid in the diagnosis of necrotizing fasciitis. Additional patients will be required to validate these findings and determine the sensitivity and specificity of this imaging modality.

### **2009 The Effect of Quality Assurance and Individualized Feedback on Point-of-Care Ultrasound Exams in the Emergency Department**

Sheetal Khiyani, Jackie Shibata, Sandra Isnasious, Stephanie Lauw, Lilly Bellman, Timothy Jang, Yiju Teresa Liu; Los Angeles County-Harbor-UCLA.

**Background:** Point-of-care ultrasound (POCUS) is considered an essential skill in emergency medicine and has become a core part of emergency medicine physician training. In October 2012, the ACGME and the American Board of Emergency Medicine (ABEM) listed competency in performing bedside ultrasound as a training milestone. According to a study in 2014 of 124 emergency medicine residencies, 82% of US emergency medicine residency programs perform quality assurance and 51% provide email feedback to their residents. However, each quality assurance process varies by individual program and the effectiveness of this feedback has not been described. The purpose of this research study is to measure the effect of feedback on the quality and accuracy of ultrasound image obtainment and interpretation by physicians. We hypothesize that if physicians are given feedback on their point-of-care ultrasound images, they will improve the quality of images that they obtain and more accurately interpret them as a result of this feedback.

**Methods:** The ultrasound department, each week between September 2018 and January 2019 reviewed approximately 10% of all departmental POCUS images. Providers who performed each ultrasound study were sent feedback regarding their interpretation and findings of incomplete or suboptimal imaging and documentation. Each study was rated based on quality, accuracy and completeness. After the initial 3-month pilot period, data was analyzed and providers were asked to evaluate the feedback process through a voluntary, anonymous survey. A focus group meeting was convened to improve the QA process based upon initial QA data and provider feedback. A modified intervention was designed and subsequently implemented. Upon completion of the study, quality, accuracy and completeness scores will be compared to baseline scores obtained before implementation of the new QA process, Results from the pilot are presented here.

**Results:** Between September 2018 and January 2019, the QA committee reviewed 223 ultrasound studies. Of these, 30% were biliary ultrasounds, 27.4% were focused assessment with sonography in trauma (FAST) studies, 24.7% were retroperitoneal ultrasounds, and 17.9% were echocardiography. In the first month of implementation, only 53% of exams were rated as "complete". Complete exams improved to 62% for the third month of the pilot intervention. The overall scores for biliary ultrasound improved from 76% to 89% ( $p \leq 0.01$ , 95%CI 3%-21%). Retroperitoneal overall study scores improved from 76% to 94% ( $p \leq 0.01$ , 95%CI 1% to 19%). However, ECHO and FAST scores remained constant (61% to 62% and 80% to 81%,  $p=0.07$ ) over the pilot period. **Conclusions:** Significant improvements in overall departmental ultrasounds are apparent after implementation of a 3-month pilot. Our study shows that individualized QA feedback for

just 10% of studies can have significant effects on the whole department's POCUS exams. With this study, we propose a simple and effective standardized method to assess POCUS images and provide feedback in a residency-training program. Small numbers and the four selected POCUS indications limit this study.

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**9:30am Pinot A Education 3**

### **872 A Descriptive Breakdown of Training Pathways for Careers in Pediatric Emergency Medicine**

Joshua A. Glasser MD Banner University Medical Center/Diamond Children's Medical Center; Aaron N. Leetch MD University of Arizona College of Medicine.

Background: There are three distinct training pathways available to medical students considering a career focused towards pediatric emergency medicine. A three-year pediatric residency followed by three-year pediatric emergency medicine fellowship (Peds-PEM), a three/four-year emergency medicine residency followed by a two/three-year pediatric emergency medicine fellowship (EM-PEM), and a five-year combined emergency medicine and pediatrics residency (EM&Peds) are all preparatory for a career in pediatric emergency medicine. Questions regarding differences in curricula are common among medical students. For clarification, strengths of each training pathway are described herein. Methods: A list of Peds-PEM, EM-PEM and EM&Peds programs were obtained from the Accreditation Council for Graduate Medical Education (ACGME) website. Published curricula were obtained from the website for each program and compared in terms of educational units (EU) of total emergency medicine (EM), pediatric EM, critical care (neonatal, pediatric and adult) and research. Fellowship trainees were presumed to have fulfilled the minimum ACGME requirements for their respective residency and these EUs were added to each fellowship's total. EUs were presumed to be in a block/month format unless otherwise specified, and EUs with split experiences were assigned half an EU to each experience. Results: A total of 75 Peds-PEM, 34 EM-PEM, and 4 EM&Peds programs were screened. Of these, 11 Peds-PEM (14%) programs and 5 EM-PEM (14%) were excluded as their website listed insufficient curriculum data. Average dedicated EUs for Peds-PEM curricula were 22 total EM, 19 Pediatric EM, 6 critical care and 9 research. Average dedicated EUs for EM-PEM curricula were 33 total EM, 19 Pediatric EM, 6.5 critical care, and 3.5 research. Average dedicated EUs for EM&Peds curricula were total 26 EM, 8 Pediatric EM, 10 critical care and 0.25 research. Conclusion: Curricula in the three training pathways were relatively similar in the experiences evaluated with the exception of dedicated research time, EM experience and critical care experience which was higher in the Peds-PEM, EM-PEM and EM&Peds pathways respectively.

### **990 Training for Success: Introducing "Pit Crew" Team-Based Resuscitation Training to the Emergency Department**

Keir Warner MD Stanford University Hospital/Kaiser-Permanente; Haley Manella MD Stanford University School of Medicine; Stefanie Sebok-Syer PhD Stanford - Emergency Medicine; Kenton Anderson MD Stanford University School of Medicine; William Mulkerin MD Stanford University School of Medicine; Marc Gautreau MD Stanford University School of Medicine; Katherine Staats MD Stanford University School of Medicine.

Background: Within the United States in-hospital cardiac arrest survival rates vary between 14 and 40%. The Seattle based Resuscitation Academy utilizes a team centric approach to provide High Performance CPR (HPCPR) using benchmarks of a compression rate of 100-120 bpm, compression depth greater than 50 mm, allowing full recoil of the chest, and compression fraction greater than 80%, to achieve greater than 60% survival in out-of-hospital cardiac arrest. We hypothesized that a one-day team training course on HPCPR would improve benchmark measurements in highly experienced Emergency Department team members. Methods: We consented and enrolled 18 Emergency Department technicians, nurses, and residents for a 4-hour Resuscitation Academy, which included didactics on the benchmarks of HPCPR, and an intensive two-hour practical session. Team approaches to HPCPR skills including shock switches and pulse checks were emphasized, and data on compression benchmark quality were collected pre and post training. Additionally, participants completed written pre and post tests on HPCPR principles. Results: Written scores

improved from 54% to 84%. There were improvements in individual performance in HPCPR benchmarks for 14/18 subjects (78%) after training. The mean compression rate in pre-training of 123 (95%CI 118-129) improved in post-training to a mean rate of 110 (95%CI 109-111,  $p<0.001$ ) Compression in-goal rate time significantly improved from 22% to 100% after training ( $p<0.001$ ). Additionally, we saw improvement in full recoil from 72% pre-course to 89% post-course. Of note, the compression depth of greater than 50 mm in-goal was 72% pre-course, 61% post-course. Impressively, emphasizing a team-based approach achieved a 95% compression fraction in a simulated three round ventricular fibrillation code after training. Conclusion: Training Emergency Department team members in HPCPR principles enhances individual compression quality with notable improvements in rate and full recoil, and improves team dynamics allowing for improved compression fraction. Knowledge of HPCPR principles also dramatically improved. Ultimately, in our small sample size, an intensive training in HPCPR appears to improve team skills for resuscitation, and this area would benefit from further study.

### **1131 Crunch Time: Utilization of an Audio Board Review Course**

James McCue MD; Jessica Mason MD University of California San Francisco - Fresno;

Background: Board review courses vary from written texts to online resources (including educational modules and review questions), with greater than 95% of participants who use examination preparatory material having higher associated performance scores. However, review material designed for an audio interface has not previously been readily available. In June 2018, Emergency Medicine: Reviews and Perspectives (EM:RAP) released a new audio board review course at no additional cost entitled Crunch Time, making it free to all current Emergency Medicine residents. The course content was structured based on The Model of the Clinical Practice of Emergency Medicine, published by the American Board of Emergency Medicine. The content is focused on the most commonly tested information, and not meant to be a comprehensive review. Most chapters are less than four minutes in length, and all audio content has supplemental bullet point notes, also available for PDF download. The goal of this abstract is to evaluate the utilization of Crunch Time since its release and survey users regarding its effectiveness compared to other components of their EM:RAP subscription. Methods This is a retrospective analysis of Crunch Time utilization since its release June 1, 2018 through December 21, 2018, broken down by individual chapters. An optional survey was sent to EM:RAP subscribers regarding the usefulness of Crunch Time compared with other components of their subscription. Results The total number of chapter listens from June 2018 to December 21, 2018 was 78,763, with Endocrine (4,648), Blood n' Stuff (4,596) and Eye (4,504) having the highest listen counts. 650 EM:RAP subscribers completed the survey, with 183 (28.15%) of respondents considering Crunch Time to be one of the features they found most useful. Conclusion Crunch Time is the first primarily audio board review course to be available to emergency medicine physicians and practitioners, and while it is still early since its release, it appears to be a valuable asset for individuals preparing for Board and In-Service Examinations. With 78,763 listens as of December 21, 2018, the number of daily listens continually increases, with an expected rise to occur as examinations approach.

### **1329 Mastery Learning of Point of Care Ultrasound by Emergency Medicine Residents: A Randomized Study**

Siobhan Smith MD MS Stanford University; Viveta Lobo MD Stanford University.

Background: Mastery learning has been gaining popularity for training medical residents in procedural skills. Several investigations have demonstrated the superiority of mastery learning methods over traditional methods for learning procedures. However, no previous studies have compared the efficacy of traditional and mastery learning methods in residency point of care ultrasound (PoCUS) education. We hypothesized that mastery learning would improve residents' PoCUS skills in performing the Extended Focused Assessment with Sonography in Trauma (eFAST). Methods: All first year Emergency Medicine resident physicians at a single university hospital received traditional lecture-based training in the eFAST, then half of these residents were randomized to receive additional mastery-learning eFAST training. Participants in the mastery group were taught using a checklist validated by a panel of experts using Angoff methods.

These residents were given feedback on missed tasks until each trainee completed the eFAST with a minimum passing standard. Our primary outcome for this study was technical proficiency in the eFAST examinations recorded in the Emergency Department (ED) over the subsequent 3-month period. We compared the aggregate technical proficiency between groups and tracked the technical proficiency of each group over time. Descriptive statistics including confidence intervals were used. Results: Sixteen residents were enrolled in the study. Eight were randomized to each group. Residents in the mastery and control groups both performed technically proficient eFASTs; there was no significant difference in proficiency between the mastery learning (73% (95%CI 68%-79%)) and traditional education (68% (95%CI 63%-73%)) groups ( $p=0.21$ ). There was a greater difference in proficiency scores between the mastery (75% (95%CI 65%-85%)) and control (56% (95%CI 43%-69%)) groups during the first month of this study ( $p=0.14$ ) compared to the last month (72% (95%CI 63%-82%) vs 71% (95%CI 64%-77%),  $p=0.07$ ), although these differences were not significant. Conclusion: Residents in both the learning groups performed eFASTs with adequate technical proficiency in the 3 months following their training. The trend towards superior proficiency in the mastery group during the month following the educational intervention did not continue further into the academic year.

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9:30am      Pinot B      International EM I

### **314 Development of the Objectives for a Standardized Pediatric Emergency Medicine Curriculum for Africa**

Aubri S. Carman MD Maricopa Medical Center; Rajesh Daftary MD University of California San Francisco; Upendo George MD, MMed Muhimbili National Hospital; Hendry R. Sawe MD, MMed, MBA; Carol C. Chen MD, MPH University of California at San Francisco.

Background: Few African countries have dedicated emergency medicine training, and none have a pediatric emergency medicine program despite a high burden of pediatric patients, as many as 25% of whom present with high-acuity diseases. The African Federation for Emergency Medicine (AFEM) is developing an open-access core curricular package for pediatric emergency medicine to meet this need. We implemented group consensus methodology to develop learning objectives for this curriculum. Methods: A group of pediatric emergency medicine and global health experts developed a comprehensive list of objectives based upon an initial needs assessment conducted in a Tanzanian emergency department in 2017. A second panel of experts met at the African Conference on Emergency Medicine in Kigali, Rwanda, in November 2018 and employed a modified Delphi process to attain consensus regarding the list of objectives. We defined consensus as >70% approval. Results: The objectives were divided into 3 previously defined provider groups: (1) pre-hospital providers, nurses, (2) medical officers, senior nurses, and (3) residents, specialists, consultants. There were 7 voting participants in the modified Delphi process. All Tier 3 objectives (79) met consensus. One objective from Tier 2 was revised under consensus, and one objective was added with consensus agreement to create a list of 42 objectives. Five objectives in Tier 1 did not initially achieve consensus, 4 of which required revision in wording, for a final list of 30 objectives. Conclusion: A group consensus process resulted in the development of a list of 161 objectives for a pediatric emergency medicine curriculum for practitioners in African settings. These objectives will guide development of the AFEM pediatric emergency medicine curriculum.

### **952 Workplace Violence Experiences Among Health Care Providers in Myanmar**

Benjamin Lindquist MD Stanford University School of Medicine; Michelle Feltes MD Stanford University School of Medicine; Rebecca Walker MD, MPH Stanford University School of Medicine; Kian Niknam Department of Emergency Medicine, Stanford Medical Center; Katie Koval MD, MPH University of South Carolina School of Medicine; Tony Ohn MBBS, MD Golden Zaneke Public Company Limited; Jennifer Newberry MD/JD Stanford University School of Medicine; Matthew Strehlow MD Stanford University School of Medicine.

Background: Health care providers face enormous threats to personal safety from workplace violence (WPV). Prior investigations estimate the prevalence of WPV experiences in domestic and global settings between 50-87.5%, including

both verbal and physical assault. However, WPV prevalence estimates may be inaccurate due to variability in participant reporting, study design, and setting. Little is known about WPV in LMICs including Myanmar. Only a single prior study evaluated WPV experiences among physicians in Myanmar, reporting an unbelievably low prevalence of verbal (8.7%) and physical (1.0%) assault. This study's purpose was to identify the prevalence of WPV experiences by health care providers in Myanmar. Methods: This was a cross-sectional analysis of WPV prevalence among health care providers who attended a national Myanmar emergency medicine conference in November 2018. The survey instrument was adapted from the Joint Program on Workplace Violence in the Healthcare Sector (ILO/ICN/WHO/PSI) which has been used in other global settings. Results: Sixty-three participants completed the questionnaire including 35 women (55.6%) and 26 men (41.3%). Twenty-five (39.7%) were primary care providers. Overall combined prevalence of WPV in the previous 12 months was 47.6% (n=30; 95% CI 34.9-60.6%). The prevalence of verbal assault was 47.6% (n=30; 95% CI 34.9-60.6%) and physical assault was 4.8% (n=3; 95% CI 1.0-13.3%). Twenty-four (42.4%) reported they were encouraged to report violence in the workplace, and five (8.1%) reported they had received training on how to manage workplace violence. Conclusion: Although a limited sample of a select group of providers, we found a higher prevalence of assault among health care providers attending an emergency medicine conference in Myanmar compared with prior investigations. Few participants had received training on WPV and less than half reported a work culture where WPV reporting is encouraged. To combat health care provider shortages, more investigation is required into WPV to understand its impact and identify amelioration strategies.

#### **1290 Global Health Education: Taking ultrasound where it's never been before**

Walter L Green MD, FACEP University of Texas Southwestern Medical School/Parkland Memorial Hospital; Liang Liu MD University of Texas Southwestern Medical School/Parkland Memorial Hospital; Anne Delisio MD University of Texas Southwestern Medical School/Parkland Memorial Hospital; Daniel Jackson MD University of Texas Southwestern Medical School/Parkland Memorial Hospital; Christopher Dammeyer MD University of Texas Southwestern Medical School/Parkland Memorial Hospital; Justin Evans MD University of Texas Southwestern Medical School/Parkland Memorial Hospital; Alan John MD University of Texas Southwestern Medical School/Parkland Memorial Hospital; Kelsey Drake MD University of Texas Southwestern Medical School/Parkland Memorial Hospital; Larissa Velez MD University of Texas Southwestern Medical School/Parkland Memorial Hospital.

Background: The spread of new technology often relies on its introduction at medical universities and subsequent spread with the graduation and dispersion of new physicians into the population. Underserved and low-resource countries can't wait decades for that process to succeed. To introduce and sustain point-of-care (POC) ultrasound in an isolated town in a low-resource country. Methods: Using in-country NGOs and Christian missionaries, an isolated Guatemalan hospital in a town of 40,000 was identified. 4 separate medical trips, each lasting 8 days, were made over 24 months to the rural ED. POC ultrasound was introduced on the first visit and procedural lectures and bedside teaching were implemented with the local physicians. Increased use and participation by the local physicians occurred with each subsequent visit. Results: A total of 556 patients were seen in the Emergency Clinic during the 4 visits. 63(11%) bedside ultrasounds were performed. 7 cases of cholelithiasis, 6 intrauterine pregnancies, 3 abscesses, 2 paracenteses, 1 ganglion cyst, 1 renal artery aneurysm, and 1 liver mass were identified by POC ultrasound. Local physicians progressed from uncertainty and complete lack of experience - to the purchase of an ultrasound machine and incorporation of POC ultrasound in their daily practice. Conclusions: Bedside ultrasound was introduced and well received - by 2018 it was perceived as necessary by both patients and the local physicians. The hospital sought and raised funds to purchase their own up-to-date ultrasound machine. POC ultrasound is now being used daily.

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10:00am Pinot B International EM 2/Wellness and Policy

1229 Novel Day of Ascent Dosing of Acetazolamide for Prevention of Acute Mountain Sickness



Christopher Winstead-Derlaga MD MPH Stanford University Hospital/Kaiser-Permanente; Grant S. Lipman MD Stanford University School of Medicine; Carrie Jurkiewicz MD Stanford University School of Medicine; Andrew Navlyt MD Stanford University Hospital/Kaiser-Permanente; Patrick Burns MD Stanford University School of Medicine; Anne Walker MD Stanford University School of Medicine; Caleb Phillips University of Colorado Boulder; Aaron Reilly MD University of New Mexico School of Medicine; Andre Burnier MD Stanford University Hospital/Kaiser-Permanente.

**Background:** Acetazolamide is the most common medication used for prevention of acute mountain sickness (AMS), a debilitating disease in those rapidly ascending to high altitude. Acetazolamide typically started the day prior to ascent, but its efficacy with day-of ascent dosing is unstudied. Our objective was to determine if day-of ascent acetazolamide prevents AMS incidence on rapid ascent to high altitude. **Methods:** Double blind, randomized, controlled non-inferiority trial of acetazolamide 125 mg twice daily, started night prior to ascent (TRAD) or morning of ascent (NOVEL) to high altitude. 105 healthy adults from low altitude recruited via e-mail list-serves ascended from 1,240 m to 3,810 m summer 2018 on White Mountain, California. Primary outcome AMS incidence (Lake Louise Questionnaire [LLQ] > 3), and secondary outcomes included severe AMS incidence (LLQ > 5), overall symptom severity, and AMS incidence based on revised LLQ published 2018 (2018 AMS). To achieve 80% power, 90 participants required to detect significant difference, defined a priori as 26% difference in AMS incidence. Outcome measures analyzed using two-sample test of equal proportions and tests for differences in group central tendency. **Results:** 104 participants completed the study, with well-matched characteristics ( $p > 0.09$ ). 1 participant excluded post-hoc for medication non-compliance. There were 54 (52%) randomized to TRAD and 50 (48%) to NOVEL, with 95 (91%) fully compliant. Intent-to-treat (ITT) analysis showed NOVEL AMS incidence 9% greater than TRAD, but 95%CI just surpassed noninferiority margin (48.0% vs. 39%, 95%CI -12% to 30%). Severe AMS incidence non-inferior between groups but lower with NOVEL vs TRAD [5(10%) vs 12(22%), 95%CI -28 to 3.6], as were symptom severity [3.1 vs 3.5, 95%CI -0.6 to 1.3], 2018 AMS [19(38%) vs 28(52%), 95%CI -34.7 to 7], and severe 2018 AMS [5(10%) vs 6(12%), 95%CI -17.1 to 11.2]. Combined AMS incidence was 45 (43%, 95%CI 33.7-53.3) compared to 2018 AMS criteria of 47 (46%, 95%CI 35.5-55.2). All ITT outcomes were similar to compliant groups. **Conclusion:** Day-of ascent acetazolamide did not demonstrate non-inferiority of AMS prevention when compared to traditional dosing, by a very small margin. As secondary outcomes were similar between groups, potential improved convenience and compliance of day-of ascent dosing may support use in high-risk populations.

## **1275 Gender Differences in Patterns of Trauma in the Emergency Department at Kigali University Teaching Hospital**

Lise Mumporeze.

**Background:** Gender roles, norms and behavior influence traumatic injuries, and awareness has increased regarding their role in trauma incidence and mortality. In Rwanda hospitals, physical trauma is the 3rd leading cause of morbidity. We determined the gender differences and similarities in injured patients presenting to the emergency department of the busiest trauma center in Rwanda. **Method:** We used a previously developed database of emergency department encounters, which includes 3,329 patients presenting over two one-year periods. The patients in this database are a random sample of approximately 145 patients per month. We excluded non trauma patients, leaving 1387 patients for analysis. Differences in injury type between male and female patients as well as respective injury characteristics were analyzed using t-tests and chi-squared tests as appropriate. **Results:** The mean age for men was 34 years while for women it was 39 years. The commonest mechanism of injury was Road traffic accidents (50%). Overall, trauma was much more common among men than women ( $p$ ). **Conclusion:** Gender differences in patterns of injuries were revealed in this study, with men more likely to experience trauma and present with multiple injuries. Road traffic accident in a young population was identified as a major burden in both men and women. Further research is necessary to evaluate for targeted measures that can reduce traumatic injuries and improve outcomes from trauma in both men and women.

## **1355 Physician Professionalism Definition from Emergency Medicine Educator Perspective**

Mook Jungteerapanich; Khuansiri Narajeenron; Soheil Saadat MD PhD; Wirachin Hoonpongsimanont MD, MS

**Background:** Physician professionalism is crucial in a medical field, as professional behaviors and qualities can enhance patient trust, patient satisfaction and the relationship between patient and physician. With different values and characteristics each emergency educator may have, the perspective on physician professionalism may be affected accordingly. Even though physician professionalism is important, there are very limited literature and research that analyze the relationship between perceptions of professionalism and educators. We aim to clarify whether a consensus on the definition of Emergency Physician Professionalism (EPP) among emergency medicine educators exists.

**Methods:** A prospective cohort study was conducted during the Council of Residency Director Assembly 2016. The subjects included 29 emergency medicine educators, in which each subject independently ranked 39 cards, portraying qualities related to EPP from the most important to the least important behavior. Illustrative statistics, assessable cultural consensus and Pearson correlation coefficient were used to analyze and interpret the data.

**Results:** We enrolled 29 emergency medicine educators. No consensus on EPP in emergency medicine educators overall was observed (E 2.37, NC 6.9%).

**Conclusion:** We observed that no consensus on EPP definition in emergency medicine educators in the United States. Further research on EPP definition is needed to improve the EPP curriculum for learners.

## **550 Physician Assistant Utilization in United States Emergency Departments; 2010 to 2015**

Fred Wu UCSF Fresno; Michael A. Darracq MD MPH UCSF Fresno.

**Background:** Physician Assistants (PAs) are widely used in United States (US) Emergency Departments (EDs). Of 58,641 emergency medicine clinicians identified in 2014 Medicare data, 14,367 were advanced practice providers (PAs and Nurse Practitioners); 9,827 were PAs. We sought to characterize ED PA utilization and practice characteristics in US EDs between 2010 to 2015.

**Methods:** A retrospective, secondary analysis of the 2010 to 2015 Center for Disease Control's National Hospital Ambulatory Medical Care Survey (NHAMCS) was performed. National estimates of ED visits involving PAs alone (PA), PAs with physician involvement (PA+), or physician only (PHYS) were analyzed for patient demographics (age, gender, race, payment type), visit (triage, diagnostic testing, admission) and hospital characteristics (geographic region). Descriptive frequencies were performed using SPSS (IBM Corp, Endicott, NY).

**Results:** Between 2010 to 2015, 805 million US ED visits occurred. 4.7% (95% confidence interval [CI] +/-0.7%) of visits were seen by a PA, and 7.8% (+/- 0.5%) by a PA+; 78% (+/-6%) by PHYS. No linear trends by year were identified in PA or PA+ visits. PA acuity was highest for semi-urgent (51%, +/-11%) and urgent (25.0%, +/-5.2%) visits and nonambulance arrival (91.4%, +/- 5.9%). The majority of PA visits were not admitted (98.1%, +/-15.8%). Less laboratory [55.3% (+/-9.2%) vs. 72% (+/-6%)] and radiographic [38% (+/-5.6%) vs. 52% (+/-4%)] studies were performed during PA vs. PHYS visits. PA visits were most common for patients 25-44 years old (yo) (32.5%, +/- 5.9%) and 15-25 yo (20%, +/-3.5%). Most PA visits resulted in a length of stay (LOS) between 1 to 1.9 hours (33%, +/-6.4%) compared to most PHYS visits resulting in a LOS greater than 3 hours (40%, +/-3%).

**Conclusions:** From 2010 to 2015, no linear trends in US ED PA and PA+ utilization were identified. PA are seeing younger patients, less immediate or emergent complaints, ordering fewer diagnostic tests and have decreased patient LOS as compared to PHYS visits to the ED. PHYS continue to see the majority of ED patients.

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**10:00am Pinot C Clinical Decision Guidelines**

## **601 Trends in morphine administration for chest pain in an academic emergency department**

Paul Yannopoulos MD The University of Utah; Jacob Steenblik MPH, MHA, BSN, RN University of Utah; Margaret Carlson BS University of Utah; Troy Madsen MD University of Utah.

**Background:** Patients presenting with acute chest pain often receive morphine to alleviate pain and anxiety with the goal of reducing myocardial tissue demand and stress. American and European cardiology societies recommend morphine in acute coronary syndrome, though recent literature has suggested increased mortality and decreased antiplatelet agent absorption with morphine. General concerns regarding opioids may also affect morphine administration. Our goal was to evaluate longitudinal trends in morphine administration in ED patients presenting with

chest pain. Methods: We performed a secondary analysis of prospectively collected data for ED chest pain patients between 2013-2017. Trained research associates enrolled patients with chest pain at the time of ED presentation and recorded baseline demographics and history, results of ED and inpatient testing, and medications administered during the ED stay. The primary study outcome was the rate of morphine administration in a year-to-year comparison over the study period. Results: Over the five-year study, we enrolled 1319 patients with chest pain (55.2% female, average age 50.4 years). The overall rate of myocardial infarction and unstable angina was 4% and remained stable over the study period ( $p=0.625$ ). Overall, 17.4% of chest pain patients received morphine in the ED. In a year-to-year comparison, the rate of morphine administration declined significantly over the study period: 2013: 24.1%; 2014: 31.8%; 2015: 14.7%; 2016: 12.1%; 2017: 9.4% ( $p$  Conclusion: In a single academic emergency department, morphine administration has down-trended from nearly one out of three to one out of ten patients receiving morphine for chest pain. The etiology of this change is likely multi-factorial but may include reluctance to administer opioid pain medications and perceived harm of morphine administration in chest pain patients. Clarifications to existing society recommendations may guide clinicians in the appropriate use of morphine in chest pain patients.

### **832 Pre-Test Probability Documentation and positive Computed Tomography Angiography yield for Pulmonary Embolism**

David Lisbon M.D. The University of Kansas Health System; Diti Ronvelia MD University of Kansas; Danielle Miller M.D. Dan Gallagher University of Kansas; Niaman Nazir MD, MPH University of Kansas Medical Center; Chad M. Cannon M.D. University of Kansas Medical Center.

Background: Recent attention has focused on improving computed tomography angiogram (CTA) utilization in emergency departments for the diagnosis of pulmonary embolism (PE). The decision of who to evaluate can be daunting given the various presentations of PE. In the era of the Electronic Health Record (EHR), an opportunity exists to increase the documentation accompanying the decision making process. Prior studies have shown mixed benefit of imbedding clinical decision rules in the EHR. Studies have shown that novice learners benefit from clinical decision rules. The documentation of the use of a decision rule might be a proxy for a more deliberative and proper use of CTA for PE. We sought to see if there was a correlation between documentation and positive pulmonary embolism yield. Methods: Our study is a retrospective chart review of patients who have had CTA to rule out pulmonary embolism. Ours is a quaternary care academic center with 62,000 ED visits a year. We queried our EHR on a weekly basis between November 2017 and July of 2018. Charts were reviewed, and data abstracted to identify patients that had CTA's performed to rule out pulmonary embolism. We abstracted data from the ED Course portion of the chart to determine if pre-test probability was assessed and with what scoring system. Results: A review of the EHR from 11-26-2017 thru 7-28-2018 yielded 1163 CTA studies for the evaluation of PE. 407 CTA studies included documentation of pre-test probability in the EMR, 49 were positive, (12.03%) yield. During the same period 756 scans did not include documentation of pre-test probability, 71 were positive (9.39%) yield. Chi square analysis revealed a  $p$  value = 0.15 and results that did not reach statistical significance. Conclusion: Our study did not demonstrate a statistically significant difference in CTA positivity yield based on differences in documentation. The 3% difference in our documentation vs. non-documented groups may be important trend and may provide data for further sub-categorization and study. Future work will aim to evaluate the effect of the implementation of embedded clinical decision support in the EHR at our institution.

### **1146 Outcomes and Physician Perception of Screening, Brief Intervention, and Referral to Treatment in Academic ED**

Margaret Carlson BS University of Utah; Jacob Steenblik MPH, MHA, BSN, RN University of Utah; Joseph Arrington MBA; Jayden Bearnson; Marina Brown; Sikoti Langi; Melissa Cheng MD, MOH, MS; Troy Madsen MD University of Utah.

Background: Screening, brief intervention, and referral to treatment (SBIRT) is a comprehensive, evidence-based public health approach to early intervention and treatment for people at risk of developing a substance use disorder. Emergency department (ED)-based SBIRT provides an opportunity to screen a large spectrum of patients, including many who may not otherwise have regular contact with the healthcare system. Our goal was to describe outcomes and physician perceptions of an ED-based SBIRT program. Methods: We implemented SBIRT at an urban, academic ED utilizing trained pre-medical student with 80 hours per week coverage. SBIRT staff approached ED patients and performed screening with those willing to participate. For patients who screened moderate or high risk for a substance use disorder, SBIRT staff performed a brief intervention and provided information on treatment resources, including ED social workers. SBIRT staff notified the treating providers of patients who screened moderate or high risk and asked providers to complete a survey regarding the ED SBIRT process. Results: Over the 18 months from March 2017-August 2018, 4,973 ED patients participated in SBIRT. Of those screened, 6.8% of patients were moderate risk and 1.2% were high risk for a substance use disorder. 18.1% of moderate-risk patients and 34.4% of high-risk patients screened positive for opioid use. Nearly all ED providers (99%) caring for moderate- or high-risk patients had spoken with the patient prior to the SBIRT staff, but 54.5% of these providers were unaware of their patient's substance abuse risk before being notified of the SBIRT findings. Most providers (61%) strongly agreed or agreed that SBIRT improved the care of their patient and most (58.9%) planned to discuss the SBIRT findings with the patient. The large majority of providers (93.8%) strongly agreed or agreed that the SBIRT process did not interfere with clinical care provided in the ED. Conclusion: In our experience with ED SBIRT, nearly 1 in 12 ED patients screened at least moderate risk for a substance use disorder. The treating provider was unaware of this risk in the majority of cases. ED SBIRT may aid in addressing substance use disorders both through the direct intervention of the SBIRT process and provider awareness of patient risk.

### **351 Dedicated Emergency Department Physical Therapy Reduces Imaging, Opioid Administration, and Length of Stay**

Andrew Pugh MBBS University of Utah School of Medicine; Keith Roper PT, DPT University of Utah; Jake Magel PhD, MSPT, DSc University of Utah; Julie Fritz PhD, PT, ATC University of Utah; Nazaret Colon BS University of Utah; Sadie Robinson BS University of Utah; Caitlynn Cooper BSN University of Utah; John Peterson BS University of Utah; Asal Kareem University of Utah.

Background: Emergency department (ED)-initiated physical therapy (PT) is an emerging resource nationwide. Early data suggest that PT in the ED has a positive effect on a number of clinical and operational outcomes in patients presenting with musculoskeletal pain. However, there are few published narratives on this topic. This study assesses the impact of ED PT on imaging studies obtained, rates of opioids prescribed, and ED length of stay. Methods: We prospectively identified patients presenting with musculoskeletal pain to an urban academic ED in Salt Lake City between January 2017 and June 2018. During the study, a physical therapist was in the ED three days a week and was available to evaluate and treat patients after consultation by the ED provider. We noted patient demographic information, imaging performed in the ED, medications administered and prescribed, and ED length of stay. We classified patients as those who received PT in the ED and those who did not and compared clinical outcomes between groups. Results: Over the 18-month study period, we identified 524 patients presenting to the ED with musculoskeletal pain. 381 (72.7%) received ED-initiated PT. The PT and non-PT groups were similar in average age (42.8 years vs. 45.1 years,  $p=0.155$ ), gender (% female: 53% vs. 46.9%,  $p=0.209$ ), and primary presenting chief complaint (cervical, thoracic, or lumbar pain: 57.7% vs. 53.1%,  $p=0.345$ ). Patients who received PT had lower rates of imaging (38.3% vs. 51%,  $p=0.009$ ), ED opioid administration (17.5% vs. 32.9%,  $p<0.001$ ), and a shorter average ED length of stay (4 hours vs. 6.2 hours,  $p<0.001$ ). Rates of outpatient opioid prescriptions were similar between groups (16% vs. 21.7%,  $p=0.129$ ). Conclusion: In our experience, physical therapy within the ED reduced the use of imaging and time spent in the ED. Patients receiving PT were also less likely to receive an opioid in the ED, a potentially significant finding given the need for opioid reduction strategies.

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**153 Collecting Unused Medical Supplies in Emergency Departments for Responsible Redistribution**

Lily B. Muldoon MD, MPH University of California San Francisco/Zuckerberg San Francisco General Hospital; Sarah H. Sabbagh MPH University of California San Francisco; Winnie W. Chan MD MS University of California San Francisco/Zuckerberg San Francisco General Hospital; Robert Rodriguez MD University of California San Francisco/Zuckerberg San Francisco General Hospital; Hemal Kanzaria MD, MSc University of California San Francisco/Zuckerberg San Francisco General Hospital.

Background: Medical supplies are unevenly distributed throughout the world. Discarded medical materials in the United States that are viable for use can be recovered and allocated to low- and middle- income countries (LMICs), where poor access to medical supplies affects the delivery of adequate health care. Our objective was to develop a pilot program and describe, quantify, and monetize unused supplies from two urban, academic EDs in California for redistribution to LMICs. Methods: We conducted this study at two urban EDs: a tertiary academic center with approximately 44,000 patients annually, and a level-one trauma center that serves approximately 77,000 patients per year. We trained ED staff to place opened, unused, uncontaminated medical supplies in strategically positioned bins located in each ED for 30 days. We sorted and quantified collected supplies, then used hospital-specific supply catalogs to determine the total cost of recovered medical supplies over the 30-day study period. We extrapolated the amount of collected medical supplies and associated costs to yearly estimates, as well as estimates that could be achieved with national implementation of this program. Results: We recovered 43.3 kilograms (\$6,635) of supplies from both the trauma and academic centers during the 30-day study period. The most commonly collected items included catheter needles (746), intravenous (IV) start supplies (308), cleansing supplies [such as alcohol preparation pads] (149), sutures (140), and phlebotomy tubes (101). The items of greatest value were open but unused procedure kits (\$1,776), catheter needles (\$1,009), sutures (\$698), IV supplies (\$621), and atomizer devices (\$528). We estimated that both the trauma and academic centers produce \$79,625 of unused medical supplies per year. If expanded to EDs across the country, similar programs would be capable of recovering approximately 1.2 million kilograms, or \$189 million worth, of medical supplies annually. Conclusions: We present a novel approach to decreasing medical supply surplus and recovering usable medical equipment. We found that a substantial quantity of valuable medical supplies can be recovered in two urban EDs. If our program were to be expanded nationally, considerable amounts of equipment could be responsibly redistributed and donated to other global health care facilities based on identified need.

**677 Feasibility of a Food Insecurity Screening and Referral Pilot Program in the Emergency Department**

Victor M. Cisneros MD, MPH University of California Irvine Health; Shashank Somasundaram BS University of California Irvine Health; Tiffany J. Hwang BS University of California Irvine Health; Hasan M. Khan University of California Irvine Health; Joseph Bui University of California Irvine Health; Shahram Lotfipour MD, MPH University of California Irvine Health; Wirachin Hoonpongmanont MD, MS University of California Irvine Health; Bharath Chakravarthy MD, MPH.

Background: Despite recent efforts by health care systems to improve patients' nutritional status, 11.8% of all United States (U.S.) households continued to report food insecurity in 2017. Recent studies show that in Orange County, 12% of households identify as food-insecure. The emergency department (ED) provides an unique opportunity to address food insecurity across a wide catchment area. This pilot study seeks to assess the feasibility of a two-tiered ED screening program and quantify the severity of food insecurity at an academic Level I Trauma Center. Methods: Research associates screened all ED patients above the age of 18 at a large, academic, Level I Trauma Center, from 8 am to 12 am daily. Patients who screened positive by the initial Two-Item Food Security Screening Tool were approached to complete the U.S. Adult Food Security Survey Module, a more extensive survey assessing severity and further demographic information. Surveys are validated by the American Academy of Pediatrics and the United States Department of Agriculture (USDA), respectively. Results: 1091 patients were screened over seven months. The initial two-item screening tool identified 201 (18.4%) food-insecure patients. Of these patients, 132 completed the extensive second survey and

received a referral to local food assistance programs. 55% of the 132 patients enrolled were female and 45% were male. 22 (16.7%) patients believed that their ED visits were related to their food insecurity status, with 17 (77.3%) categorized as the most food insecure. 84 (63.6%) of the 132 reported having “very low food security,” defined by the USDA as having “multiple indications of disrupted eating patterns and reduced food intake.” 42% of these 84 identified as Hispanic or Latino (a) and 43% reported having at least one child in their household. Conclusion: Screening for food insecurity is feasible in a busy ED setting. Of the considerable number of patients screening positive for food insecurity, a majority were Hispanic/Latino, with many having children. A targeted, stepwise approach to screening in high acuity settings may help increase awareness of existing food assistance programs among food-insecure individuals. Further research should study longitudinal effectiveness of a tiered ED-based screening and referral system to identify further barriers to accessing food resources.

#### **684 Reducing ED Recidivism – Addressing Social Determinants and Improving Care Coordination for Frequent ED Users**

Marina Rosenberg BA University of California San Francisco; Isabel Ostrer AB University of California San Francisco School of Medicine; Maria C. Raven MD, MPH.

Background: Frequent ED users often visit more than one ED and are more likely to be adversely affected by poor social determinants of health (SDH), yet EDs do not routinely collect SDH data. Eight of ten Francisco EDs implemented the Emergency Department Information Exchange (EDIE) in 2017. EDIE is an IT platform that pushes real-time EMR-based alerts to ED providers at participating hospitals for patients who meet specific frequent ED use thresholds. We collected data on SDH from patients flagged by EDIE that we used to craft ED Action Plans (EAPs) meant to reduce ED recidivism and improve connection to community-based services. Methods: ED-based health care navigators interviewed a convenience sample of frequent ED users flagged by EDIE, using validated questions from multiple SDH domains (e.g. housing, social support). We created EAPs (short, actionable plans to help coordinate care) based on patient interviews, provider input and chart review, and entered them into EDIE. EAPs were visible to all ED providers on the platform during patients’ visits: navigators assisted ED providers with short-term management based on EAPs. We collected comprehensive ED visit data from all EDs on the EDIE platform for patients with EAPs. Results: We interviewed 456 patients (ages 18-92; mean=55; 57.0% male). Almost half, (199, 44.0 %) were homeless/unstably housed. Of 156 who were homeless, most (98; 64.1%) had been for >1 year and 93 (59.6%) lived on the street. We crafted 650 unique EAPs (456 interviewed patients, and 194 more for patients, referred by outside providers, who met EDIE visit criteria). Patients most often requested help with housing (38.8%), mental health (32.2%), case management (31.6 %), in-home care (28.3%), substance use (26.5%) and primary care (17.5%). The 650 patients with EAPs had a mean of 6.65 visits/yr (range 0 – 140) to our ED, but a total of 22.5/yr (range 0 – 341) when accounting for all ED visits on EDIE. Before EAPs entry into EDIE, these patients had a mean overall ED visit rate of 2.23/month, compared to 1.83/month after EAP entry, an 18% reduction. Conclusion: ED providers cannot see the full extent of frequent ED use outside of a platform such as EDIE. Frequent ED users were highly affected by poor SDH and required connection to multiple community-based services. ED-based SDH screening may inform interventions such as EAPs that can reduce ED recidivism.

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**10:30am Pinot B Disease/Injury Prevention**

#### **1050 A Descriptive Study of Strangulation Injuries Identified in a Single University Emergency Department**

Lindsay Leech MD The University of Utah; Bushra Hussein The University of Utah; Megan Fix MD; Troy Madsen MD University of Utah.

Background: Strangulation is defined as the external compression of a person’s neck and/or upper torso in a manner that restricts that person’s airway or the flow of blood into or out of the head. Strangulation accounts for 10% of violent deaths in the United States and 15-20% of deaths associated with domestic violence. If a man strangles a woman, she is 7.5 times more likely to become a homicide victim. Our emergency department (ED) does not have a dedicated evaluation and treatment protocol for strangulation victims. Our goal was to document the prevalence of strangulation-

related emergency department (ED) visits, imaging performed, and injuries identified in these individuals. Methods: We reviewed the records of patients presenting to a single urban, academic ED over the four-year period from 2015-2018 using diagnosis codes related to asphyxiation and/or strangulation. We collected information regarding patient gender, age, presentation, mechanism of injury, physical exam findings, imaging performed, injuries identified, and disposition. We compiled descriptive statistics to characterize these strangulation-related ED visits. Results: We identified 33 unique patients who presented to the ED with strangulation-related injuries. Twelve (36.3%) of these patients were victims of manual strangulation by another person, and nine (75%) of these victims were female. Ten patients (83.3%) reported that the injuries resulted from domestic violence. In ten cases (83.3%), the provider documented objective trauma-related findings on physical examination. Six patients (50%) had dedicated imaging of the neck vasculature and six (50%) had brain imaging in the ED. Two patients (16.6%) had internal head and neck injuries identified. Three patients (25%) were admitted to the hospital for further treatment. Conclusions: Documented cases of interpersonal manual strangulation injuries were rare in our ED, averaging three per year over the study period. Imaging varied between patients. EDs may wish to consider dedicated protocols to encourage consistent documentation, imaging, and injury identification in this vulnerable population.

### **1215 Suicide Attempt in California Emergency Departments in 2011 and its Risk Factors**

Soheil Saadat MD PhD UC Irvine; Nikhil Shah; Cassandra Saucedo; Tim Bruckner MPH PhD; Parvati Singh; Jangho Yoon PhD; Lonnie Snowden MA PhD; Bharath Chakravarthy MD, MPH UC Irvine.

Background: The World Health Organization suggests that suicide, the 10th leading cause of death, accounts for over one million deaths annually. Suicide rates have been increasing in almost every state, resulting in nearly 45,000 American deaths per year. Since individual safety is a balance between risk and control, the loss of control inherent in any Suicide Attempt (SAT) remains a large public health issue. Additionally, SATs have an enormous burden on the US healthcare system as a whole. In order to provide specialized prevention strategies to clinicians, this study will provide comprehensive data on specific demographics including gender, age, income, race, and substance abuse for suicide attempters across California. Methods: By using the 2011 California State Emergency Department Databases (SEDD), we explored the prevalence of SAT among ED patients and associated variables. SAT was identified by using the relevant ICD-9 codes. Results: The study included 10,124,598 patients referred to EDs in California in 2011. The prevalence of Suicide Attempt (SAT) was 302.2 (298.9-305.7) per 100,000 ED visits. It was more common among younger age groups (after the age of 10), females, white individuals, and patients with chronic conditions. Substance abuse was a strong risk factor of SAT (OR=11.21, 95%CI: 10.84-11.59). Suicide mortality was higher in men, old ages, and patients with no medical insurance. Conclusion: Our data corroborated the gender paradox of suicidal behavior in that while males have a lower rate of suicide attempts, they have a higher mortality rate. The substantial increase in SAT prevalence for women ages 10-20 identifies a high-risk group that can be specifically targeted for psychosocial intervention. Additional non-modifiable risk factors involve adolescent and young adult (10-30) white individuals living in high-income households. While substance abuse corresponds with a greater than ten-fold increase in the prevalence of suicide attempt, this population had a significantly lower mortality rate. This suggests that these individuals may be susceptible to multiple suicide attempts and should be targeted by public health efforts.

### **1258 The Fill Rate of Naloxone Prescriptions After Video vs Written Opioid Education Programs**

Megan McElhinny; Ashley Carter Powell; Kimberly Chea; Alyssa Thomas; Bikash Bhattarai; Aimee Mishler; Kara Iskyan Geren

Background: Timely administration of naloxone, the antidote for opioid overdose, can be a life-saving intervention. At Maricopa Medical Center's (MMC) Adult ED we studied the fill rate of free naloxone prescriptions given to patients at risk for opioid overdose after opioid overdose and naloxone education program in a video or written format. This study was a first of its kind in Arizona. Methods: This was a prospective, randomized controlled study of patients seen in the

adult ED from August 1, 2017 to December 1, 2018. The patients were current opioid users or being seen in the ED for opioid related conditions. Patients were randomized to receive opioid overdose and naloxone education through a video or a written pamphlet. Upon discharge, the patients received a prescription for a free naloxone kit redeemable at a MMC pharmacy only. Patients who filled the prescription were contacted 3 months later and asked if the naloxone kit was used. Chi-square test and odds ratio were performed with 95% confidence limits calculated to measure the magnitude of the association between education method and whether the prescription was filled. Results: Of the 769 patients screened for the study, 702 were excluded from analysis. Common reasons for exclusion where patients were admitted to the hospital (108) and were deemed not be to candidates for naloxone by providers (21). Of the 67 patients enrolled, four withdrew consent and eighteen (28%) filled a naloxone prescription. 28% (13/41) of patients who received video education and 29% (5/22) who received written pamphlet education filled naloxone prescriptions. Patients who received video education were 1.6 times more likely to fill their naloxone prescription. ( $p=0.654$ ). Four of the patients who filled naloxone prescriptions were successfully contacted after 3 months and none had used the naloxone kit. Conclusion: Patients who received video education were more likely to fill their naloxone prescription. The results of this study were limited by patient enrollment. Major barriers to enrollment were the inability to include admitted patients and provider perception of patient opioid overdose risk. As a result, a current follow up study focuses on opioid overdose and naloxone education for the providers of MMC's entire health care system, allowing for patients to receive naloxone prescriptions regardless of discharge location.

### **1261 Association of Suicide Attempt With Stimulant Abuse in California Emergency Departments in 2011**

Soheil Saadat MD PhD UC Irvine; Nikhil Shah UC Irvine; Cassandra Saucedo; Tim Bruckner MPH PhD; Parvati Singh; Jangho Yoon PhD; Lonnie Snowden MA PhD; Bharath Chakravarthy MD, MPH UC Irvine

Background: Misuse and abuse of cocaine and amphetamines are known to cause multiple issues including tissue ischemia and long-term neurological changes. While research has been conducted on Stimulant Abuse (StA) rates and population demographics, specific behavioral outcomes have not been substantially established. This study will analyze the association between Suicide Attempt (SAT) and StA to find specific population groups that can be targeted for psychosocial intervention. Methods: We used the California State Emergency Department Databases (SEDD) to obtain discharge information from 2011, the most recent data available. These datasets contained discharge information on all ED encounters that did not result in an admission to the same facility. This included uninsured patients along with those covered by Medicare, Medicaid, and private insurance. StA and SAT were identified by using the relevant ICD-9 codes. Results: The study included 10,124,598 patients referred to EDs in California in 2011. The prevalence of StA was 1.0% and it was associated with SAT (OR=7.29, 95%CI: 6.97-7.64). The association of StA and SAT in Asian/Pacific (OR= 12.01, 95%CI: 8.88- 16.26) and Hispanic patients (OR= 9.41, 95%CI: 8.59-10.32) was higher than in white (OR= 6.66, 95%CI: 6.26-7.09) and black (OR= 5.61, 95%CI: 4.93-6.39) patients. The association of StA with SAT was stronger in women (OR=9.18, 95%CI: 8.60-9.80) compared to men (OR=6.45, 95%CI: 6.04-6.88). This pattern was seen in all age groups above 10. Moreover, the association was substantially stronger in patients with no chronic conditions. Conclusion: The differential strength of association between StA and SAT among different racial groups may be a result of the stimulant type used. The increased rate of cocaine abuse in black populations has been attributed to established distribution networks. On the other hand, White, Hispanic, and Asian/Pacific populations more commonly use amphetamines, which may lead to stronger association with SAT. To prevent SAT among stimulant abusers, public health intervention efforts should be directed at females and patients without chronic conditions due to a stronger association between StA and SAT.

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11:00am Pinot A Social EM 2

698 Categorizing Drivers of Physician Burnout



Katherine Hiller MD, MPH, University of Arizona; Kelly Barringer; John Cienki MD, MSPH Jackson Memorial Hospital; Lawrence A. DeLuca EdD, MD University of Arizona; Kristi Grall MD, MHPE Regions Hospital/HealthPartners; Robert Lam MD University of Colorado School of Medicine Anschutz Medical Campus; K Kay Moody Capital Medical Center, Glacier Rock Wellness Ranch, EMDOCS;

Background: Workplace Burnout is exceedingly prevalent among emergency physicians (EP's), yet little research has analyzed the problem in terms of unmet or thwarted needs. Contemporary use of social media provides a window into physician thoughts and attitudes. Social media can provide a space where physicians can voice concerns without stigma or fear of retribution. Physician discussions are publicly accessible, and observation in such a naturalistic setting provides different insights into topics like burnout than those obtained through prospective study. The Facebook community EMDOCS is composed of verified, practicing EP's. The group discusses many topics of interest to currently practicing EP's. We sought to utilize this posted data to categorize and prioritize workplace drivers of burnout, and examine the intersection between Maslow's Hierarchy of Needs and drivers of burnout as categorized in the Medscape National Physician Burnout and Depression Report. Methods: Responses to an August 2018 EMDOCS post which asked "What disrupts your mood the most on shift?" were tabulated and qualitatively analyzed. Responses were then categorized according to Maslow's Hierarchy of needs. We analyzed both the frequency of needs related to each category as well as where the needs fell in the hierarchy. The data was decoupled from respondent's profiles to maintain anonymity. This study was approved by Colorado Multiple Institution Review Board. Analysis: Each of the 484 responses to the post were tallied and categorized. Every tier of Maslow's hierarchy: Physiological/Safety/Love and Belonging/Self Esteem/Self Actualization - was represented in the sample. Iterative analysis revealed linkages between the Medscape Burnout Survey and Maslow's hierarchy including lack of and/or malfunctioning resources, frequent task switching/interruptions, and feeling overworked. Conclusion: Social Media provides a source of data on workplace drivers of physician burnout. Categorizing social media responses against known drivers of burnout and prioritizing them according to Maslow's hierarchy, can use a validated tool to prioritize these drivers. This process facilitates research into the impact of burnout on self-actualization and aids in designing programming to reduce burnout for practicing EPs.

### **1314 Temporal Characteristics of Homelessness and Housing Instability in an Urban Emergency Department**

Leah Fraimow-Wong; Jennifer Sun Highland Hospital-Alameda Health System; Daniel Haro; Partow Imani; Harrison Alter MD, MS Highland Hospital.

Background: Lack of stable housing affects health, ED utilization and outcomes. The presence of housing specialists in the ED may significantly improve outcomes for homeless and unstably housed patients. Little is known about the true prevalence of housing instability in the ED and whether a greater number of such patients present to the ED at certain times of the day. Deeper understanding may help allocate limited resources to address the greatest housing needs. Methods: We surveyed patients in an urban safety net ED about housing status and social needs using a sampling strategy that met them at all times of day, every day of the a week, covering a period of two full weeks for a total of 336 hours (14 days x 24 hours/day) from 6/2018-8/2018. Any patient 18 or older, with a preferred language of English or Spanish who completed an ED visit during the study time period was eligible to be surveyed. Time of arrival and disposition was determined from the chart. Housing status was determined using items validated for housing stability, including PRAPARE, the Accountable Health Communities Survey, and items from the US Department of Housing and Urban Development. Data were explored with descriptive statistics. Results: During the study period, 2330 potentially eligible ED visits occurred and 1573 patients (68%) were approached. Of these, 759 (48%) completed the survey, 466 (30%) declined, and 319 (20%) were ineligible. Among respondents, 40% identify as Latino, 39% Black, 15% white, 5% Asian and 11% other races/ethnicities. Median age is 42 (IQR 29-57) and 54% were male. Of those surveyed, 34% (95% CI, 30-37) were found to be homeless and 27% (95% CI, 24- 30) reported being unstably housed. Severe hunger was reported often or sometimes by 44% (95% CI, 41-48). Temporally, 59% (95% CI, 52-65) of those reporting homelessness and 56% (95% CI, 46-62) with unstable housing presented between the hours of 8 am and 4 pm, which represented the

highest incidence interval. Prevalence peaked later, with 47% (95% CI, 45-50) of all homeless patients and 42% (95% CI, 40-45) of all unstably housed patients present in the ED from 12 pm to 8 pm. Conclusion: In this high-needs ED, the majority of patients with housing challenges present during the daytime hours favored by employment norms, facilitating the provision of services by community agencies in the ED.

#### **1441 Health, Homelessness, and Criminal Justice**

Michael Dodge University of California, San Francisco; Newton Addo University of California San Francisco/Zuckerberg San Francisco General Hospital; Charles Murphy MD University of California San Francisco/Zuckerberg San Francisco General Hospital; Sarah H. Sabbagh MPH University of California San Francisco; Maria C. Raven MD, MPH.

Introduction: Many chronically homeless individuals who frequently use the health system cycle between EDs, the street, and shelters. A subset of individuals also have interactions with the criminal justice system. But while some research has examined patterns of criminal justice system use by homeless individuals, few studies have integrated data from health, housing, and the criminal justice system in order to simultaneously examine their health system use. We used integrated housing, health, and jail data from Santa Clara County to compare chronically homeless, high frequency users of acute health and mental health services who have and have not been engaged in the criminal justice system. Methods: We analyzed data from an ongoing randomized controlled trial (RCT) studying the impact of permanent supportive housing on health services use for 372 chronically homeless, frequent health system users in Santa Clara County. We identified study participants with at least one arrest in the two years prior to RCT enrollment and categorized them as "justice-involved." We then analyzed all documented criminal offenses to determine which types of charges justice-involved individuals most frequently faced, using an existing categorization scheme. Next, we analyzed health services utilization and compared those with prior arrests to those without. Results: Justice-involved chronically homeless study participants had significantly more ED (25.4 vs 18.3,  $p < 0.01$ ) and psychiatric ED visits (7.3 vs 3.6,  $p < 0.01$ ), and significantly fewer primary care visits (8.3 vs. 11.8,  $p < 0.01$ ) over the two years that were analyzed. There was no difference in the amount of outpatient behavioral health services utilized by either group. Among those with criminal justice interactions, arrests were most frequently related to use and/or possession of alcohol or drugs. Discussion: We found that justice-involvement was associated with higher levels of utilization of acute care services and lower levels of utilization of primary care services. Substance-related offenses accounted for the highest frequency of criminal charges. This suggest that interventions aimed at improving health outcomes and reducing utilization for chronically homeless individuals should also aim to identify patients at risk for arrest and intervene to reduce justice-involvement.

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**11:00am Pinot C Radiology**

#### **403 Reliability of pH Paper with Venous and Arterial Blood Samples**

Kirsten M. Douglass UC Davis Medical Center; Megan A. Gilbert; John-Lloyd K. Santamarina BS Department of Emergency Medicine, UC Davis School of Medicine; Michelle Nguyen; Mylas Canales MD; Michael A. Schick MD Department of Emergency Medicine, UC Davis School of Medicine

Background: In resource poor settings, measurements for blood pH are often unavailable to health care practitioners. An accurate, quick, and inexpensive method would be useful for measuring blood pH in these settings. Several studies have compared the accuracy of pH paper in pleural fluid samples, but none have compared their accuracy of measuring blood pH. The objective of this project was to verify if nitrazine and phion urine pH strips can accurately measure the pH of human plasma in a hospital setting. Methods: This was a single center study, convenience sample of patients older than 18 years seen in a high-volume Emergency Department. Nitrazine and phion urine pH strips were tested on centrifuged plasma of 50 patients with a suspected acid-base derangement. Nitrazine samples were recorded in increments of 0.5 (6.5, 7.0, 7.5, 8.0) and phion samples were recorded in increments of 0.25 or 0.5 according to manufacturer's instruction (6.5, 7.0, 7.25, 7.5, 8.0). This data was then compared against the pH from the Arterial Blood Gas (ABG) or Venous Blood Gas (VBG) samples reported by the hospital laboratory. Results: 50 patients were enrolled in this study over two years. Three were excluded from data analysis; one for not having a VBG or ABG drawn and two screen failures. Of the

included patients, the average age was 57.9 years (SD 14.0) and 51.0% were female. When compared with the ABG or VBG result, the pH paper method was faster on average by 11.3 minutes (SD 12.8). ABG/VBG results were 14 (30%) with acidemia, 24 (51%) with a physiologically normal pH, and 9 (19%) with alkalemia. The sensitivity and specificity with 95% confidence interval for nitrazine were 46.1% [19.2-74.9%] and 56.7% [37.4-74.5%] for acidemia, and 57.1% [18.4-90.1%] and 44.4% [27.9-61.9%] for alkalemia, respectively. The sensitivity and specificity for phion papers were 78.6% [49.2-95.3%] and 39.4% [22.9-57.9%] for acidemia, and 44.4% [13.7-78.8%] and 68.4% [51.3-82.5%] for alkalemia, respectively. A Pearson correlational linear regression demonstrated a correlation coefficient of 0.166 for nitrazine pH strips and 0.236 for the phion pH strips, indicating both strips had a negligible correlation. Conclusion: Nitrazine and phion pH strips were neither sensitive, specific, nor accurate enough in detecting acidemia and alkalemia to be used to make clinical decisions.

### **1013 Psychosocial Factors Affecting ED MRI Use for Lower Back Pain**

Vishnu Parthasarathy MD UC San Diego.

Background: Routine magnetic resonance imaging (MRI) for lower back pain has been correlated with additional tests, follow-ups, referrals and increased rates of lumbar surgery and not with any clinically meaningful outcomes. While emergent MRI evaluation in the Emergency Department (ED) continues to be requested outside of the recommended guidelines at increasing rates, the reasons behind this remain elusive. We aimed to evaluate the influence of psychosocial factors and other nuances in the emergency physician (EP)-patient dynamic on ordering of lumbar spine MRIs in patients who do not meet the American College of Radiology (ACR) criteria for an emergent MRI. Methods: 282 patients presented to 2 EDs over 2 years with a chief complaint of back pain and received MRIs. 78 of these patients did not meet criteria for emergent MRI imaging based on the ACR guidelines. The population was compared to a cohort consisting of similar patients who did not receive MRIs. A rubric created to define nuances of the EP-patient interaction was used to perform a manual chart review to identify any psychosocial factors related to the patient encounter. Chi-square analysis was used to compare the two groups. Results: One or more studied psychosocial factors were more likely to be noted in cases where patients received MRIs for lower back pain ( $p=0.01$ ). Those who received MRIs were more likely to have had a recent health care visit for the same chief complaint or been directly referred to the ED by another physician ( $p=0.02$ ,  $p=0.02$ ). Patient request for an MRI however did not appear to correlate with increased MRI ordering ( $p=0.68$ ). Those who verbalized dissatisfaction with their care were less likely to have received an MRI ( $p=0.01$ ). Lastly, a patient's inability to get follow up or outpatient MRI did not correlate with receiving an MRI in the ED ( $p=0.07$ ,  $p=0.87$ ). Conclusion: A recent health care visit for back pain or a direct referral to the ED by other physicians may pressure the EP to do more of a workup than was previously done, by ordering an MRI. Conversely, patient dissatisfaction with their care or their inability to get outpatient imaging or follow up does not affect EP MRI ordering. The retrospective nature to study makes it difficult to make any causal speculations. Additional factors like patient narcotic requirements, and other patient comorbidities may also play a role and will need to be further studied.

### **1178 Use of Transcutaneous Bilirubin Spectrophotometry to Distinguish Cutaneous Birthmarks From Contusions**

Isabelle Chea BS University of Arizona College of Medicine Tucson / Department of Emergency Medicine; Robert Martinez BS University of Arizona College of Medicine Tucson / Department of Emergency Medicine; Bethany Boczar BS University of Arizona College of Medicine / Department of Emergency Medicine; Buddy Wagoner University of Arizona College of Medicine Tucson / Department of Emergency Medicine; Quelly Ramos University of Arizona College of Medicine Tucson / Department of Emergency Medicine; Emily Galloway University of Arizona College of Medicine Tucson / Department of Emergency Medicine; Nicole Abdy MD University of Arizona College of Medicine Tucson / Department of Pediatrics; Dale Woolridge MD, PhD University of Arizona College of Medicine Tucson / Department of Emergency Medicine.

Background: Particularly in cases of suspected child abuse and maltreatment, it can be critical to accurately distinguish between birthmarks and contusions. Birthmarks, especially that of Congenital Dermal Melanocytosis (CDM), can be difficult to differentiate from contusions and is solely dependent on physician gestalt, which is not always reliable. The use of transcutaneous bilirubin (TcB) spectrophotometry as a technique to discriminate birthmarks from contusions has recently been piloted and demonstrated accuracy in the identification of contusions as contusions consistently yielded significantly elevated readings of TcB. In this study, we attempt to validate this demonstrated technique to distinguish birthmarks from contusions. Methods: Patients of all age groups with a wide sampling of various types of birthmarks or contusions were enrolled in an academic inpatient and outpatient setting. Lesions were identified and defined by patient or parent history and two-physician visual assessments. TcB scans were obtained from the affected skin (birthmark or contusion) along with the adjacent unaffected native skin to correct for any baseline variation in reflectance imparted by differing skin pigmentation per the previously established process. The difference in measurements was recorded as the delta TcB level ( $\Delta$ TcB). The sample size included 91 patients with contusions ( $x$  age = 20.7) and 121 with birthmarks ( $x$  age = 5.4). Results: On average, TcB measurements of skin pigmented by CDM or other birthmarks resulted in lower scan values ( $x$  = 3.04 mg/dL,  $s$  = 3.22) in comparison to adjacent native tissue scan values ( $x$  = 2.14 mg/dL,  $s$  = 2.46). In contrast, cutaneous contusions resulted in high value readings ( $x$  = 4.93 mg/dL,  $s$  = 2.84) compared to adjacent native tissue ( $x$  = 1.04 mg/dL,  $s$  = 1.02). Analysis using a two-sample t-test demonstrated that the  $\Delta$ TcB measurements were significantly higher in cutaneous contusions when compared with birthmarks ( $x$  = 3.9 and 0.9 mg/dL, and  $s$  = 2.77 and 2.74, respectively) ( $p$  < 0.001). Subset analysis of the two groups did not show significant variation across the enrollment ages or native skin pigmentation. Conclusion: Use of TcB Spectrophotometry can reliably differentiate skin lesions obtained through trauma from congenital birthmarks thus illustrating a diagnostic method to complement or improve on simple visual assessment.

### **386 Historical, Clinical, and Laboratory Features of Emergency Department Patients With Choledocholithiasis**

Josephine E. Valenzuela M.D. Banner University Medical Center; Bailey Lynn M.D. University of Arizona; Asad E. Patanwala Pharm D, M.P.H The University of Sydney; Elaine Situ-LaCasse M.D. Banner University Medical Center.

Background: Current knowledge of the characteristics of patients with choledocholithiasis is derived from subset analysis of patients with known cholecystitis or cholelithiasis. We sought to characterize the historical, clinical, and laboratory presentations of emergency department patients with choledocholithiasis, regardless of cholelithiasis, to describe the differences, if any, in these presentations versus previously described subset analysis. Methods: We conducted a retrospective chart review at two urban academic emergency departments (EDs) with combined annual visits of 135,000. Adult (age > 18) ED patients with International Classification of Diseases, 10th revision (ICD-10) codes for gallstone pancreatitis or choledocholithiasis were identified for visits between January 1, 2014 and January 1, 2017. Patients with common bile duct stones confirmed on advanced imaging comprised the study population. We reviewed the electronic medical records of these patients for demographic information, symptoms, signs, and serum laboratory values, and imaging findings. Results: We found 143 cases of confirmed choledocholithiasis, for an annual incidence of 5 cases per 10,000 ED visits. Forty-seven patients (33%) underwent prior cholecystectomy. Mean patient age was 51 ( $\pm$  21); 90 patients (63%) were female. Nausea and vomiting was the most common historical feature, seen in 117 (82%) patients. The most common physical examination finding was right upper quadrant tenderness, noted in 87 of 143 (61%) of patients. Mean laboratory values were abnormally elevated, but with large standard deviations: alkaline phosphatase 273 IU/L ( $\pm$  247), aspartate aminotransferase 264 IU/L ( $\pm$  219), alanine aminotransferase 280 ( $\pm$  254), and total bilirubin 3.0 ( $\pm$  2.6). Conclusion: Patients presenting to the ED with confirmed choledocholithiasis averaged 51 years of age and were 63% female, in line with prior studies. Surprisingly, a third of the patients had undergone prior cholecystectomy, some decades prior to ED presentation, calling into question the traditional teaching that common bile duct stones form in the gallbladder and then migrate into the common bile duct. No feature of history, physical examination, or laboratory values was sensitive or specific for choledocholithiasis, similar to previous studies.

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**11:30 Pinot A Cardiovascular (Troponin)**

**113 High sensitivity troponin I: 2 hour evaluation for acute myocardial infarction in the United States**

Richard M. Nowak MD, MBA Henry Ford Health System, Detroit, MI; Gordon Jacobsen MS Henry Ford Health System, Detroit, MI; James McCord MD Henry Ford Health System, Detroit, MI; Fred S. Apple PhD Hennepin County Medical Center/University of Minnesota; Robert Christenson PhD University of Maryland, Baltimore, Maryland; Christopher DeFilippi MD University of Maryland, Baltimore, Maryland.

Background: High sensitivity cardiac troponin I (hs-cTnI) assays are being approved for use in the United States (US). Our objective was to determine the efficacy of a 2 hour acute myocardial infarction (AMI) rule-out/rule-in European derived hs-cTnI algorithm when applied to patients in the US when the second sample was drawn 2-3 hours later in the High Sensitivity Cardiac Troponin I in the US (HIGH-US) study. Methods: Adults presenting with any suspicion for AMI were included. Patients with STEMI were excluded. Baseline and 2-3 hour plasma samples were analyzed in a core laboratory (University of Maryland) using the Siemens Atellica hs-cTnI assay (99th % 45.0 ng/L). AMI was independently adjudicated using all 30 day clinical materials available. Results: 2505 patients were enrolled with 1916 having complete data for the 2-3 hour algorithm analyses. Subjects had a mean age of  $56.7 \pm 12.9$  years and 1419 (56.5%) were males. Past medical history included hypertension in 1730 (69.1%), coronary artery disease, cardiac bypass surgery, percutaneous coronary interventions or AMI in 930 (37.1%) and diabetes in 739 (29.5%) while 83 (3.3%) were receiving renal dialysis. ECG abnormalities included ST depression ( $\geq 0.5$ ) or elevation ( $> 1.0$ ) in 231 (9.2%) or T wave inversions in 298 (11.9%). Patients with AMI (except on dialysis) had significantly more ( $p < 0.001$ ) of each of these characteristics but they were also commonly seen in those without AMI. 1066 (55.6%) were ruled-out with a NPV 99.8% and sensitivity 99.1% (95%CI: 99.3-99.9 and 96.8-99.8 respectively). Of these 612 (31.9%) had a baseline hs-cTnI  $< 3$  ng/L and 454 (23.7%) had a baseline hs-cTnI  $< 6$  ng/L and a 1 hour delta value  $< 3$  ng/L. 254(13.3%) were ruled-in with a PPV 69.7% and specificity 95.5% (95%CI: 63.8 -75.0 and 94.4-96.3 respectively). Of these 199 (10.4%) had a baseline hs-cTnI  $\geq 120$  ng/L and 55 (2.9%) had a delta value  $\geq 12$  ng/L. The remaining 596 (31.1%) in the continue evaluation zone had an adjudicated AMI prevalence of 7.0% (95%CI 5.3-9.4). Conclusions: The European utilized 2 hour rule-out/rule-in algorithm using hs-cTnI for AMI evaluation yields very similar results (very high NPV) when used in an all comers US population with many cardiac risk factors when the second blood draw is 2-3 hours later. Further studies are needed to improve the PPV and specificity of a 2-3 hour rule-in algorithm for AMI in the US ED population.

**559 Reclassification With a High-Sensitivity Cardiac Troponin Assay**

Scott Casey UC Davis School of Medicine; Jeffrey Barrett MD Department of Emergency Medicine, UC Davis School of Medicine; Nam Tran PhD Department of Pathology and Laboratory Medicine, UC Davis School of Medicine; Daniel Tancredi PhD Department of Pediatrics, UC Davis School of Medicine; Ezra Amsterdam MD Department of Internal Medicine, UC Davis School of Medicine; Robert Narverud MD Department of Emergency Medicine, UC Davis School of Medicine; Bryn Mumma MD, MAS Department of Emergency Medicine, UC Davis School of Medicine.

Background: High-sensitivity (hs) cardiac troponin (cTn) assays may detect myocardial injury and acute myocardial infarction (AMI) in patients whose conventional cTn assay results are normal. Our objective was to describe rates of specimen and AMI reclassification between conventional cTn and hs-cTn. We hypothesized specimen and AMI reclassification rates of 20% and 10%, respectively. Methods: This was a single-center, observational study of symptomatic ED patients  $\geq 18$  years undergoing cTn testing in the ED with sufficient residual specimen for hs-cTnT testing. Conventional TnI (Siemens, Malvern, PA) and hs-cTnT (Roche Diagnostics, Indianapolis, IN) results were obtained from a laboratory quality improvement database. Specimen reclassification was defined as a result below the 99th percentile of one assay and above the 99th percentile of the other. All cases of specimen reclassification underwent physician adjudication using the Fourth Universal Definition of AMI. Outcomes were the rates of specimen and AMI reclassification between the conventional cTnI and hs-cTnT assays. Reclassification probabilities were assessed using sample proportions and 95% confidence intervals for binomial data, and were compared using McNemar's

test. Results: We included 511 patients (52% [268/511] female; median age 60 [25th, 75th percentiles: 48, 70]) with 735 paired cTn results. Specimen reclassification rate was 16% (117/735; 95% CI 13-19%), and 96 of 511 (19%, 95% CI 15-22%) patients had  $\geq 1$  reclassified specimen. More specimens were positive using the hs-cTnT assay (262/735, 36%) than the conventional cTnI assay (185/735, 25%;  $p < 0.0001$ ). One patient (0.2%, 95% CI 0.0-1.1%) was reclassified by hs-cTnT as having an AMI, and four patients (0.8%, 95% CI 0.2-2.0%) were reclassified as having no AMI. AMI reclassification could not be determined in 17 patients (3.3%, 95% CI 1.9-5.3%) due to lack of serial cTn results. Conclusions: Compared to conventional cTnI, hs-cTnT resulted in significant specimen reclassification but few cases of AMI reclassification. Introducing hs-cTnT has potentially substantial implications on patient care and clinical workflows and warrants investigation.

## **985 Do Computer Interpreted Normal Electrocardiograms Require Immediate Review by Emergency Physicians?**

Leigha Winters MD Department of Emergency Medicine UC Davis Health System; Ramandeep Dhillon; Gurjit Pannu; Patrick Terrassa; James Holmes MD, MPH Department of Emergency Medicine UC Davis Health System; Mary L. Bing MD Department of Emergency Medicine UC Davis Health System.

Background: EM physicians are regularly interrupted to screen ECGs for ST-elevation myocardial infarct (STEMI) that the computer interpreted as "normal ECG". Our objective was to identify discrepancies between the computer-interpreted "normal ECG" and the final cardiologist interpretation. We hypothesized that computer-interpreted "normal ECGs" do not require immediate review by an EM physician as the computer adequately identifies patients without cardiac ischemic events during that ED visit. Methods: This was a retrospective study of adult ( $> 18$  years old) ED patients with computer-interpreted "normal ECG". All ECGs underwent cardiologist final interpretation. If the cardiologist interpretation was not "normal ECG", it was further classified as potentially significant or not clinically significant. Laboratory and clinical outcomes were collected, including stress testing and cardiac catheterization. Data was described with simple descriptive statistics. A sample of 800 ECGs provided an acceptable upper bound of the 95%CI based on rate of normal ECGs found to be abnormal of 0.001. Results: 989 encounters were analyzed with a mean age of  $50.4 \pm 16.8$  years (range 18-96 years) and 527 (53%) female. Discrepant ECG interpretations were found in 184 cases including 124 (12.5%, 95%CI 10.4-14.7%) not clinically significant and 60 (6.1%, 95%CI 4.6-7.7%) potentially clinically significant. The 60 potentially clinically significant changes included: ST/T wave changes 45 (75%), T wave inversions 6 (10%), prolonged QT 3 (5%), and possible ischemia 10 (17%). Of these 60, 21 (35%) were admitted. Six patients had potassium levels  $> 6.0$ , but only one had a potentially clinically significant ECG change per the cardiologist. Conversely, two patients with computer-interpreted "normal ECGs" were ultimately admitted for cardiac intervention. Importantly, both patients had prior abnormal ECGs earlier in their ED visit, exemplifying dynamic ECG changes. Conclusions: Patients with computer-interpreted "normal ECGs" rarely have potentially significant ischemic events after ED workup. However, a rare number of patients will have important cardiac outcomes regardless of a "normal ECG". In this study, no "normal ECGs" required immediate cardiac catheterization lab activation.

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**11:30am Pinot B Health Policy 2**

## **1117 Identifying Roadblocks to Buprenorphine Prescriptions Per Specialty in Sacramento and El Dorado County**

Neeraj Ramakrishnan California Northstate University College of Medicine; Alana Friefeld California Northstate University College of Medicine; Aimee Moulin MD Department of Emergency Medicine UC Davis Health System; Joshua W. Elder MD, MPH, MHS Department of Emergency Medicine UC Davis Health System.

Background: Overdose deaths from heroin and prescription opioids have quadrupled over the last three decades in the United States. Buprenorphine has been demonstrated to be an effective outpatient opioid cessation drug, but relatively few healthcare providers prescribe it. There is an unequal distribution of provider specialties who prescribe this drug. The purpose of this study is to assess the attitudes and practices related to buprenorphine prescription in the

Sacramento and El Dorado Counties and to identify barriers to buprenorphine prescriptions. Methods: This is a descriptive study to identify provider practices, attitudes, and barriers towards buprenorphine prescriptions. X-waivered providers are individuals who have completed training that qualifies them to prescribe buprenorphine. We surveyed 36 of the 95 total X-waivered providers (38%) who practice in El Dorado and Sacramento Counties. Demographic information, physician specialty, current prescription practices, drug satisfaction, and barriers to prescription of buprenorphine were collected via phone interviews through a 19 question validated survey. Results: Descriptive analysis of the 36 interviews from X-waivered providers revealed the majority (92%) prescribe buprenorphine, but not to their full waiver capacity. Self-motivation was the most cited reason to become X-waivered (81%), while an institutional requirement was the least cited (8%). The most common motivations for prescribing buprenorphine was low overdose potential (91%), drug efficacy (85%), and low abuse potential (82%). The greatest barriers to buprenorphine prescription included poor reimbursement (46%), time constraints (39%), and patient preference for opioids (33%). More than half of the respondents (61%) prescribe buprenorphine for pain, an off-label use. Conclusion: Providers need more tools to manage patients with opioid use disorder. This study found that the majority of X-waivered providers in Sacramento and El Dorado Counties do prescribe buprenorphine, but there is limited representation from many physician specialties including emergency medicine. The authors propose recruiting more X-waivered providers, diversifying the type of physicians who prescribe, and addressing barriers like reimbursement and time constraints in order to increase buprenorphine prescriptions.

### **1137 Designing a Web-Based Referral Tool for Patients With Opioid Use Disorder in the Emergency Department**

Alex Schmalz MD, MPH Department of Emergency Medicine UC Davis Health System; Maggie Ohama; Tamanna Akluwalia; Joshua W. Elder MD, MPH, MHS Department of Emergency Medicine UC Davis Health System.

Background: Linking appropriate patients to opioid use disorder treatment is a critical role that emergency departments serve in prevention and treatment efforts to fight the opioid epidemic. An online referral tool linking patients with opioid use disorder to outpatient treatment has the potential to reduce barriers and improve this referral process. We conducted a community-based needs assessment of local emergency providers, counselors, and outpatient treatment centers in order to determine the need for a technology based linkage referral tool. Methods: Specific stakeholder engagement surveys were completed among local stakeholder participant groups (emergency physicians, counselors, and outpatient opioid use disorder treatment centers). Each group was surveyed on how the current linkage process occurs, current awareness of technology tools to facilitate process, and how technology could improve this linkage. Results: 66 surveys were completed (72% response rate); 30 from emergency providers, 23 from counselors, and 13 from outpatient treatment centers. Regarding the current linkage process, emergency providers mainly use hand-outs (43%) or a counselor (32%). Counselors mainly use hand-outs (78%) or called to place referrals via phone (23%). Outpatient treatment centers receive the majority of their referrals by phone (69%) with the minority come from emergency department referrals (5%). Regarding awareness of technology, 7% of emergency providers are familiar with available online referral tools (e.g. <http://findtreatment.samhsa.gov>) compared with 26% of counselors and 58% of outpatient treatment facilities. Regarding how technology could improve the linkage process, nearly all of the stakeholder participants (94%) cited the need for locally based technology to provide up to date information about local outpatient treatment options with insurance, capacity, and availability the most cited data elements. Conclusion: Less than 5% of local opioid use disorder referrals come from local emergency department. The stakeholder participants agreed on the need for a locally based online referral tool to provide up to date information to improve the referral process including particular data elements (insurance, capacity, availability). A locally based online referral tool ([www.connect2treatment.org](http://www.connect2treatment.org)) was developed based on this needs assessment.

### **2002 Are Variations in Syncope Admissions Associated with Malpractice Rates?**

James Quinn, MD MS Emergency Medicine, Stanford University; Audrey Murchland, MPH Stanford University; Giorgio Costantino, MD Internal Medicine University of Milan; Monica Solbiati, MD PhD Internal Medicine University of Milan; Raffaello Furlan, MD Internal Medicine Humanitas University; Giovanni Casazza, PhD Statistical Medicine University of Milan

**Background:** Most patients with syncope have benign causes and few are at risk for serious outcomes. Many low-risk Emergency Department (ED) patients are still admitted with large variation in admission rates. Some have suggested this variability is due to malpractice concerns. This study examined the admission rates of ED syncope patients based on rates of malpractice claims in different states. **Methods:** The Optum® de-identified Clinformatics® Datamart database is an insurance database that represents millions of Americans every year from 2003-2016 across 50 states. In 2015 the database contained approximately 16 million members. From this database we considered ICD-9 780. 2 and ICD-10 R 55 codes for syncope in 2015. We also utilized publicly available data on tort reform and rates of malpractice claims at the state level from the same year. We analyzed initial admission rates, 7-day admission rates, length of admission, associated codes for cardiac, neuro and cancer diagnoses, and death rates at 180 days for states with “high” > 19, and “low” ≤ per 100,000 persons. Spearman correlation coefficient was used to examine the differences between claims rate and tort reform. T-test and chi square test were used for parametric analysis. **Results:** There were 5. 15 million ED visits for in 2015, 1. 1% or 57,687 were for syncope with an overall ED admission rate of 22%. There were large ranges in malpractice claims rate (4-47/100,000) and admission rates (14%-34%) by state. Comparing states with “high” vs “low” malpractice claims, we found no clinically significant differences in age, sex, length of admissions, associated diagnoses (cardiac, neuro or cancer) or death rates at 180 days. However, states with “high” rates of malpractice claims admitted 11. 7% more patients (p< 0. 001), absolute difference 2. 6%, 23. 6% (95% CI: 23. 1%, 24. 1%) vs 21% (95% CI 20. 6%, 21. 5%). We found no correlation between malpractice claims rates and tort reform at the state level 0. 15 (95% CI: 0. 11, 0. 42). **Conclusion:** Admission rates of ED patients with syncope are higher in states with higher rates of malpractice claims. This may be due to perceived malpractice risk. Tort reform is not correlated to malpractice claims rate and is not a good proxy for malpractice risk.

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**1:00pm      Pinot A      Pediatrics I**

### **531      Racial Disparities in Opioid Prescriptions for Fractures in the Pediatric Population**

Emily Wing MD University of California Irvine Health; Soheil Saadat MD PhD; Rishi Bhargava MD, FAAP, FACEP Long Beach Memorial Medical Center; Bharath Chakravarthy MD, MPH University of California Irvine Health.

**Background:** Growing attention to the opioid epidemic in the United States has led to increased research of prescriber practice patterns, particularly in racial and ethnic biases. Racial disparities have been well documented in literature regarding pain management. However, few studies have focused on its effect in the pediatric population. This study seeks to examine the relationship between race and opioid prescription patterns for children with fractures. **Methods:** A retrospective study was conducted by studying prescription patterns of analgesia in pediatric patients in a large children’s hospital in California between 2012 and 2016. Patients’ ages ranged from 0 to 21, with the median being 10. All patients who were discharged home with a prescription for an analgesic medication were included in the study. Through multivariable logistic regression, we examined racial differences in opioid prescriptions for fractures upon discharge after adjusting for sex and age. **Results:** 58,402 analgesic prescriptions were reviewed in this study. Of these prescriptions, 5,061 were given for the primary discharge diagnosis of “fracture” of any bone. Overall, 52% of analgesics prescribed for this diagnosis contained opioid medications. The relative frequency of opioid prescriptions ranged from 22.6% in Hispanic whites to 39.4% in non-Hispanic white patients (p<0.001). Non-Hispanic white patients were prescribed more opioids compared to African-American patients (p<0.001) and also compared to Hispanic whites (p<0.001) after adjustment for sex, age, length of hospital stay, and location of fracture. **Conclusions:** Racial bias is suggested in opioid prescription patterns, even in the pediatric population. Non-white pediatric patients are less likely to receive an opioid prescription for their pain secondary to fractures. This study draws attention to the need for improved and standardized methods to adequately treat pain and reduce variations in prescriber habits.



### **532 Reducing Opioid Doses Prescribed From a Pediatric Emergency Department**

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**Background:** Opioid overdose and abuse have reached epidemic rates in the United States. Legitimate prescriptions are a large source of opioid misuse in adults and adolescents. The goal of this quality improvement project was to reduce opioid exposure from our pediatric emergency department (ED). **Methods:** Our aim was to reduce the total number of opioid doses prescribed weekly from the ED by 50% within 4 months. A multidisciplinary team reviewed baseline opioid prescribing data and developed a key driver diagram. Plan-Do-Study-Act (PDSA) cycle #1 (Feb-May 2018) interventions were the development of and education on hospital and ED opioid prescribing guidelines, a 5-dose default for ED discharge opioid prescriptions in the electronic medical record, and an educational handout for patients/families prescribed opioids. PDSA cycle #2 (June-Oct 2018) interventions were an educational poster for ED providers and provider specific feedback on individual opioid prescribing practices compared to the group. Primary measure was total opioid doses prescribed weekly from the ED. Process measures were total opioid prescriptions, mean opioid doses per prescription, and opioid prescriptions for unspecified abdominal pain, headache, and viral upper respiratory infection (URI). Balancing measures were phone calls and return visits for poor pain control in patients prescribed opioids and reports of poor pain control in call backs to orthopedic reduction patients. We used statistical process control to determine changes between pre- and post-intervention measures. **Results:** Total weekly opioid doses decreased from 153 (UCL 190, LCL 116) to 35 (UCL 53, LCL 18) post-intervention and equivalently when accounting for ED census. Total weekly opioid prescriptions decreased from 12.8 (UCL 23.5, LCL 2.1) to 4.4 (UCL 10.7, LCL 0.2) and weekly prescriptions for unspecified abdominal pain, headache, and viral URI decreased from 0.7 (UCL 3.1, LCL 0) to 0 (UCL 0, LCL 0). Mean opioid doses per prescription did not decrease with no special cause variation. Phone calls and return visits in patients prescribed opioids did not increase. There was one report of poor pain control amongst 69 orthopedic reduction patients called back post-intervention. **Conclusion:** We decreased total opioid doses prescribed weekly from the pediatric ED by 77% while minimizing return visits and reports of poor pain control.

### **789 Use of Supplemental Data Fields to Identify Additional Cases of Potential Abusive Head Trauma**

Joshua B. Gaither MD University of Arizona College of Medicine; Martyn Urquijo MD University of Arizona College of Medicine; Vatsal Chikani Arizona Department of Health Services; Robyn Blust Arizona Department of Health Services; Curtis Knoles MD University of Oklahoma College of Medicine; J. Joelle Donofrio DO University of California, San Diego/Rady Children's Hospital; Amber D. Rice MD; University of Arizona College of Medicine; Kurt Denninghoff MD The University of Arizona, SAEM Pediatric EM IG; Bentley J. Bobrow MD University of Arizona College of Medicine.

**Background:** In children, who are the victims of maltreatment, Traumatic Brain Injury (TBI) is the leading cause of death. Past attempts to identify patients with Abusive Head Trauma (AHT) with a state trauma registry (STR) using the Center for Disease Control and Prevention (CDC) "Broad Definition" have resulted in a surprisingly low incidence of AHT but high morbidity/mortality. The aim of this study was to determine if supplemental data fields, within a state trauma registry, could identify additional cases of AHT and if patient outcomes differ based on the method of identification. **Methods:** This was a retrospective review of TBI cases with age < 5 years (identified by ICD-9-CM code) in the Arizona STR from 1/1/2014 through 9/30/2015. Cases were excluded if missing demographic data or supplemental AHT data. Cases were then classified as: 1) CDC-AHT [cases meeting CDC definition of AHT], 2) STR-AHT [case with STR field for AHT but not CDC definition], 3) Accidental TBI [cases without CDC or STR criteria]. Differences between groups were then compared using simple descriptive statistics (Chi Square test) and logistic regression (reported as adjusted Odds Ratios

(aOR) with 95% confidence Intervals (CI)). Results: 1,120 cases were identified. Thirty-six were excluded for missing demographics or supplemental fields leaving: 157 CDC-AHT, 124 STR-AHT, and 816 Accidental-TBI cases included. Most AHT occurred in children under age 1 year with 78.9% of CDC-AHT and 62.9% of STR-AHT under 1 year of age vs. 32.2% Accidental-TBI ( $p < 0.0001$ ). Severe Injury (injury severity score [ISS]  $> 15$ ) and ICU admission were highest in the CDC-AHT group (37.6%, 59.2%) and lowest in the Accidental TBI group (9.3%, 27.9%). The STR-AHT category had 17.3% ISS $>15$  and 48.0% ICU admission. Mortality was the highest in CDC-AHT at 5.1%. Both STR-AHT and Accidental-TBI had Conclusion: Supplemental STR data fields identified additional cases of potential AHT. In our study, cases identified using the CDC-AHT criteria had a higher morbidity and mortality than did STR-AHT cases. Including these STR-AHT cases in general AHT reporting would likely decrease overall AHT mortality, injury severity and ICU utilization.

### **881 Marijuana in homes with kids: a parent survey on use, storage, and attitudes**

Alex G. Gimelli California Northstate University School of Medicine; Anusha Deshpande University of Health Sciences - College of Osteopathic Medicine of the Pacific; Julia N. Magana MD University of California Davis Medical Center; Aimee Moulin MD Department of Emergency Medicine, UC Davis.

Background: Little research describes the prevalence and attitudes of marijuana use, or storage practices in household with families. The study's objectives are to evaluate the prevalence and attitudes of marijuana use, as well as storage practices in homes with children. Methods: Research assistants in the Pediatric Emergency Department (PED) administered electronic anonymous surveys through RedCap to a convenience sample of 401 adults living with children. Participants answered 42 yes-no or likert scale questions regarding their marijuana use, storage, and attitudes. Data is described with basic statistics. Results: From 6/8/18 – 8/16/18, 558 adults living with children were approached and 401 (72%) consented. Of those 58/401 (15%, 95% CI 11.3, 18.4%) participants reported marijuana use in the home. The most common forms were inhaled marijuana (46/57, 81%, 95% CI: 68%, 90%) and edibles (22/57, 39%, 95% CI: 26%, 52%). For adults with household marijuana, the average safety score (1=Extremely Unsafe; 10=Extremely Safe) regarding adult use was 7.4/10 (95% CI: 6.73, 8.07). While adults with no household marijuana had an average safety score of 3.0/10 (95% CI: 2.72, 3.28). Most users (31/58, 54%, 95% CI 40%, 67%) do not keep their marijuana both locked and hidden. The most common source of storage advice was friends and family (21/41, 51%, 95% CI: 35%, 67%) with 11/41 (27%, 95% CI: 14%, 43%) citing this as their lone source. Only 9/41 users (22% 95% CI: 10%, 38%) reported receiving safe storage information from a dispensary; while 9/41 (22% 95% CI: 11%, 38%) report receiving no storage information whatsoever. The majority of users 50/58 (88%, 95% CI: 77%, 95%) reported feeling comfortable talking to their primary care provider about marijuana. Conclusion: A significant portion of PED patients are exposed to marijuana. Marijuana users are more likely than non-users to believe marijuana is safe around children. Many users do not store marijuana safely, but the most are willing to discuss marijuana with healthcare providers. Further investigation regarding safe marijuana storage practices and education in homes with children is needed. Healthcare providers should consider screening households for marijuana use and storage practices.

### **884 Transfer Patterns of Pediatric Patients in California Emergency Departments (2005-2015)**

Moon O. Lee MD MPH Stanford University School of Medicine; Jessica J. Wall MD, MPH, MCSE University of Washington School of Medicine; Olga Saynina Stanford University School of Medicine; Carlos A. Camargo MD, MPH, DrPH; Nancy E Wang MD Stanford University School of Medicine.

Background: Each year, there are 30 million ED visits by U.S. children, with approximately 300,000 transfers for more specialized care. Hospital and patient characteristics of these transfers are not well understood. Objective: To describe pediatric patient transfers in California EDs over ten years and to start identifying factors and diagnoses associated with transfers. Methods: A retrospective cohort study of all California ED visits by children age 0-17 years using the California Office of Statewide Health Planning and Development ED and Inpatient Discharge Data for 2005-2015. We categorized hospitals into 3 groups: adult hospitals without licensed pediatric beds, general hospitals (adult and pediatric beds), and

children's hospitals. Diagnoses were grouped by Clinical Classifications Software (CCS) diagnosis categories. We used descriptive statistics to report pediatric transfer patterns. Results: Of 29,341,606 ED visits by California children, 46% occurred in 227 adult hospitals, 42% in 103 general hospitals, and 12% in 6 children's hospitals. Across these 3 hospital groups, among all ED visits, discharges occurred in 96%, 93%, and 89%, respectively; admissions occurred in 1%, 5%, and 10%, respectively; and transfers occurred in 2%, 2%, and 0.3%, respectively. The age with the highest proportion transferred was 0-1 year old age group at adult hospitals (28%), but it was 15-17 years old age group for general hospitals (28%) and children's hospitals (29%). The top 3 CCS categories that were transferred out of adult hospitals were: diseases of the blood (25%), mental illness (20%), and neoplasm (16%). General hospitals transferred out: mental illness (24%), diseases of the blood (12%), and neoplasm (4%). Children's hospitals transferred out: complications of pregnancy and childbirth (24%), mental illness (14%), and conditions originating in the perinatal period (0.7%). Conclusion: California EDs within adult hospitals and general hospitals both transferred only 2% of pediatric visits and for the same top 3 CCS conditions which reflect specialty care needs. Adult hospitals were most likely to transfer infants. Further studies are needed to examine hospital and patient factors associated with pediatric transfers, and the clinical/educational implications of these transfer patterns.

### **900 The Utility of the Focused Assessment with Sonography for Trauma Enhanced Physical Examination in Children**

Aaron Kornblith MD University of California San Francisco; Chris Newton MD UCSF Benioff Children's Hospital Oakland; David Jaffe MD University of California San Francisco.

Background: Untreated intra-abdominal injury (IAI) resulting from blunt torso trauma (BTT) is a common cause of preventable death in children. Computed tomography (CT) is the gold standard for diagnosis of IAI but carries risk, including ionizing radiation. CT-sparing clinical decision rules have relied heavily on the emergency bedside physical examination. However, many of these rules are suboptimal given unacceptably low accuracy and the omission of some clinically useful variables, including the Focused Assessment with Sonography for Trauma (FAST). The FAST is a point-of-care ultrasound evaluation performed to enhance the physical examination to rapidly detect traumatic hemorrhage and guide clinical decisions. The FAST has been shown to improve clinical outcomes in adults but not yet in children. However, the FAST has gained widespread acceptance and been incorporated into Pediatric Emergency practice in the last decade. We sought to determine variables independently associated with IAI in children with BTT, including the FAST, in a free-standing Level 1 pediatric trauma center. Methods: We conducted a retrospective review of the hospital's trauma registry and identified all children with FAST for BTT from 2013 to 2015. We collected demographic and clinical information, and reviewed FAST images. We created a multivariate logistic regression model to determine independent variables associated with IAI and then we determined their test characteristics. Results: Among the 354 children presenting for BTT, 50 (14%) had IAI. In the multivariate analysis, FAST and physical examination were the only independent predictors of IAI. The FAST-enhanced physical examination had a sensitivity of 44 of 50 (88%; 95% CI, 76-96%), specificity of 217 of 304 (71.4%; 95% CI, 66-76%), negative predictive value of 217 of 223 (97.3%; 95% CI, 94.5-98.7%), positive predictive value of 44 of 131 (33.6%; 95% CI, 29.2-38.3%), likelihood ratios: positive 3.1 (95% CI, 2.5-3.8%), negative 0.17 (95% CI, 0.1-0.4%). Four of the 6 false-negative FASTs (67%) were true-positive on expert over-read. Conclusion: FAST and physical examination were independent predictors of IAI in children with BTT. The FAST-enhanced physical examination may be a useful variable in refining clinical prediction rules in children BTT.

### **956 Feasibility of Intranasal Ketamine for Pediatric Procedural Sedation: An Initial Descriptive Report**

Vivienne Ng MD, MPH University of Arizona College of Medicine; Priti Rawani-Patel MD University of Arizona College of Medicine; Lindsey Retterath MD University of Arizona College of Medicine; Daniel Jarrell PharmD, BCPS, BCCCP University of Arizona.

Background: Ketamine is a commonly used pediatric sedative, also offering analgesia, amnesia, and limited mobility. Usually delivered intravenously (IV) or intramuscularly, it can also be given intranasally, which is an attractive option to minimize distress. Intranasal ketamine (INK) use is reported but not well described in pediatric emergency department (PED) settings. We aim to evaluate the efficacy, safety, and feasibility of INK for children undergoing minor procedures in the PED. Methods: This is a prospective single-arm feasibility study conducted in a single PED that included children ages 2-7 years, body weight  $\leq 20$  kg, without oral intake for at least four hours, who underwent procedural sedation. Subjects received one 10 mg/kg INK dose for sedation. Data collected included demographics; patient position; vital signs before, during, and after sedation; drug administration method; need for rescue medication (drug, dose, route); and adverse effects (apnea  $>10$  seconds, jaw thrust or bag valve mask ventilation, hypersalivation needing suction or treatment, stridor, vomiting). The primary outcome is successful procedure completion without rescue medication. Descriptive data is presented. Results: Eleven patients met inclusion criteria and were approached; one parent declined. Four of the 10 patients who completed the protocol were male. The average age was 3.6 years (range 2-5) and weight 16.5 kg (range 11.2-19.7). Procedures included 6 laceration repairs, 3 fracture reductions, and 1 foreign body removal. Six required IV and INK rescue medication at provider discretion. One patient vomited after sedation recovery and one had hypersalivation after rescue medication delivery that did not require suction or treatment. No other adverse events occurred. All patients successfully completed the intended procedure. Enrollment is ongoing. Conclusion: INK for analgesia in adult and pediatric populations is well described but less so for procedural sedation, particularly in children. In this preliminary report, we describe safe use of INK as the initial sedative for minor pediatric emergency procedures, however concluding that INK is an adequate sole agent is difficult with small numbers. With additional enrollment, we hope to identify a clear pattern when INK can be utilized for sedation, thereby providing a less distressing experience for pediatric patients.

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**1:00pm**                      **Pinot B**                      **Toxicology**

**84      Caterpillar Clinical Effects: A Review of 17 years of Poison Control Centers' National Poison Data**

Russell Means MD Banner University of Arizona Tucson Emergency Medicine Residency; Robert French MD, MPH University of Arizona, Tucson; Tomas Nuno PhD University of Arizona College of Medicine.

Background: Caterpillars, the larval form of the order Lepidoptera, have multiple mechanisms of defense that can cause significant reactions in humans. Stinging spines and fiberglass-like setae can cause mechanical irritation or serve as vehicles for chemical irritants and toxins. The purpose of this study was to describe human exposures to caterpillars reported to United States (US) poison control centers (PCC). Methods: The American Association of PCC's National Poison Data System (NPDS) was used to access and retrospectively review all calls to US PCCs, concerning caterpillars between January 1, 2000 and January 1, 2017. Results: A total of 27,103 cases regarding human exposures to caterpillars were identified in the NPDS and analyzed for our study. The median age of those exposed was 16. Exposures occurred during all months of the year, peaking in September. While present in all 50 states they were most common in the southeast and least common in northern Midwest. Presentations were mostly dermal stings (76.3%), a few ingestions (12.3%) and rare ocular (0.4%), otic (0.01%) and inhaled exposures (0.01%). Most (86.5%) cases were managed on site and 11.97% of cases were seen at a health care facility. Medical outcomes were predominately minor with only (4.2%) moderate medical outcomes and (0.07%) major events. There were no reported deaths. The most frequent symptoms reported were dermal irritation (67.57%) including erythema, hives, edema and pruritus which rarely resulted in cellulitis (0.06%) or necrosis (0.01%). Gastrointestinal, neurologic and respiratory symptoms such as vomiting (0.58%), headache (0.2%) and dyspnea (0.22%) occurred rarely. Treatment most commonly included decontamination or irrigation (50.78%) and medication with antihistamines (12.68%) and steroids (4.77%). Very rarely were serious interventions with bronchodilators (0.04%), vasopressors (0.01%) and mechanical ventilation (0.01%) implicated. Conclusion: Caterpillar exposures were most common in late spring through early fall and predominant in Southeastern US. Mild dermatologic effects were present in the majority of caterpillar exposures reported to poison centers. Serious complications were

rare but included respiratory distress, neurologic dysfunction, syncope and seizures that in rare incidences required advanced life support.

### 103 Possible Buprenorphine Toxicity in a Breastfeeding Neonate

Alyrene Dorey MD University of California, Davis, School of Medicine; Kelly Owen MD; James Chenoweth MD; James Catlin; Jonathan Ford MD University of California, Davis, School of Medicine.

Background: Buprenorphine is an acceptable alternative for medication-assisted treatment (MAT) of opioid use disorder during pregnancy and is associated with lower risk of neonatal abstinence syndrome (NAS). Buprenorphine has not previously been associated with adverse effects in breastfeeding neonates and new mothers are encouraged to continue buprenorphine while breastfeeding. Case Presentation: A full term, previously healthy 2-week-old male was brought to an Emergency Department (ED) for somnolence and decreased feeding. Upon arrival he was lethargic with pinpoint pupils and initial Glasgow Coma Score 5. His blood glucose was 79mg/dL. He received Naloxone 0.15mg twice after which he cried and had improved tone. His mother was undergoing MAT and had been taking buprenorphine 8mg twice daily for several months. She denied illicit substance use. Patient was exclusively breastfeeding. Neither was taking other medications. He was transferred to our hospital where he had negative infectious studies and extended toxicologic screen. He had recurrent hypoglycemia requiring intravenous dextrose. He again received Naloxone 0.15mg for pinpoint pupils, bradycardia and lethargy, with some improvement. Urine buprenorphine metabolites were sent approximately 16 hours after symptom onset (table 1). Breastfeeding was stopped. Over the next 3-5 days he developed signs and symptoms of NAS however morphine rescue was not required. Discussion: Buprenorphine is metabolized to active metabolites norbuprenorphine, norbuprenorphine-glucuronide and buprenorphine-glucuronide. The latter two caused sedation and respiratory depression in an animal model. A previous study of 9 asymptomatic breastfeeding infants of mothers taking buprenorphine found undetectable serum metabolites. Our patient had detectable urine metabolites and demonstrated both opioid intoxication and NAS.

Buprenorphine	< 2ng/mL
Norbuprenorphine	13 (< 2ng/mL)
Buprenorphine glucuronide	< 5ng/mL
Norbuprenorphine glucuronide	11 (< 5ng/mL)
Naloxone	< 100

Possible explanations for this are inherent or induced variability in maternal or neonatal CYP3A4 activity, or impaired neonatal P-glycoprotein activity. Future work could correlate presence of metabolites and symptoms in neonates. Mothers using buprenorphine should remain vigilant for signs of opioid intoxication in breastfeeding neonates.

### 735 Arrhythmogenic Antitussive: A case report of pediatric cardiac arrest following benzonatate overdose

Mary Billington MD UT Southwestern; Jakub Furmaga UT Southwestern; Thomas Schaeffer UT Southwestern.

Benzonatate is a commonly prescribed antitussive. Ingestion can result in rapid and deadly toxicity. Toxicity is primarily cardiac, however, laryngospasm and bronchospasm have been described. We report the case of a 14-year-old female who, in a suicidal attempt, ingested 14 capsules of 200mg benzonatate. She was brought to an emergency room 15 minutes post-ingestion, where she was found to be pulseless and in torsades-de-pointes. After cardiopulmonary resuscitation with rapid return of spontaneous circulation, she was intubated and transferred to a children's hospital. She ultimately recovered without neurologic or other complications. Her case represents the only reported benzonatate overdose with torsades-de-pointes as the presenting ventricular dysrhythmia. It also represents the only reported pediatric benzonatate ingestion complicated by cardiac arrest but with full clinical recovery.

## **955 Altered Immune Markers in Emergency Department Patients Who Self-Reported Alcohol Consumption**

Maria Nguyen University of California, Irvine School of Medicine; Ghadi Ghanem University of California Irvine Health; Christine Louis University of California Irvine School of Medicine; Preet Kaur; K. Sahota MS University of California Irvine Health; Anshu Agrawal; Sudhanshu Agrawal UC Irvine Health; Soheil Saadat MD PhD; Wirachin Hoonpongsimanont MD, MS.

**Background:** Alcohol consumption is a known modulator of immune function. Heavy alcohol use has been associated with impaired response to infection and negatively impacts patient morbidity and mortality. Literature has shown alcohol exposure to increase inflammatory cytokines and susceptibility to respiratory pathogens; however, the majority of these studies were performed in animal models and in vitro. In this study, we aimed to identify specific immune markers that were altered in emergency department (ED) patients who reported alcohol consumption. **Methods:** We conducted a prospective study from June 2018 to December 2018 at a university-based, level-one trauma ED. We included all adult, English-speaking patients; we excluded patients who were incarcerated, pregnant, under psychiatric hold, or had a history of transplant operation, cancer, or immunodeficiency disorder. Each patient completed the Alcohol Use Disorders Identification Test (AUDIT), a self-report alcohol use survey developed by the World Health Organization. The AUDIT scores generated from the patients' responses range from 0 to 40, with higher scores indicating a greater risk of developing alcohol dependence. Peripheral blood mononuclear cells (PBMCs) were stimulated with heat-killed *Staphylococcus aureus* (HKSA) or inactivated Influenza A virus for 5-6 days. PBMCs and cytokines were acquired on a flow cytometer and analyzed using the Flow Jo software. We compared immune marker levels between patients reporting no alcohol consumption, as indicated by an AUDIT score of 0, and patients with self-reported alcohol consumption, as indicated by an AUDIT score above 0. **Results:** A preliminary sample of 18 patients participated in this study; 12 patients had AUDIT scores of 0, and 6 patients had AUDIT scores above 0. The following inflammatory cytokines were significantly increased in patients with AUDIT scores above 0: interleukin (IL) 1 beta, IL-6, IL-10, IL-17, IL-22, and tumor necrosis factor alpha (all p-values < 0.05). **Conclusion:** Self-reported alcohol consumption was associated with significantly elevated inflammatory cytokines and increased host susceptibilities to HKSA and Influenza A virus. ED providers should thus be aware of the potentially-impaired immune response in patients who self-report alcohol use.

## **1018 Pulmonary Injury and Outcomes Data in Butane Honey Oil Explosion Victims: A Descriptive Study**

Walid Hamud-Ahmed UCSF Fresno; Crystal M. Ives Tallman MD University of Michigan.

**Background:** Emergency departments and burn intensive care centers across the country are witnessing a climbing rate of burn victims from accidental explosions from butane honey oil (also known as hash oil, a high-potency cannabis extract). In our clinical experience, the presentation of pulmonary injuries after such incidents can be quite severe, requiring intubation, ventilator support, and in some cases, extracorporeal membrane oxygenation (ECMO). While burn injury patterns have been described in this cohort, there is a paucity of literature detailing the degree of pulmonary injury. **Methods:** A retrospective chart review was performed of patients who suffered injuries from a honey oil explosion and admitted to a major regional burn center from 2012 to 2017. Variables collected included patient demographics, percent total body surface area (TBSA) burned, rate of ICU admission, ICU length of stay, overall hospital length of stay, need for Parkland fluid resuscitation, need for operative intervention, and all-cause mortality. To assess the severity of pulmonary injuries, variables of interest included arterial blood gas (ABG) data with associated P:F ratios, rate of endotracheal intubation, the number of ventilator days, rate of tracheostomy placement, and need for extracorporeal membrane oxygenation (ECMO). **Results:** 37 patients with confirmed butane honey oil injuries were reviewed. 34 (92%) were men. Mean age was 30 (+/- 10). 20 (54%) were admitted to the ICU. Mean ICU length of stay was 10 days (+/- 19). Mean hospital length of stay was 30 days (+/- 36). Mean TBSA burn was 25% (+/- 19%). 16 (43%) required Parkland fluid resuscitation. 34 (92%) required surgical intervention. The average number of operations per patient was 5 (+/- 6). 5 patients (13.5%) had a calculated P:F ratios of less than 300 on Day 0, suggesting early

development of hypoxemia. 9 (24.3%) dropped below 300 at some point in the initial 5 days of hospitalization. 17 (46%) were intubated, of which 15 were intubated on Day 0 for airway protection. Mean ventilator-dependent days were 9 (+/- 19). 8 (21.6%) had tracheostomy placement. 3 (8.1%) required ECMO. 2 patients died during the study period (all-cause mortality of 5.4%). Conclusion: Pulmonary injury in victims of butane honey oil explosions can be quite severe, and as a cohort experience a clinically significant degree of morbidity and mortality.

### **1375 Case of a patient with a digoxin concentration of 13.5ng/mL successfully treated without digoxin-specific antibody**

Patrick Ng MD Uniformed Services University of the Health Sciences; Keith Baker MD Rocky Mountain Poison and Drug Center; Christopher Hoyte MD University of Colorado.

Background: Digoxin is a xenobiotic used to treat patients with conditions such as heart failure with reduced ejection fraction and atrial fibrillation. By cardiac myocyte sodium/potassium ATPase inhibition, digoxin leads to an increase in intracellular calcium which results in increased contractility as well as decreased atrioventricular node conduction. Currently, digoxin-specific antibody fragments serve as a therapeutic option in patients with digoxin toxicity, however the indications for digoxin-specific antibody fragments are inconsistent, and some sources report a serum digoxin concentration of >12ng/mL as a treatment indication. Methods: A retrospective chart review was performed for a patient presenting with a high digoxin concentration that was managed without digoxin-specific antibody fragments. Results: A 75 year-old woman presented to a local emergency department with lip swelling that resolved prior to evaluation without any interventions. She had a recent hospitalization for heart failure and was discharged on digoxin.

Her review of systems was positive for a baseline, intermittent confusion per family, as well as sharp chest pain. Initial vitals include BP 98/28, HR 104, RR 18, SpO2 of 94% on 3L/min of oxygen. Exam revealed a 2/6 systolic murmur, a pacing device in the chest wall, dry mucus membranes and disorientation to place and situation, which was reported to be her baseline mental status per family members. Work up was significant for a ventricular paced rhythm at a rate of 96 on EKG, serum creatinine of 1.2mg/dL, troponin of 0.08ng/mL and digoxin concentration of 13.5ng/mL. Given report of patient presenting at her baseline, without any complaints on bedside exam, the decision was made to treat the patient with supportive care. She was discharged on hospital day 6 with normal vital signs, asymptomatic and without any arrhythmia or adverse events during hospital stay. Conclusion: We present a case of a patient with a digoxin concentration of 13.5ng/mL secondary to medication dosing error that was treated without digoxin-specific antibody fragments. An elevated serum digoxin concentration does not necessitate treatment with antibody.

### **1385 Use of Novel Drugs of Abuse in Adolescents Reported to National Poison Data System, 2007-2017**

Patrick Ng MD Uniformed Services University of the Health Sciences; Shireen Banerji Jessica Graham; Jan Leonard; George Wang.

Background: As many as 25% of adolescents report illicit drug use in their lifetime. Many surveillance methods do not ask about novel drugs of abuse (new synthetic drugs and analogs of older illicit drugs). Drug compounds are constantly changing, making surveillance difficult. However, because novel drugs can be associated with significant morbidity and mortality, surveillance is critical. We sought to describe trends and characteristics of United States poison center calls for use of novel drugs of abuse in adolescents. Methods: We conducted a 10-year retrospective review of exposure calls to all United States poison centers for adolescents. The National Poison Data System was searched for generic codes for synthetic cathinones, loperamide, synthetic cannabinoids, fentanyl and analogs, lysergic acid diethylamide and analogs, 2C compounds, khat, hallucinogenic amphetamines, and phenylcyclidine. Age, sex, management site, outcomes, and calls for each category of substance was obtained. Descriptive statistics were performed, and call trends were analyzed by Poisson Regression. Results: 23,687 exposure calls were reported to the National Poison Data System for novel drugs of abuse(2007-2017). The median age was 16 years, and 66% were male. Synthetic cannabinoids (10,586; 45%) and

hallucinogenic amphetamines (5,649; 24%) accounted for the most calls. Most exposures were evaluated in a healthcare facility (69-97%). Hallucinogenic amphetamines (n=20), synthetic cannabinoids (13), 2C drugs (12) and fentanyl (9) accounted for the most number of deaths. A high proportion of exposures had moderate or major effects (48-70%). The rate of synthetic cannabinoid exposure calls per 1,000 NPDS calls peaked in 2011 and have declined (RR=0.85; 95% CI 0.76-0.95), while the rate of lysergic acid diethylamide exposure calls per 1,000 NPDS calls increased (RR=1.19; 95% CI 1.01-1.42). Conclusion: Adolescent novel drug abuse has a significant public health impact. The most commonly reported novel drugs were synthetic cannabinoids, hallucinogenic amphetamines, and lysergic acid diethylamide. Synthetic cannabinoid exposures have declined. Further studies are needed to evaluate the health impact that novel drugs of abuse have on this vulnerable population.

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**1:00pm**      **Pinot C**      **Health Policy 3**

**683      Evaluating Frequent Emergency Department Users Missed by Single Facility Data**

Isabel Ostrer AB University of California San Francisco School of Medicine; Maria C. Raven MD, MPH; Hemal Kanzaria MD, MSc University of California San Francisco/Zuckerberg San Francisco General Hospital.

Background: Frequent emergency department (ED) users are typically defined as patients who have >4 ED visits annually. Because data across hospitals are not normally integrated, frequent users are often identified from visits to a single ED. This can negatively impact patient health, for example, by increasing risky opioid prescribing or duplicative diagnostic testing. The Emergency Department Information Exchange (EDIE) is an IT platform that identifies visits at every ED on the platform, in order to facilitate care coordination. Eight of ten EDs in San Francisco County have implemented EDIE. We used EDIE to determine how many frequent ED users are “missed” when using single facility data, and to quantify how often frequent ED users visit multiple EDs. Methods: We analyzed EDIE data from October 2017 to September 2018. Our sample included 74,878 patients, who comprised all ED users at two hospitals in SF, and captured any additional visits to over 125 other EDs on the EDIE platform. We stratified patients into ED use categories based on prior literature. Occasional ED use was defined as 1-3 ED visits/year, frequent as >4 visits/year, and super use (a subset of frequent use) as >18 visits/year. We analyzed the two hospital data sets separately to identify frequent users “missed” using single facility data and examined how often frequent ED users visited more than 1 ED. All analyses were performed using Stata version 15.1. Results: 9,581 of 74,878 patients (12.8%) met criteria for frequent ED use. Classifying ED users using single facility data significantly underreported frequent ED use uncovered via the EDIE data: 3,492 (36.4% of frequent users) and 3,475 (36.3% of frequent users) were missed at each of the two referent hospitals, respectively. In total, 4,740 patients (nearly half) of actual frequent users were missed using single facility data. The number of EDs visited increased with annual ED visit frequency. Only 9% of occasional users visited >1 ED, while 66% of frequent users, and 93% of super users visited >1 ED. Conclusion: Single facility ED data cannot be used to accurately classify patients as frequent ED users or to quantify their visits. We found that as patients’ rate of ED use increases so does the number of hospitals they visit. These findings support the need for enhanced identification and care coordination capabilities using integrated data.

**1073      Effects of Traffic Patterns on Access to Comprehensive Stroke Care in Los Angeles County**

Daniel A. Dworkis MD, PhD University of Southern California, Keck School of Medicine; Sarah Axen Ph.D. University of Southern California, Keck School of Medicine; Sanjay Arora MD University of Southern California, Keck School of Medicine.

Background: Optimizing regional systems of emergency stroke care requires understanding geospatial patterns in access to comprehensive stroke centers (CSCs). In Los Angeles County (LAC), emergency medical services (EMS) skip closer hospitals and transport patients with suspected large vessel stroke directly to a CSC only if the expected transport time is ≤ 30 minutes. In addition to areas which always or never have access to a CSC within 30 minutes, we hypothesized



that this policy would result in areas which sometimes had access, depending on traffic. Methods: We performed a prospective geospatial analysis of drive times to CSCs during various traffic conditions at the US census block group level. For each census block group, we identified the closest CSC in LAC and estimated drive time to it using the Google Maps Distance Matrix API. Drive times were sampled 12 times for each block group across morning and afternoon traffic peaks, between the peaks, and in the late evening. Each block group was then defined as sometimes, always, or never having access to a CSC depending on drive times  $\leq 30$  minutes. Comparisons between access groups were performed using ANOVA and multinomial logistic regression. Results: Among the 6,415 census block groups in LAC, the median straight-line distance to a CSC was 6.8Km (IQR 3.9-10.0Km) with an associated median driving time to this closest hospital across all traffic conditions of 14.6 minutes (IQR 9.8-19.5 minutes). 5,213 census block groups (79.6%) always had access to a CSC within 30 minutes of driving time, 225 (4.9%) never had access, and 977 (15.5%) sometimes had access. Geospatial analysis showed that the never group was mostly in rural LAC. The sometimes group occurred not only at the borders of the always and never groups, but also in large areas in south-central and eastern Los Angeles. Regression analysis showed the sometimes group as distinct in key demographic characteristics including insurance status, income, race, and age. Conclusion: Traffic strongly impacts access to CSCs in LAC, resulting in highly-populated urban areas within the borders of Los Angeles which only sometimes have access to CSCs. Further work is needed to understand the unique barriers to stroke care faced by these sometimes areas, as well as to optimize stroke care delivery across a county with highly variable traffic patterns.

#### **1104 Assessing Local California Trends in Emergency Physician Opioid Prescriptions from 2012 to 2018**

Joshua W. Elder MD, MPH, MHS University of California, Davis, School of Medicine; Simson Hon University of California, Davis, School of Medicine; Jeehyoung Kim MD Seoul Sacred Heart General Hospital, Seoul, Korea; Aimee Moulin MD University of California, Davis, School of Medicine; Heejung Bang PhD University of California, Davis; Aman Parikh MD University of California, Davis, School of Medicine; Larissa May MD, MSPH, MSHS University of California, Davis, School of Medicine.

Background: There has been increased focus nationally on limiting opioid prescriptions. National data demonstrates a decrease in annual opioid prescriptions among emergency medicine physicians. We analyzed data from 2012 to 2018 to understand trends in our local California opioid prescribing patterns for emergency department (ED) discharged patients and assessed the impact of two initiatives at limiting local opioid prescriptions. Methods: From March 2012 until August of 2018 monthly ED visit data was used to evaluate total opioid use, percent of ED visits with opioid prescriptions, and the mean number of opioid pills prescribed. Descriptive statistics, graphic representation, and segmented regression were used based on two prespecified time points associated with intensive local initiatives directed at limiting opioid prescribing. Results: Between 2012-2018, a total of 41,290 ED discharged patients received an opioid prescription. The three most commonly prescribed drugs were hydrocodone (83.2%), oxycodone (9.7%) and codeine (3.7%). In 2012, the annual number of opioid prescriptions was 668(+/-77.4) and decreased to 291(+/-16.7) in 2018. In 2012, the mean pill count was 18.6 (+/-10.3), which decreased to 13.5(+/-6.4). After comprehensive emergency medicine resident education a significant decrease was observed; about 5 times larger slope (-104) for total count and 2 times larger slope (-2%) for percent measure, p-value 0.19). Pill counts demonstrated similar trends – strong decreasing trend since baseline to the first changepoint (slope of -0.33 with p=0.01) and followed by further decrease (-1.03 with p=0.03 after the first changepoint and -0.12 with p=0.84 after the second). Conclusion: From 2012 to 2018, we found that opioid prescriptions decreased significantly for discharged ED patients. While we implemented two interventions, the trends noted here represent an overall change in practice, with heightened effects from these two specific interventions. Determining the impact of legislative, policy, and educational initiatives on opioid prescriptions is important in directing future efforts.

#### **395 Effects of Mobile Health With Social Support on Emergency Department Utilization by Patients with Diabetes**

Liza R. Raffi University of Southern California, Keck School of Medicine; Janisse Mercado BA University of Southern California, Keck School of Medicine; Nefertari Rincon Guerra B.A. University of Southern California, Keck School of Medicine; Alex Chang University of Southern California, Keck School of Medicine; Christian Perez University of Southern California, Keck School of Medicine; Erika Ayar; Alexander Ruiz; Crystal Vargas; Adriana Berumen University of Southern California, Keck School of Medicine.

**Background:** Mobile health (mHealth) - the use of mobile phones to provide medical care and education - offers a low-cost way to integrate a patient's friend or family member into their diabetes management. ED-based mHealth programs have reduced ED utilization, but none have involved a family or friend as a social supporter. Increasing social support has been shown to improve health outcomes, particularly in lifestyle-dependent conditions such as diabetes. In this study, we examine changes in healthcare utilization for ED patients enrolled in an mHealth intervention designed to improve social support and diabetes self-care. **Methods:** We recruited ED patients with  $HbA1C \geq 8.5$  and a patient-designated supporter. All patients received TExT-MED, a mHealth program for patients with diabetes. Supporters were randomized to receive a curriculum (FANS intervention, Family And friends Network Supporter) of social support text messages or the same FANS curriculum in pamphlet form (active control). We reviewed electronic medical records to determine the change in scheduled clinic visits, Emergency Department/Urgent Care Center (ED/UCC) visits, and hospitalizations in the 6 months preceding and following first intervention text-message. **Results:** Of 113 patients who completed 6 months of the intervention, 112 had follow-up data for analysis, 1 patient excluded for  $>40$  ED visits in study period. Overall, patients increased scheduled clinic visits (mean increase 1.4 visits, (95%CI 0.4 to 2.4,  $p < 0.001$ )) and decreased ED/UCC visits (mean decrease -1.1 (95%CI -1.5 to -0.7,  $p < 0.01$ )). Compared to the active control, TExT-MED+FANS did not significantly change clinic visits, ED/UCC visits, or hospitalizations. Both arms combined exhibited a trend towards decrease in hospitalizations (mean decrease 0.14 hospitalizations,  $p = 0.14$ ). **Conclusion:** Overall, the TExT-MED intervention led to a significant decrease in Emergency Department or Urgent Care Center utilization and increased scheduled clinic appointments. This intervention directed patients towards less costly care venues. The modest decrease in hospitalizations suggests another potential avenue of health savings. Through reducing the number of unplanned care visits for uncontrolled diabetes, mHealth can reduce costs to health care systems and hospitals, in addition to improving patients' health.

### **317 Effects of Mobile Health on Emergency Department Patients With Diabetes With Social Supporters**

Alex Chang; Christian Perez University of Southern California, Keck School of Medicine; Liza R. Raffi University of Southern California, Keck School of Medicine; Travis Eurick B.S. University of Southern California, Keck School of Medicine; Alyssa Sanchez; Vanessa Garcia LAC+USC Medical Center; Janisse Mercado BA University of Southern California, Keck School of Medicine; Nefertari Rincon Guerra B.A University of Southern California, Keck School of Medicine; Adriana Berumen University of Southern California, Keck School of Medicine.

**Background:** Patients with diabetes have increasingly been utilizing EDs for acute and chronic care. Mobile health (mHealth)- the use of mobile phones to provide medical care and education- offers a low-cost method to increase healthy behaviors among patients with diabetes. While ED-based mHealth programs have improved diabetes behavior in the past, it is unknown if a social support component increases the efficacy of these programs. In this study, we examine whether social support-augmented mHealth (TExT-MED+FANS (TExT-MED+Friends and Family Supporters)) increases diabetes self-care activities compared to minimally augmented social support (TExT-MED) in ED patients with poorly controlled diabetes after 6 months. **Methods:** We recruited ED patients with  $HbA1 \geq 8.5$  and a text-capable mobile phone. Patients selected a relative or friend to be their social supporter. All patients received TExT-MED, a mHealth program for patients with diabetes consisting of educational and healthy lifestyle challenge text messages. Supporters were then randomized to receive a curriculum (FANS) of social support text messages or the same FANS curriculum in paper form (control). The outcomes measured were change in self-report of diabetes self-care activities (SDSCA) and medication adherence (Wilson 3-Item Scale). **Results:** Of 98 patients enrolled, 66 had follow-up data for analysis. Overall, all patients improved in days of healthy eating (mean increase 1.4 days,  $SD = 2.8$ ,  $p = .001$ ), days of adherence to diet plan

(+0.74, SD=2.0, p=.004), days of footcare (+1.6, SD=2.8, p=.0001), and medication adherence (13.0 percentile increase, p=.002). Compared to control, TExT-MED+FANS did not significantly improve self-care behaviors but did see a trend toward improvement in days of healthy eating (mean increase 0.91 days in FANS versus 0.59 control) and exercise (+0.25 versus +1.14). Conclusion: TExT-MED patient intervention overall led to statistically significant increases in healthy eating, adherence to diet, footcare, and medication adherence. While the increased social support offered via TExT-MED+FANS did not result in statistically significant change in SDSCA, there were observed increases in healthy eating and exercise. mHealth technologies offer a low-cost strategy to engage patients in healthy diabetes behavior and may have an even greater effect when involving loved ones.

### **392 Role of Health Literacy in Mobile Health for ED Patients with Uncontrolled Diabetes**

Christian Perez University of Southern California, Keck School of Medicine; Liza R. Raffi University of Southern California, Keck School of Medicine; Alex Chang University of Southern California, Keck School of Medicine; Hector Moreno Rojas University of Southern California, Keck School of Medicine; Ariadna K. Cruz; Jennifer Gonzalez University of Southern California; Janisse Mercado BA University of Southern California, Keck School of Medicine; Nefertari Rincon Guerra B.A. University of Southern California, Keck School of Medicine; Adriana Berumen University of Southern California, Keck School of Medicine.

Background: Mhealth (mobile health) interventions have provided a way for EDs to aid patients in the management of chronic diseases, including diabetes. However, little is understood about the role that health literacy plays in mHealth interventions, as low health literacy is associated with low self-efficacy and subsequent poor health outcomes, particularly in diabetes. In this study we evaluate the effects of health literacy on changes in self-efficacy in ED patients participating in a text-message intervention for uncontrolled diabetes. Methods: Patients with uncontrolled diabetes (HbA1C>8.5) and family members were enrolled in a mHealth intervention designed to improve social support and diabetes self-care available in English and Spanish. Patients reported their demographics, English proficiency and completed a health literacy screen at enrollment. Diabetes specific self efficacy was assessed at enrollment and 3-months. The "Brief Health Literacy Screen" (BHLS) was used to evaluate patient health literacy levels. BHLS of 5 and above was categorized as high health literacy (HHL), while < 5 was categorized as low health literacy (LHL). The "Diabetes Empowerment Scale Short Form" (DES-SF) was used to quantify self efficacy. We examined changes in self-efficacy based on baseline health literacy. Results: 90 patients were enrolled and had data available for follow-up at 3 months. Baseline HbA1C's ranged from 8.5% to 15.5%, with a median (interquartile range) of 10.3% (9.4% to 11.7%). Patients were 54% female with ages ranging from 21 to 65 with a median of 47 years. 96% reported Hispanic/Latino ethnicity with 71% Spanish language preference. Of Spanish speakers, self-reported English proficiency was as follows: 70% not well at all; 20% not well; 9% well; 1% very well. Overall, self-efficacy improved for all patients (LHL mean change in self efficacy: 4.3 vs. HHL mean change in health efficacy 1.9, p 0.089). Patients with LHL showed a trend toward greater change in self-efficacy compared to those with HHL at their 3 month follow up. Conclusions: In this study of ED patients with diabetes, all patients displayed increased self-efficacy; however LHL patients had slightly greater improvements than HHL patients. Mhealth may be particularly effective for patients with difficulty accessing medical information in more traditional formats.

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### **2:00 Pinot A Pediatrics 2**

#### **1122 The Practice Patterns of Emergency Physicians Obtaining Additional Training in Pediatrics**

Danielle Dardis; Kathryn Hodgdon; James Dill; Dale Woolridge MD, PhD University of Arizona College of Medicine Tucson Department of Emergency Medicine; Aaron N. Leetch MD University of Arizona College of Medicine.

Introduction: Pediatric patients account for a large U.S. Emergency Departments (ED), 20% of U.S. children presenting each year, with the majority (83%) presenting to EDs within their community. These are mostly staffed by emergency

physicians (EP), while the majority of Pediatric Emergency Medicine (PEM) specialists (90%) practice in children's hospitals. The American Board of Medical Specialist (ABMS) national database show EPs seeking training in pediatric care do so through additional board certification in pediatrics or via PEM fellowship. We attempt to characterize this here. Methods: Data from the ABMS database was reviewed to identify board certifications and methods of eligibility (training versus practice track). Information including address of practice was obtained from double verified online searches via websites such as US News and Doximity. Teaching hospitals, children's hospitals, and dedicated pediatric EDs were obtained from Centers for Medicare and Medicaid Services, Children's Hospital Association, and self-listed institutional online reporting. Accuracy in data collection was determined by blinding the data extractor with secondary confirmation of data on known individuals. Results: EPs with additional board certification in pediatrics versus those with PEM fellowship training were assessed. Those no longer listed as practicing (unavailable information, retired, or deceased) were excluded. 384 persons were included. Of dual boarded EPs (N=70), 81% identified as pediatric EM, 71% work in teaching hospitals, 35% in dedicated children's hospitals, and 50% in dedicated pediatric EDs. For those with EM residency and PEM fellowship (N=153), 70% identify as PEM physicians, 75% work in teaching hospitals, 60% in dedicated children's hospitals, and 70% in a dedicated pediatric EDs. Conclusion: EPs with additional pediatric training (dual board certification or sub-board certification) show a trend toward academic and pediatric emergency medicine. Dual boarded physicians have less association with children's hospitals.

### **1034 Emergency Screening and Care for the Adolescent Patient: A Prehospital Behavioral Health Assessment Screening Tool**

Dale Woolridge MD, PhD University of Arizona College of Medicine Tucson / Department of Emergency Medicine; Elhaam Anvar MD University of Arizona College of Medicine; Mary Logsdon MD University of Arizona College of Medicine; Isabelle Chea BS University of Arizona College of Medicine Tucson / Department of Emergency Medicine; Martyn Urquijo MD University of Arizona College of Medicine; Louise Malburg MD University of Arizona College of Medicine; Julie Najjar University of Arizona College of Medicine; Maria G. Moros University of Arizona College of Medicine; Magnolia H. Swanson University of Arizona College of Medicine.

Background: Behavioral health conditions account for a significant number of Emergency Department (ED) visits in the United States. Emergency physicians are challenged with the medical assessment for these patients whether or not a primary medical complaint exists. This medical clearance precedes and can often delay definitive psychiatric care. Screening tools to effectively identify patients who can be diverted from an ED to an appropriate psychiatric care facility have been established in adults, however similar tools have not been developed for adolescents. Here we propose five exclusionary elements obtained in triage to identify adolescent patients for whom medical interventions do not have an impact on disposition to behavioral health care. Methods: A retrospective medical record review was conducted in a suburban academic medical center with 28,000 pediatric visits per year. Medical records for adolescent patients (defined as 13-17 years of age) presenting with a behavioral health complaint from October 2015 through September 2017 were reviewed for ED care events and interventions. Elements included presenting complaint, vital signs, past medical history, physical exam, ED interventions, mode of arrival, and ultimate patient disposition. Results: Medical record review identified 309 adolescent patients with presenting behavioral health complaints. Chart review demonstrated that patients who were likely to require medical evaluation included those with altered mental status, injury, reported drug use, medical complaint, or abnormal presenting vital signs. Applying these as exclusion criteria, 55 patients remained, 28 of whom had a past medical history consistent with their presenting behavioral health complaint. Mode of arrival did not demonstrate an impact in ultimate behavioral health disposition. 45 of 55 patients screened negative but still received testing (blood work, imaging). In 100% of these cases, medical interventions had no impact in ultimate behavioral health disposition. Conclusion: Application of this screening criteria appears to have the ability to reliably identify adolescent patients who are unlikely to require medical clearance beyond triage screening prior to behavioral health assessment.

## **627 Association of Peak Expiratory Flow With Forced Expiratory Volume During Acute Childhood Asthma Exacerbations**

Catherine E. Burger MD Vanderbilt University School of Medicine; Christopher H. Daly MD Vanderbilt University School of Medicine; Donald H. Arnold MD, MPH Vanderbilt University School of Medicine.

Background NIH guidelines recommend %-predicted peak expiratory flow (%-PEF) or forced expiratory volume in 1-second (%-FEV1) measurement in children with acute asthma exacerbations to categorize severity ( $\geq 40\%$ , mild-moderate;  $< 40\%$ , severe) and response to treatment. However, PEF has low sensitivity to detect change of FEV1 in asymptomatic children with asthma. To our knowledge, the validity %-PEF to predict %-FEV1 as a criterion measure of lung function and response to treatment during childhood asthma exacerbations has not been examined. We sought to examine whether %-PEF predicts %-FEV1 in children during asthma exacerbations. Methods: We prospectively studied children aged 5–17 years with acute asthma exacerbations in a pediatric ED. Participants performed PEF and spirometry in accordance with American Thoracic Society (ATS) standards. Data from those with spirometry meeting ATS quality criteria were included in multivariable linear regression models to examine associations of pretreatment %-PEF with %-FEV1 and proportionate change of %-PEF with proportionate change of %-FEV1 after 2 hours of treatment. Model covariates included age, gender, race and pretreatment severity measured using the validated, 0-16 point (16 most severe) Acute Asthma Intensity Research Score (AAIRS). Results: Among 933 participants, 555 (59%) performed ATS-criteria spirometry, with median [IQR] age 9.3 [7.7, 11.5] years, pretreatment AAIRS 4 [1, 6], 334 (60%) male, 325 (59%) Black and 227 (41%) White. Median pretreatment %-PEF was 43 [30, 61] and %-FEV1 50 [36, 71]. Median proportionate changes after 2 hours of treatment were %-PEF 0.23 [0.05, 0.56] and %-FEV1 0.25 [0.08, 0.59]. There were adjusted associations of pretreatment %-PEF with %-FEV1 ( $\beta$ -coefficient 0.93; 95%CI 0.88-0.98;  $p < 0.001$ ) and of proportionate change of %-PEF with proportionate change of %-FEV1 after 2 hours of treatment ( $\beta$ -coefficient 0.71; 95%CI 0.67-0.75;  $p < 0.001$ ). Conclusion %-PEF predicts %-FEV1 as a measure of lung function impairment and response to treatment during acute asthma exacerbations. However,  $\beta$ -coefficients of 0.93 and 0.71 indicate that the absolute %-predicted values of these measures are not directly comparable. NIH guidelines should be revised to reflect acute exacerbation severity categories defined according to different %-predicted values of PEF and FEV1.

## **703 Public Deliberation for Community Consultation: A Case Study for a Pediatric Trauma Trial**

Patricia E. Powers MPA Center for Healthcare Policy and Research; Karen K. Shore PhD Center for Healthcare Policy and Research; Susan Perez PhD, MAS Center for Healthcare Policy and Research; Dominique Ritley MPH Center for Healthcare Policy and Research; Hiwote G. Shawargga BS Department of Emergency Medicine, University of California Davis School of Medicine; Leah Tzimenatos MD Department of Emergency Medicine, University of California Davis School of Medicine; James F. Holmes MD, MPH Department of Emergency Medicine, University of California Davis School of Medicine; Nathan Kuppermann MD, MPH Department of Emergency Medicine, University of California Davis School of Medicine, California; Daniel K. Nishijima MD, MAS Department of Emergency Medicine, University of California Davis School of Medicine.

Background: Community consultation is required for clinical trials considering exception from informed consent (EFIC) procedures. Public deliberation methods that provide baseline participant education and elicit participants' values and opinions about consent options is a novel approach during community consultations. We evaluated the use of structured public deliberation methods to assess the community's values and opinions about informed consent procedures for a pediatric trauma trial. Methods: This was a mixed-methods study that included 8 public deliberation sessions (6 parent sessions and 2 youth sessions) assessing participants' opinions about informed consent procedures. We recruited participants through local organizations and social media in communities that historically experienced high rates of pediatric trauma. Deliberation sessions focused on 3 informed consent options for the trial: 1) Enrollment using EFIC procedures without attempting to obtain written informed consent; 2) Enrollment using EFIC procedures under certain circumstances (e.g., parent is not available); or 3) Enrollment with written informed consent only. Demographic data of participants and opinions about the trial and deliberative sessions (using a Likert scale) were collected. We

analyzed data using descriptive statistics. Results: There were 102 participants for the 8 public deliberation sessions (range 9 to 15). Most participants were female (n=78, 76%) and a plurality black (n=48, 47%). Most participants preferred enrollment using EFIC procedures under certain circumstances (n=58, 57%), followed by enrollment using EFIC procedures without initially attempting to obtain written informed consent (n=30, 30%), and enrollment with written informed consent only (n=13, 13%) (did not respond, n=1). Eighty-four (82%) participants agreed or strongly agreed that the trial was important, and 79 (77%) felt the sessions provided sufficient information to make an informed decision. Conclusions: Structured public deliberation is an effective approach when consulting communities for trials considering EFIC procedures. Future studies are needed to evaluate if public deliberation methods provide participants with enhanced understanding of clinical trials compared to other community consultation methods.

### **907 Accuracy of Pediatric Triage and Field Intervention Using 360 Virtual Reality Mass Casualty Simulation**

Jason Lowe D.O. Stanford University School of Medicine; Cynthia Peng Stanford; Cameron Mozayan M.D. Stanford University School of Medicine; Christopher Winstead-Derlaga MD MPH Stanford University Hospital/Kaiser-Permanente; Anne Merritt M.D. Stanford University School of Medicine; Henry Curtis MD Stanford University School of Medicine.

Background: Our study injected subjects into a pre-filmed, 360 virtual reality (360 VR) experience simulating the triage process after a mass casualty incident (MCI) event on a high school campus. Methods: The filming of 150 high school students and post-production occurred on Stanford's medical campus in July, 2018. A convenience sample of 187 subjects were enrolled at the 2018 American College of Emergency Physicians Scientific Assembly in San Diego, California from October 1-4, 2018. Participants who declined to participate in the study were excluded. Subjects donned portable virtual reality headsets and were asked to both triage and choose a medical intervention for 9 patients. Each patient had the potential for 2 points, one for triage level and the other for intervention, totaling 18 points. Subjects were also asked to complete a post-simulation Likert survey to assess satisfaction and applicability. Results: Of the 187 subjects enrolled, 46% identified as attendings, 32% as residents, 6% as medical students, 2% as emergency medical technicians, and 14% as other. Residents and attendings who were >40 years old performed significantly worse than those who were <40 years old ( $p<0.001$ ). Subjects who identified as residents scored better than those who identified as attendings ( $p=0.0099$ ). Subjects who were residency trained scored higher than those who were not residency trained ( $p=0.0097$ ). Subjects felt the experience was engaging (4.63) and would be useful for further training (4.57). They also felt 360 VR was more immersive than traditional mannequin training (4.2). Conclusion: We postulate the performance difference is due to increased familiarity to digital media in younger groups. The difference between resident and attending subjects may be due to temporal distance from MCI training. That subjects who were residency trained performed better than those were not suggests our content was of appropriate level. Our Likert survey responses indicate high enthusiasm for this platform for training. Our production was quick, efficient, and portable, making it exciting for future work.

### **505 Using Medical Students to Screen Athletes for Hypertrophic Obstructive Cardiomyopathy via Point of Care Ultrasound**

Daniel Azzam BS University of California Irvine Health; Jack Birkenbeuel BS University of California Irvine Health; Ajay Sharma BS University of California Irvine Health; Louie Cao BS University of California Irvine Health; David Merriott BS University of California Irvine Health; Alexandra Bray BS University of California Irvine Health; Chanel Fischetti MD University of California Irvine Health, Department of Emergency Medicine; John Fox MD; Uthara Mohan MD Newport Harbor Cardiology.

Background: Hypertrophic obstructive cardiomyopathy (HOCM), one of the leading causes of sudden cardiac death in athletes, often remains undetected by routine screening (e.g., history and physical examination, with or without an electrocardiogram). The prevalence in the general population is estimated to be about 1 in 500, affecting approximately 600,000 people in the United States. Previous research has displayed benefits in screening with the addition of point of

care ultrasound, but only limited data exists regarding implementation of this technology into preparticipation physical exams for athletes. In a small cohort study, our group previously found that HOCM was more common in males and African Americans. Here, we evaluated the feasibility of using ultrasound performed by medical students to screen for HOCM in youth athletes, with particular attention to investigating the demographics that are more frequently affected by HOCM. Methods: We prospectively enrolled 263 high school athletes voluntarily sampled from many sports at 3 different high schools. All athletes were screened using a 14-point history and physical exam based on 2014 American College of Cardiology (ACC) and American Heart Association (AHA) guidelines and cardiac ultrasound performed by medical students. The ultrasound measurements and histories were evaluated by a board-certified cardiologist if medical students found a ratio of the interventricular septal diameter at end-diastole (IVSd) to the left ventricular posterior wall thickness at end-diastole (LVPW) greater than 1.25. Results: We screened 100 female and 163 male athletes. Based on history and physical exam alone, no athletes demonstrated a positive screening for HOCM. However, 30 athletes demonstrated a ratio of IVSd:LVPWd greater than 1.25 on ultrasound, warranting further workup. After appropriate follow-up with a board-certified cardiologist, all 30 athletes were deemed safe to participate. Conclusion: Although we are still in the process of gathering data, thus far, we believe that the addition of point of care ultrasound to the preparticipation physical exam is feasible. This medical student workflow platform may provide a model for other athletic departments' screening routines. Future studies should focus on screening a larger sample to expand on the demographics associated with HOCM.

### **1195 The Pediatric Opioid Prescription Choice From 2012 to 2016 in a Pediatric Hospital in California**

Soheil Saadat MD PhD UC Irvine; Nikhil Shah; Cassandra Saucedo; Rishi Bhargava MD University of California Irvine Health; Bharath Chakravarthy MD, MPH UC Irvine.

Background: Initiated by rising rates of pediatric opioid overdose, recent reports by the FDA regarding codeine and tramadol, along with a reclassification of hydrocodone-containing drugs by the Drug Enforcement Administration, have decreased pediatric opioid prescriptions. This begs the question: why are hospitalization rates increasing? Previous research has shown increased rates of prescription to family members is one contributing factor. In this study, we aim to answer this question by evaluating analgesic prescription patterns in a large pediatric hospital with an emphasis on opioid potency as measured by Morphine Milligram Equivalents (MME). Methods: The analgesic prescriptions in a pediatric hospital in California from 2012 to 2016 were included. Prescriptions that contained any type of opioid medication were analyzed. The MME for each opioid was assigned to the prescription and presented as mean  $\pm$  Standard Deviation (SD). Statistical analysis was performed by using IBM SPSS statistics version 25. Results: There were 14,194 opioid prescriptions recorded during the study period. Hydrocodone (11,247), Codeine (2,117), and Tramadol (411) were the most commonly prescribed opioids. The relative frequency of opioid prescription has decreased from 2012 to 2016. This was mainly due to the decreased prescription of Hydrocodone from 19.1% of all analgesic prescriptions in 2012 to 14.0% in 2016 ( $P < 0.001$ ) and Codeine from 12.7% in 2012 to 2.4% in 2016 ( $P < 0.001$ ). Despite the decreased relative frequency of opioid prescription during the study period, the mean MME of prescribed opioids increased from 0.69 in 2012 to 0.89 in 2016 ( $P < 0.001$ ). This was partly due to increases in Methadone prescriptions and a decrease in the prescription of Codeine. Conclusion: The study demonstrated that recent efforts to limit pediatric exposure to opioids have been effective. However, recommendations limiting the use of weak opioids (codeine and tramadol) have caused an increase in average prescribed opioid potency. This may be a contributing factor to the overall increase in opioid-related pediatric hospitalizations. Revision of prescription guidelines for hydrocodone (MME=1) is the next step to protect pediatric patients from unnecessary opioid exposure.

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2:00pm      Pinot B      Critical Care

428      Emergency Critical Care SOFA Score Predicts In-Hospital Mortality

Kian Niknam Stanford University School of Medicine; Michael A. Kohn MD, MPP; Tsuyoshi Mitarai MD; Jason Nesbit RN Stanford University Medical Center; Jennifer G. Wilson MD, MS.

**Background:** The field of Emergency Critical Care (ECC) is rapidly expanding. In order to assess the efficacy of ECC interventions, we need a reliable illness severity score that can be calculated based on variables available in the ED. In this study, we assessed the ability of a modified SOFA score, calculated using patient variables available at the time of critical care admission from the ED (eccSOFA), to predict in-hospital mortality. **Methods:** This was a retrospective cohort study using electronic health record data from an academic medical center ED. All adult patients with a critical care admission order placed in the ED from 10/24/2013 to 9/30/2016 were included. eccSOFA scores were calculated using the worst of SOFA variables recorded from ED arrival up to 1 hour after critical care admission order. Any variables not available within this time frame were assigned a score of zero. To determine the discriminatory ability of the eccSOFA score with regard to in-hospital mortality, we generated an ROC curve and calculated the area under this curve (AUROC). We also established mortality estimates for 3 eccSOFA ranges for subsequent assessment of calibration. **Results:** Of 3,912 patients, 57.5% were male, the median age was 63, and 11.4% died in hospital. 67% of patients had all eccSOFA variables available, with the most common missing variables being GCS and PaO<sub>2</sub>/FiO<sub>2</sub>. Overall, the AUROC for eccSOFA as a predictor of in-hospital mortality was 0.77 (95% CI 0.74 – 0.79). The proportion of patients in each eccSOFA category were as follows: eccSOFA 0-3, 51.7%; eccSOFA 4-6, 29.2%; and eccSOFA ≥ 7, 19.1%. The mortality for each of these eccSOFA categories was 3.5%, 13.5%, and 29.6%, respectively (p Conclusions: As a predictor of in-hospital mortality, the eccSOFA score has good discriminatory ability, with AUROC roughly comparable to other commonly used illness severity scores. The advantage of eccSOFA is that it can be calculated based on variables that are commonly available at the time of critical care admission order. Assessing the calibration of our absolute risk estimates will require additional studies in other settings.

#### **453 Emergency Critical Care Nurses and Management of Critically Ill Patients Boarded in the ED**

Jason Nesbitt RN, MA Stanford University Medical Center; Garrett Chan PhD, RN, NP, CNS Stanford University School of Medicine; Kian Niknam Stanford University School of Medicine; Tsuyoshi Mitarai MD; Jennifer G. Wilson MD, MS; Christopher Cinkowski BSN, RN, CEN, CCRN Stanford University Medical Center; Michael A. Kohn MD, MPP.

**Background:** Several studies have suggested that boarding of ICU patients in the ED is associated with increased mortality. We hypothesized that establishing a program of specialized emergency critical care (ECC) nurses would improve mortality of ICU patients boarding in the ED. **Methods:** This was a retrospective pre- and post-intervention cohort study using electronic health record data at an academic medical center. The pre-intervention period (10/2013-9/2014) consisted of usual care by ED nurses with a nurse:patient ratio of 1:2. In the post-intervention period (10/2015-9/2016), ICU patients in the ED were cared for by an ECC nurse in addition to the primary ED nurse. All adult ED patients who received an ICU admission order were included. Patients transferred to an outside facility directly from the ED were excluded. SOFA scores were calculated using the worst reported values from time of ED arrival up to 1-hour after ICU admission order (eccSOFA). Boarding time was defined as the time from ICU admission order to the time of ED departure, downgrade order, or death. The primary outcome was in-hospital mortality. Groups were compared using  $\chi^2$  tests. **Results:** There were no statistically significant differences between groups with respect to age, sex, co-morbidities, or illness severity. The proportion of patients who boarded for >6 hours almost doubled from 13.8% pre-intervention to 26.9% post-intervention (p<0.0001). In-hospital mortality in the pre-intervention group (N=1199) and the post-intervention group (N =1386) was the same (11.8%). Mortality of patients boarding >6 hours in the combined pre- and post-intervention groups was 9.5%. Surprisingly, mortality was higher for patients boarding ≤6 hours, which was 12.4% (p=0.06). Mortality of severely ill patients (eccSOFA >5) boarding for >6 hours in the pre-intervention group was 19.4% and post-intervention was 17.8% (risk difference -1.6%, 95% CI -16.8% to 13.5%). **Conclusions:** Contrary to previous reports, critically ill patients who boarded >6 hours did not have higher mortality than patients who boarded ≤6 hours. During the study period, the proportion of critically ill patients boarding in the ED for >6 hours increased dramatically, yet overall mortality remained the same. In the sickest subgroup of ICU patients boarding >6 hours in the post-



intervention period, mortality was lower, although the difference was not statistically significant. These results suggest that ECC nurses may improve outcomes for severely ill ICU patients who board in the ED.

#### **457 Five-minute Hands-only Cardiopulmonary Resuscitation Classes Effective Among College Students**

Morgan Battaglia University of Arizona College of Medicine; Tanwe C. Shende University of Arizona College of Medicine; Hannah Shy University of Arizona College of Medicine; Dawn Bowling University of Arizona College of Medicine; Alaina Martinez B.S. University of Arizona College of Medicine; Tomas Nuno PhD University of Arizona; Dan Beskind M.D., MP.

Background: CPR is a critical step for improving neurologically intact survival after a cardiac arrest. Currently in the U.S., over 90% of cardiac arrests happen out of the hospital, but less than 50% receive bystander CPR. Reducing the time needed to teach CPR may make it easier to train more people who can respond during a cardiac arrest. This study compares qualitative outcomes among participants trained with a 5 minute vs a 30 minute hands-only CPR class. Methods: A prospective randomized controlled trial of 59 University of Arizona undergraduates was performed. Participants were randomized to either a five-minute (experimental) or 30-minute (control) hands-only CPR instruction class. Pre- and post-testing was performed with a written and simulation test. Measurements collected assessed time to call 911, time to start chest compressions, rate and depth of compressions. Prior to instruction, subjects' baseline measurements of CPR performance were evaluated during a standardized sudden death scenario using a Laerdal Skillreporter™ mannequin. The test and scenario were repeated after either the five or 30 minute hands-only CPR instruction using the same outcome measures. Statistical tests of association for categorical variables were assessed using the chi-square test and the independent samples t-test was utilized for continuous variables. All tests were two-sided and the level of significance was set at  $\alpha=0.05$ . Results: Among the 59 participants, 28 received five minutes of instruction and 31 received 30 minutes. 15 (25.4%) individuals reported prior CPR training. Post intervention, all measurements reached statistically significant improvements in each group but there was no difference between the two groups in depth of compressions (experimental group: 40.0 mm, 95% CI 36.6-43.4 vs control group: 44.6 mm, 95% CI 40.9-48.3,  $p=0.064$ ), compressions per minute (113.7, 95% CI 105.5-122.0 vs 123.2, 95% CI 115.1-131.4,  $p=0.098$ ), time to starting chest compressions (13.5 vs 12.4 sec,  $p=0.45$ ), or time to calling 911 (8.34 vs 7.65 sec,  $p=0.58$ ). Further, 100% of the experimental group and 94% of the control group said they would probably or definitely perform hands-only CPR in real life ( $p=0.17$ ). Conclusions: Five-minute instruction is as effective as 30-minute instruction at teaching undergraduate students how to perform quality bystander hands-only CPR.

#### **780 Assessment of Novel Tool for Estimation of Ideal Tidal Volume for Mechanical Ventilation**

Katelin Morrissette; Ashley Ealey MD Banner University Medical Center/Diamond Children's Medical Center; Ryan Miller MD University of Arizona; Jeremiah Garrison; Cameron Hypes MD MPH University of Arizona College of Medicine; Jarrod Mosier.

Background: The assessment of ideal tidal volume for the mechanically ventilated patient is important due to the well documented impact of tidal volume on lung injury. This practice is especially significant in critically ill patients in whom excessive tidal volumes have been correlated with higher rates of acute lung injury and mortality. Multiple studies have documented a poor rate of compliance of ventilator settings with the lung protective goal tidal volume of 6-8 cc/kg ideal body weight (IBW). Common practice is often visual inspection alone to determine a patient's ventilator settings. The goal of this study was to evaluate the common practice of visual inspection compared with the use of a novel purpose-specific measuring tool designed to determine ideal tidal volumes. Methods: Participants included emergency medicine residents who were randomized to estimate the tidal volume of each standardized patient by one of two methods. The first method was by means of visual inspection. The second method was by means of a novel measuring tool which the participant laid out alongside the standardized patient. The tool was labeled with the appropriate tidal volume of 6 cc/kg IBW for each one inch increment of height. Separate male- and female- specific tools were utilized. The Bland-Altman approach was used to assess agreement between evaluation methods. Results: The median tidal volumes in the visually

estimated and measuring tool estimated groups were 6.17 cc/kg IBW ( $\pm 0.73$ ) and 6.31 cc/kg IBW ( $\pm 0.31$ ), respectively. There was no significant difference between these two methods. All estimations using the measuring tool were within the range of 6-8 cc/kg IBW. Conclusions: Despite the previously documented poor rate of compliance with ideal ventilator settings, this small study failed to significantly improve on visual estimation of ideal tidal volume by using a labeled measuring tool. This leads to many questions regarding how to translate study findings into clinical practice. Future study is needed including a wider range of patient body habitus and closer evaluation of daily clinical practice to improve lung protective ventilation for mechanically ventilated patients.

### **932 Impact of an Advanced Cardiac Life Support Process Improvement Initiative on Leadership Role Comfort**

Annaleigh Boggess; Danielle Albright; Kimberly Bolton; Jessica Fontanez; Madison Fletcher; Tatsuya Norii.

**Background:** An Extracorporeal Cardiopulmonary Resuscitation (ECPR) program in the Emergency Department (ED) requires optimized advanced cardiac life support (ACLS). The ACLS leader monitors compressions, orders medications, prepares for rhythm checks, directs defibrillation, and times events in accordance with ACLS best practices. This role is usually performed by a physician. Nurse led ACLS may allow physicians to diagnose reversible causes for the cardiac arrest and assess for ECPR inclusion criteria. There is limited research on ACLS leader role comfort for nurses. In this study, we hypothesized an ECPR initiative in the ED would improve personnel comfort in the ACLS leader role. **Methods:** The ECPR initiative assigned the role of ACLS leader to ED nurses and specified roles for other personnel. Implementation included didactics and simulation training. A semi-annual stakeholder survey, used to monitor process improvements in the ED and distributed to all ED resident and attending physicians and nurses, included six Likert scale items on comfort with the ACLS leader role. We retrieved data from surveys administered 6 months prior to and 3 months following the implementation of ECPR. There were 91 respondents at baseline and 100 respondents in the follow-up, resulting in a 43% and 48% response rate, respectively. We used Mann-Whitney tests to compare ordinal variables and non-parametric tests to assess the impact of initiative completion and level of experience on a cumulative score for "comfort." **Results:** We observed no significant changes for the six comfort items from the baseline survey regardless of respondent group. In the post-period, nurses (22.6/30) and resident physicians (23.9/30) had significantly lower mean cumulative comfort scores when compared to attending physicians (27.5/30) ( $p \leq .001$ ). Experience leading ACLS in the past 12 months was a significant predictor of the cumulative comfort score for nurses in the post-period ( $p = .029$ ), even when completion of initiative requirements was controlled. **Conclusion:** While most report comfort acting in the role of ACLS leader there was no significant improvement post-initiative. These findings, combined with the significance of experience leading ACLS on comfort for nurses and resident physicians, suggest continued experiential learning and opportunities for simulation.

### **400 Surgical Airways Performed in an Academic Emergency Department Over a 10-Year Period**

James D. Kim MD University of Arizona College of Medicine; Trenten L. Martinez DO University of Arizona College of Medicine; Christopher C. Wu MD University of Arizona College of Medicine; John C. Sakles MD University of Arizona College of Medicine.

**Background:** The purpose of this study is to determine the prevalence and clinical characteristics of surgical airways performed in an academic emergency department (ED) over a 10-year period. **Methods:** A retrospective review was used to determine the clinical characteristics of all surgical airways prospectively recorded into a continuous quality improvement (CQI) database at an urban academic ED over the 10-year period from July 1, 2007 to June 30, 2017. The situational and procedural characteristics of all surgical airways managed in the ED were recorded by EM residents immediately after the procedure. **Results:** A total of 5228 airways were managed in the ED during the study period, 4361 with rapid sequence intubation (RSI). Fourteen patients (0.27%) required a surgical airway, 13 (93%) were men and 1 was a woman. The mean age of the patients was 44 (range 13–84). Of the 14 surgical airways, 1 (7%) was done as a primary approach and 13 (93%) were done after failed attempts at oral intubation. Six (42%) were performed after a

failed RSI, for an overall failed RSI rate of 0.14%. 9 (64%) were performed in the setting of trauma. Of these, 8 (89%) were performed in blunt trauma patients and 1 (11%) in a penetrating trauma patient. Five (36%) patients were in cardiac arrest before airway management commenced and 2 (14%) patients suffered a cardiac arrest during airway management. Eight (57%) were performed by surgeons and 6 (43%) were performed by emergency physicians. Ten (71%) had an attempt with a video laryngoscope (VL) and 1 (7%) had an attempt with a supraglottic device (SGD) prior to advancing to a surgical airway. The mean number of devices was 1.8 (range 0–3). The mean number of anatomic difficult airway predictors was 3.8 (range 1–7) and 11 (78%) patients were noted to have blood or vomit in the airway. The mean number of intubation attempts was 4.6 (range 0-11) and the mean number of operators was 2.5 (range 1-4). Conclusion: Surgical airways were performed infrequently in this ED, and rarely for a failed RSI. The majority were in men and most were in trauma patients. A fluid filled airway with blood or vomit was a common occurrence. A VL was used in most patients prior to advancing to a surgical airway, but SGDs were rarely used.

#### **964 Preliminary Safety Evaluation of Inhaled 13C-Urea in Subjects with Pneumonia: Phase 1, Open-Label Study**

Nicholas Parchim; Justin Baca; Jon Femling; Robert Taylor; Silas Bussmann; Lionel Candelaria; Tatsuya Norii; Michelle Moyer; Rena Laliberte.

Background: Rapid identification of pneumonia-causing organisms is challenging in the emergency department setting. Delayed identification of organisms results in improper antibiotic selection and administration. A point-of-care, nebulized urea breath test for pneumonia caused by urease-producing bacteria could aid in proper antibiotic selection, but the safety of nebulized urea has not yet been established. We report initial safety outcomes in an ongoing investigation of this test. Methods: We enrolled a pre-defined safety cohort of 15 emergency department subjects with radiographic and clinical evidence of pneumonia. Subjects in this cohort completed inhalation of a nebulized preparation of 50mg 13C-urea dissolved in 3 mL of sterile water. Breath samples were collected before and after inhalation of 13C-urea and analyzed for exhaled 13CO<sub>2</sub>. Adverse events (AEs) were recorded from time of enrollment until completion of telephone follow-up at 48-96 hours post nebulization. Exhaled 13CO<sub>2</sub> was measured before and after 13C-urea nebulization to calculate a normalized change from baseline. Student's T-test was used to determine significance of change over baseline. Results: We screened 257 subjects for the study and excluded 242 for clinical signs of severe disease (109), age > 70 (52), logistical difficulties (75), and declining consent (6). Mild, self-limited cough was noted in 3 cases and nausea in one case after administration of 13C-urea. One episode of syncope was noted but was determined to be an exacerbation of a pre-existing condition and not related to the study product. Two patients in the initial cohort were determined to have significantly elevated exhaled 13CO<sub>2</sub> and were found in post-hoc chart review to have high suspicion for bacterial pneumonia including elevated procalcitonin levels or bilateral pneumonia on imaging. Conclusions: Mild cough was common after urea administration, though all subjects were able to complete nebulization. There were no reports of clinical deterioration related to the study drug. This study establishes a preliminary safety profile of inhaled 13C-urea in subjects with pneumonia. We noted significantly elevated exhaled 13CO<sub>2</sub> in two subjects and are currently enrolling subjects in a larger study of ED subjects with pneumonia who are planned for hospital admission.

#### **887 Repeat Venous Thromboembolism in Cancer Patients Presenting to the Emergency Department**

Eric L. Ha UCSD School of Medicine; Christopher J. Coyne MD, MPH University of California San Diego School of Medicine.

Background: Cancer induces a hypercoagulable state that often leads to venous thromboembolism (VTE), the second leading cause of death among all cancer patients. Low molecular weight heparin (LMWH) and novel oral anticoagulants (NOACs) are each considered the gold-standard prophylaxis to guard against VTE among these patients, and non-adherence has consequences for patients and the health system. Methods: We conducted a retrospective cohort study at 2 cancer center affiliated emergency departments (EDs) on all patients with an active cancer who presented with an

acute VTE. We collected data on all ED patients 18 years of age or older who were diagnosed with a deep vein thrombosis or pulmonary embolism from 6/2012 to 6/2016. We also gathered data on previous VTE history, antiplatelet or anticoagulant use, ED-prescribed anticoagulation, and return visits within 30 days. We focused specifically on those patients who were VTE positive, in the setting of a prior VTE. Results: During the study period, we identified 355 active cancer patients presenting with a VTE to the ED. 25% (89) of these patients had at least one prior VTE. Among these patients, many were not on any form of blood thinner (48.3%), without having a clear contraindication, while 28.1% were on LMWH or a NOAC and 15.7% were on a different anticoagulant. The ED prescribed new or higher doses of LMWH or NOAC to 61.8% of these patients and warfarin to another 5.6%. The remaining 32.6% received no ED-prescribed anticoagulation or medication adjustment. 14.5% of those patients who received LMWH or NOAC returned to the ED for treatment within 30 days, compared to 35.3% of those patients who did not receive LMWH or NOAC. Conclusions: VTE in the ED cancer population remains a challenging disease. In our sample, the majority of cancer patients with a prior VTE were not on LMWH or any other anticoagulant, placing them at higher risk of morbidity and mortality from thromboembolic disease. This is despite these patients being treated at EDs that are affiliated with an NIH/NCCN cancer center. In addition, several patients are not receiving LMWH or a NOAC during their ED visit and are subsequently returning to the ED more than twice as often as those who do receive the appropriate treatment. As ED physicians, we must ensure that these patients receive appropriate therapy and outpatient follow-up to reduce future morbidity and mortality related to VTE.

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3:00pm

Pinot A

Trauma 1

### 132 Female Pediatric and Adolescent External Genitalia Trauma

Haris H. Chaudhry MD University of California, Irvine; Areg Grigorian MD UC Irvine; Patrick T. Delaplain MD University of California Irvine Health; Austin Dosch; Angela Allen BS University of California Irvine; Beatrice J. Sun BS UC Irvine School of Medicine; Nathan Jasperse UC Irvine School of Medicine; Spencer Albertson B.S. University of California Irvine Health; Jeffrey Nahmias MD MHPE University of California, Irvine Medical Center.

Background: Pediatric and adolescent patients are vulnerable to traumas involving violence. Pediatric genital injury represents 0.6% of all pediatric trauma. Pediatric patients may withhold details regarding injury, particularly in the case of external genitalia trauma. It is crucial for healthcare providers to understand whether different adolescent and pediatric patients are at risk for different violent mechanisms such as rape, assault, and other abuse. Therefore, we sought to perform the first large database analysis of pediatric and adolescent female genitalia trauma. Methods: The National Trauma Data Bank was queried (years 2007-2015) for a total of 3,206 female patients <16-years-old with external genitalia trauma (vaginal or vulvar). Two groups were compared: pediatrics (< 12 years-old) and adolescents (12-16 years-old). A Student's t-test was used to compare continuous variables and chi-square was used to compare categorical variables for bivariate analysis. Results: Out of 303,992 patients, 3,206 (1.1%) were identified to have external genitalia trauma with the majority being pediatric patients (92.1%) and with injury to the vagina (62.6%). From this cohort no patients were excluded. Compared to the adolescent group, pediatric patients with injury to the vagina had a lower median injury severity score (ISS) (1.0 vs 2.0,  $p<0.001$ ), shorter median length of stay (LOS) (1 vs 2 days,  $p<0.001$ ), were less likely to be victims of rape (4.1% vs 17.3%,  $p<0.001$ ) and assault (2.1% vs 7.2%,  $p<0.001$ ) but more likely to be victims of other abuse (9.5% vs 3.4%,  $p=0.003$ ). More adolescent patients with vaginal trauma required repair (58.7% vs 43.2%,  $p<0.001$ ), compared to pediatric patients. Pediatric patients with injury to the vulva had a similar ISS (1,  $p<0.001$ ), shorter median LOS (1 vs 1.5 days,  $p<0.001$ ) and were less likely to be victims of rape (0.7% vs 2.8%,  $p=0.01$ ), compared to the adolescent group. There was no difference in the rate of mortality (0.9% vs 0.0%,  $p=0.26$ ) between both groups. Conclusion: Pediatric and adolescent external genitalia trauma occurs in 1.1% of cases with the vagina being more commonly injured compared to the vulva. Adolescent patients are more likely to be victims of rape and assault. Health care providers must be aware of these at-risk populations to identify pediatric female victims of violence and provide resources to assist with recovery.

### **382 Closing the Gap: Improving access to trauma care in New Mexico (2007-2017)**

Erik Anderson MD Alameda Health System–Highland Hospital; Margaret Greenwood-Ericksen MD Nancy E Wang MD Stanford University School of Medicine; Daniel A. Dworkis MD, PhD University of Southern California, Keck School of Medicine.

Background: Trauma is a major cause of death and disability in the United States, and significant disparities exist in access to care and outcomes for rural and poor communities, and for people of color. From 2007 to 2017 New Mexico expanded its trauma system by focusing on building capacity at the hospital level. We aim to evaluate the impact of the trauma system expansion and explore any remaining disparities in access to care. Methods: We conducted a geospatial analysis at the census block level of access to a trauma center in New Mexico within 1 hour by ground or air transportation for the years 2007 and 2017. This analysis was combined with data from the American Community Survey to examine the characteristics of the population with access to care. A multiple logistic regression model with predictive margins assessed for remaining disparities in access to trauma centers in 2017 for select communities. Results: The New Mexico trauma center expansion increased the proportion of the population in New Mexico with access to a trauma center within 1 hour from 73.8% in 2007 to 94.8% in 2017 (difference in proportions 21.0%; 95% confidence interval [CI] 20.9% to 21.1%). The largest increases in access to trauma care within one hour was found among American Indian/Alaska Native populations (35.2%, 95% CI 35.0% to 35.4%), suburban areas (62.9%, 95% CI 62.8% to 63.0%), and socially vulnerable communities as determined by the Area Deprivation Index scale (quintile 4: 28.8%, 95% CI 28.1% to 28.5%; and quintile 5: 33.2%, 95% CI 33.0% to 33.4%). A multiple logistic regression analysis of suburban and rural areas found that in 2017, the most rural communities (aOR 58.0, 95% CI 11.8 to 284.2), communities on an AI/AN reservation (aOR 25.6, 95% CI 5.2 to 126.5), communities with a high proportion of Hispanic/Latino population (aOR 8.4, 95% CI 3.2 to 21.8), and a high proportion of elderly persons (aOR 3.2, 95% CI 1.2 to 8.4) were more likely to lack access to a trauma center within one hour. Conclusion: The New Mexico trauma system expansion significantly increased access to trauma care within 1 hour for most of New Mexico. Populations with the largest increase in access to care in 2017 include the AI/AN community and suburban areas. Despite the progress, there are still barriers to trauma care for very rural parts of the state and for its sizable American Indian community.

### **464 Comparison of Ultrasound and Chest X-ray in Patients with Traumatic Pneumothorax and Received Tube Thoracostomy**

Sana Rukh MPH University of Arizona College of Medicine; Rachelle Halasa MD University of Arizona; Tomas Nuno PhD University of Arizona College of Medicine; Terence O'Keeffe MD University of Arizona; Srikar Adhikari MD, MS University of Arizona College of Medicine.

Background: Chest X-ray (CXR) is the most commonly used imaging modality for diagnosing pneumothorax in the Emergency Department (ED) trauma patients. Point-of-care ultrasound (POCUS) is increasingly being used for the evaluation of trauma patients with suspected pneumothorax. POCUS has been shown to be superior to CXR in detecting pneumothorax. However no prior studies have specifically demonstrated if POCUS findings altered management (thoracostomy tube placement) in patients with traumatic pneumothorax and negative CXR. It is clinically meaningful to know if POCUS is a valid modality compared to CXR to determine the need for thoracotomy tube placement in patients with traumatic pneumothorax. We hypothesize that POCUS is superior to CXR in determining the need for thoracostomy tube placement in ED trauma patients. The objective of our study was to compare POCUS and CXR findings in patients with traumatic pneumothorax and underwent thoracostomy tube placement. Methods: This is a retrospective study at a Level 1 academic trauma center. Adult patients with traumatic pneumothorax who underwent thoracostomy tube placement and received a CXR and POCUS were included in the study. The POCUS examinations were performed by the emergency medicine faculty and residents before CXR was performed. Medical records of these subjects were reviewed for history, additional diagnostic testing, and hospital course. Standardized data collection forms were used

and appropriate blinding methods were followed for data collection. All POCUS examinations were reviewed for quality assurance. Descriptive statistics were used to summarize the data. Results: A total of 179 patients (female-28, male-151) were enrolled. The mean age of the patients was 49 years. Thirty patients presented with penetrating injuries to the thoracoabdominal region. A majority (59%, 105/179) reported chest pain or shortness of breath. Seventy percent (125/179) of patients underwent thoracostomy tube placement. Pneumothorax was detected only on POCUS (not on CXR) in 26% (32/125) of patients who underwent thoracostomy tube placement. Conclusions: Our results suggest that POCUS is superior to CXR in detecting traumatic pneumothorax which requires thoracostomy tube placement.

### **785 Use of the Pulse Oximeter Plethysmograph Waveform to Measure Ankle-Brachial Index**

Cosby G. Arnold MD, MPH University of Tennessee at Memphis; James R. Walker MD, MS University of Tennessee at Memphis; Rachel H. Mitchell MD, MPH University of Tennessee at Memphis; Jason Silberman MD University of Tennessee at Memphis; Mark F. Brady MD, MPH University of Tennessee at Memphis.

Background: The ankle-brachial index (ABI) assesses the integrity of the lower-extremity arterial vasculature and is used to determine the need for emergent vascular imaging in trauma. However, ABI measurement using Doppler may be difficult during EMS or helicopter transport, or busy trauma bays, with high levels of ambient noise. Use of the pulse oximeter plethysmograph (POP) waveform might circumvent this limitation. We sought to test the hypothesis that the ABI measured using the POP waveform agrees with the criterion ABI measurement by Doppler. Methods: We conducted a cross-sectional study using a convenience sample of healthy adults age 18 or older. We measured systolic blood pressures in each participant's right arm and right leg to calculate the ABI using three different methods: (1) Doppler and manual sphygmomanometer; (2) Pulse oximeter plethysmograph waveform and manual sphygmomanometer; and (3) Automated oscillometric sphygmomanometer (Dynamap). We repeated each method three times to quantify the variability of each method. Bland-Altman (B-A) plots were used to visually examine the agreement of Doppler-measured with POP-measured ABI and, as a secondary outcome, of Doppler-measured with Dynamap-measured ABI. We calculated 95% confidence intervals for the limits of agreement of each B-A plot. Results: Among 26 participants enrolled to date, median [IQR] age was 28 [22, 54] years, 10 (38%) were male, 2 (8%) Black and 22 (85%) White, median BMI was 25.6 [20.4, 37.3], and 0 were smokers. Mean (SD) ABI values for each method were Doppler 1.1 (0.09); POP 1.08 (0.08); and Dynamap 1.04 (0.05). Mean (95% CI) B-A plot differences were: Doppler- vs. POP-measured ABI, 0.02 (95% CI -0.06, +0.10); and Doppler- vs. Dynamap-measured ABI, 0.06 (95% CI -0.12, +0.23). Conclusion: ABI measured using the pulse oximeter plethysmograph waveform has a high level of agreement with measurement by the criterion standard Doppler. Dynamap-measured ABI agrees less well with greater variability of measured difference with Doppler-measured ABI.

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**3:00pm Pinot C EMS**

### **97 Whole Blood Transfusion in the Prehospital Setting**

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Background: Prehospital transfusion of blood products dates back to World War I. The transfusion of low-titer whole blood, however, remains a relatively novel concept and has seen a recent resurgence in the far-forward military environment, along with becoming the product of choice for a few civilian emergency medical service (EMS) agencies. The implementation of a whole blood system with hospital partners and regional blood banks, along with a prehospital transfusion protocol is critical to the success of these programs. Methods: A retrospective review was

performed of all patients receiving whole blood from a suburban EMS system. Inclusion criteria were patients >12 years of age, with two or more of the following criteria: heart rate (HR) >120, systolic blood pressure (SBP) 90 mm Hg, penetrating or blunt trauma, or hemoglobin < 6.0 g/dL. The protocol further dictates low-titer O+ whole blood to be given to all patients other than females. Results: Over a period of 12 months, twenty patients received pre-hospital whole blood administration. Mean age was 52 and 70% were male. Seven (35%) were trauma patients (1 blunt, 6 penetrating) with the remainder experiencing non-traumatic hemorrhage. Transfusion was associated with a decrease in heart rate [94 (79-126) pre transfusion vs. 87 (76-107) post transfusion] and an increase in systolic blood pressure [76 (60-94) pre transfusion vs. 103 (94-115) post transfusion]. Patients also experienced increased serum hemoglobin levels (n=12) following transfusion [10.4 (6.3-12.6) vs. 11.5 (8-13)]. Twelve patients required further transfusion in hospital, with a mean of 7.6 units per patient. All patients survived to hospital discharge. Conclusion: Blood transfusion is developing as a novel tool in the armamentarium of prehospital agencies in the United States. The process to obtain blood products and establish a prehospital protocol remains challenging. With access to already established, successful blood administration protocols, the potential exists for a more efficient process of implementing an administration program at other EMS agencies. The range of injuries and medical emergencies that could potentially benefit from access to blood products is vast. Though it appears safe to implement at this time, further studies are required to understand the true benefit of whole blood products in comparison to component therapy.

#### **467 Evaluating Intranasal Naloxone Administration by Emergency Medical Technicians in a Two-Tiered EMS System**

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Background: Due to the current opioid epidemic in the United States, naloxone has become more widely accessible and utilized by BLS providers in cases of acute opioid overdose. In Seattle, WA, King County Emergency Medical Services (KCEMS) introduced a permissive clinical protocol that allowed EMTs to administer intranasal (IN) naloxone to suspected opioid overdoses based on five clinical criteria. These five criteria included: a decreased level of consciousness, "pinpoint" pupils, a blood glucose greater than 150 mg/dl, a high risk clinical scene, and a history of opioid use. Our investigation sought to evaluate the protocol's safety and efficacy. Methods: We conducted a retrospective cohort study of patients who received IN naloxone from EMS in King County, Washington (excluding the city of Seattle) from August 1, 2017 to June 15, 2018. Data were collected from the electronic clinical record completed by both BLS and ALS providers. Two reviewers examined each case to determine if a clinical diagnosis of opioid overdose was appropriate. Results: Of the 102 cases eligible for analysis, 95% were determined to be opioid overdoses. Ninety three percent of opioid overdose cases had inadequate respirations while none of the non-opioid cases did. All opioid overdose cases met at least three of the five algorithm criteria, the majority meeting four or more (90%), while no cases of non-opioid overdose met more than three of the criteria. Conclusions: We found that when EMTs in King County, Washington administered IN naloxone they are able to correctly determine whether it is clinically indicated using the KCEMS algorithm. No significant complications occurred while two patients reported opioid withdrawal symptoms following IN naloxone administration.

#### **930 Recognition of Active Pediatric Seizures: Prehospital Provider Sensitivity and Specificity**

Tiffany M. Abramson MD; Elizabeth Crow MD; Christianne Lane PhD; Emily Rose MD; Yvette Kearl MD; Angelica Loza-Gomez MD Keck School of Medicine of the University of Southern California, Department of Emergency Medicine.

Background: Emergency medical services (EMS) provide the first line of treatment for out of hospital pediatric seizures. Seizures are the most common pediatric neurologic emergency and account for around 15% of all pediatric

EMS calls. Prior studies suggest that more than 50% of patients with active seizure activity do not receive prehospital antiepileptic drugs. It is possible that pediatric seizures are not adequately recognized by EMS. The primary purpose of this study is to evaluate specificity and sensitivity of EMS diagnosis of active seizure. Secondary outcomes are clinical characteristics and patient disposition of unrecognized seizures. Methods: This is a prospective, single site, observational study at an urban pediatric emergency department (ED) over 18-months. Patients 15 years old and younger that arrived by ambulance with a chief complaint of seizure were included. Local EMS protocols include administration of versed 0.1 mg/kg to actively seizing patients. Upon patient arrival to the ED, a survey was completed by the emergency physician which included EMS verbal report and patient's clinical status. The gold standard for active seizure was the emergency physician's ED assessment. Of the missed (discordant) cases, a retrospective chart review was performed of the ED record. Descriptive statistics, sensitivity, and specificity were computed. Results: In the study period, 407 patients met inclusion criteria. Surveys were completed on 349 patients aged 0.04 – 15 years (Median 3, IQR = 3.4). Fifty-five percent were male. Fifty-two of the patients (15%) were actively seizing upon arrival at the ED and 112 (32%) were postictal. Of the 52 who were actively seizing, 28 were recognized as seizing by EMS. Sensitivity was 54% and specificity was 96% for EMS seizure recognition. In discordant cases, the median age was 4 years old. The most common features of the discordant cases were abnormal vital signs (75%), gaze deviation (50%) and clenched jaw (33%). Of these, 50% were in status epilepticus, 47% were febrile seizures, 37% required intubation and 53% were admitted to the pediatric intensive care unit. Conclusion: EMS providers were highly specific but not sensitive in recognizing active pediatric seizures on ED arrival. Patients with unrecognized seizures were younger, most commonly presented with abnormal vitals, and had a high ICU admission.

#### **1413 Use of Prehospital Data to Create a Gold Standard for Identification of Opioid Overdose**

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Background: Opioids have been the leading cause of fatal drug overdoses in King County, Washington from 2008-2017, and thus pose a significant health threat to the population. Quantifying and delineating this threat are critical actions in order to combat it. Prior research on opioid overdoses using emergency medical services data has relied upon the administration of naloxone for identifying opioid overdose cases, but such methodology may bias overdose estimates. This project aims to develop a "gold standard" case definition that can accurately identify true opioid overdoses using information provided by basic life support and advanced life support providers in their charting. This will allow for real time surveillance of opioid overdoses. Methods: ESO reports from June 1, 2018 to July 11, 2018 were obtained from Seattle Fire Department/Seattle Medic One. Incidents that listed "overdose" as a primary or secondary impression or met the case definition criteria for opioid overdose were independently reviewed (N=225). Each of the 225 charts was classified as a probable overdose, possible overdose, unclear, unlikely an overdose and not an overdose by two medical professionals. Hospitals records from facilities affiliated with the University of Washington School of Medicine were reviewed for discharge impressions. Results: The medical professionals had an excellent inter-rater reliability with a kappa value of 0.95. The medical professionals also had a very good inter-rater reliability with their impression and the hospital discharge impression with a kappa value of 0.87. Common clinical scenarios where it was determined that the patient did not overdose on opioids includes adverse effects to opioid use, substance abuse, alcohol intoxication and polydrug abuse. Only about 74% of opioid overdoses received naloxone, meaning that if we only use naloxone administration as a measure for opioid overdoses, we will miss 26% of true opioid overdoses. Conclusion: Developing a case definition that accurately identifies opioid overdose is complicated. Limited qualitative information provided by emergency medical services documentation will cause the automated case definition to be weaker and not perform with great specificity. This case definition will allow for better real-time opioid overdose tracking in King County and the state of Washington.



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3:30pm

Pinot A

Trauma 2

## **720 Hyper/Hypoventilation Following Intubation for Severe Traumatic Brain Injury in Adult vs. Pediatric Patients**

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Background: Traumatic Brain Injury (TBI) is a leading cause of morbidity and mortality nationwide. In TBI patients, hyper/hypo-ventilation following prehospital or emergency department (ED) intubation increases morbidity and mortality. In our system, initial ventilator settings are guided by a weight-based resuscitation in children while estimates of height guide the care of adults. Therefore, we hypothesize that the incidence of hyperventilation is higher in adults than in pediatric patients. The aim of this study is to compare the incidence of hyper/hypoventilation between children and adults intubated in the ED following severe trauma. Methods: This was a retrospective review of prospectively collected data for an ongoing quality improvement project. We included patients with severe trauma intubated in the ED at a Level I Trauma Center. Data from the first 40 minutes of patient care included: End-Tidal CO<sub>2</sub> (EtCO<sub>2</sub>), Heart Rate (HR), Blood Pressure (BP), Respiratory Rate (RR), Oxygen saturation (O<sub>2</sub> Sat), patient location, ventilation method, sedatives, and age. Patients were excluded if they did not have TBI or less than 6 minutes of EtCO<sub>2</sub> data. Groups were divided by age: 0-18 (children) and >19 years (adult). The percent of time outside goal EtCO<sub>2</sub> range (goal: 35-45) was used as the primary outcome. Secondary outcomes included the mean EtCO<sub>2</sub> and lowest/highest EtCO<sub>2</sub>. Differences were compared using simple descriptive statistics (Students T-test). Results: Quality improvement data was available for 103 cases and 19 were excluded. Of the remaining 84 cases there were 10 children and 74 adults. The mean percent of time outside goal EtCO<sub>2</sub> range was 51.5% for children and 63.9% in adults (p = 0.245). The mean EtCO<sub>2</sub> was 37.2 in children and 36.7 in adults (p=.400). The mean lowest/highest EtCO<sub>2</sub> in children was 27/44 and 26.3/42.6 in adults (p = 0.778/0.469). Conclusion: In this small retrospective study, no significant difference in EtCO<sub>2</sub> values is identified between intubated adults and intubated children with TBI. It is notable that both groups have a higher than expected time out of the goal EtCO<sub>2</sub> range. Future work should focus on identifying ventilation adjuncts and strategies that increase the time at goal EtCO<sub>2</sub>.

## **791 Correlation of End-Tidal and Venous Carbon Dioxide Following Intubation of Patients with Severe Trauma**

Adam M. Field MD University of Arizona College of Medicine; Colin R. Reisenauer University of Arizona; Tomas Nuno PhD University of Arizona College of Medicine; Jeffrey P. Tolson University of Arizona College of Medicine; Isabelle Chea BS University of Arizona College of Medicine Tucson / Department of Emergency Medicine; Amber D. Rice MD University of Arizona College of Medicine; Joshua B. Gaither MD University of Arizona College of Medicine.

Background: Abnormal end-tidal carbon dioxide (EtCO<sub>2</sub>) measurements are associated with increased mortality in prehospital and very early emergency department (ED) patient care. Strong evidence supports the use of continuous EtCO<sub>2</sub> monitoring to maintain normal ventilation. Once in the ED, venous blood gas values are often obtained and used to direct early ventilator adjustment. However, it is unclear in the very early ED care of patients if EtCO<sub>2</sub> and the venous partial pressure of CO<sub>2</sub> (PvCO<sub>2</sub>) can be used interchangeably. The aim of this study is to determine, in intubated patients with serious injury, the correlation between EtCO<sub>2</sub> and PvCO<sub>2</sub> and identify any potential causes of variation. Methods: This was a retrospective review of prospectively collected data. Prospective vital sign data, including EtCO<sub>2</sub> values, were recorded every two minutes using a standardized data collection tool. After patient care, PvCO<sub>2</sub> values were extracted from the patient care record and matched to the vital sign data for the time at which the blood was drawn. Cases excluded if either vital sign data or VBG data were not available. The correlation between EtCO<sub>2</sub> and PvCO<sub>2</sub> was calculated using the Pearson correlation coefficient. Individual cases were then reviewed to identify factors that might

be associated with either good or poor correlation. Results: There were 126 cases of severe trauma identified and 104 were excluded: age less than 17 years old (8), missing demographic data (19), or missing VBG or EtCO<sub>2</sub> values (77). Within this sample, the correlation coefficient between EtCO<sub>2</sub> and PvCO<sub>2</sub> was 0.320 (weak correlation). Two cases had a difference in CO<sub>2</sub> measurement of more than 40mmHg while 9 cases had a difference of more than 20mmHg. Common factors in those cases with poor correlation between EtCO<sub>2</sub> and PvCO<sub>2</sub> included: recent bag valve mask ventilation, acidosis, hypotension, and peri-intubation values. Conclusion: In the very early care of patients with serious traumatic injury requiring intubation there was poor correlation between EtCO<sub>2</sub> and PvCO<sub>2</sub>. It remains unclear why this occurred and which value (EtCO<sub>2</sub> or PvCO<sub>2</sub>) should be used to make clinical decisions. Further research is needed to make this finding generalizable.

#### **844 Thoracic Spine Fracture in the Blunt Trauma Pan-Scan Era**

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Remy Bizimungu MD Department of Emergency Medicine, The University of California San Francisco, San Francisco, CA;  
Robert Rodriguez MD University of California San Francisco/Zuckerberg San Francisco General Hospital.

Background: We have shown that the current era of adult blunt trauma pan-scan imaging protocols that include chest CT diagnose greater numbers of minor, clinically insignificant pneumothorax, sternal fracture, rib fractures, and pulmonary contusions. We seek to update teachings regarding thoracic spine fractures (TS FX). Specifically, we sought to determine how many clinically insignificant TS FX are being diagnosed by characterizing 1) TS FX morphology; 2) TS FX associated injuries; and 3) the frequency of TS FX associated neurologic injury or interventions. Methods: This was a pre-planned analysis of prospectively collected data from the NEXUS Chest CT study that was conducted from 2011 to 2014 at 9 Level I trauma centers. The inclusion criteria were 1) age > 14 years, 2) blunt trauma occurring within 6 hours of ED presentation, and 3) chest imaging ordered during ED evaluation. Subjects were followed through their hospital course to determine clinical outcomes. Results: Of 11,477 enrolled subjects, 217 (1.9%) had a TS FX. Their median age was 45 years; 29% were male; their median Injury Severity Score was 17; 89% were admitted; their mortality was 5.2%. The most common mechanisms of injury were motor vehicle collision (47%), falls (34%), and pedestrian struck by a motor vehicle (10%). Half (49.8%) of patients had more than 1 level of T spine fracture with a mean of 2.1 (SD 1.6) T spine levels involved. 63.6% of patients had vertebral body fractures, 45% had posterior column fractures, 27.8% had compression fractures and 6.2% had burst fractures. Most patients (61.8%) had associated thoracic injuries with rib fracture (45%), pneumothorax (36%), clavicle fracture (18%), scapular fracture (17%) and hemothorax (15%) being the most common. These injuries were more common in TS FX patients than non-TS FX patients ( $p < 0.0001$ ). Over half (52.2%) of TS FX patients did not have neurologic deficits, spinal surgery or TLSO brace (3.8% had neurologic deficits, 10.5% had surgery and 40.7% received TLSO bracing). Conclusions: Under current imaging protocols that include chest CT, most TS FX are associated with other thoracic injuries and half occur at more than 1 thoracic spine level. Over half of TS FX patients did not have neurologic deficits, surgery or TLSO bracing, validating our prior research that these imaging protocols are diagnosing a greater number of clinically insignificant injuries.

#### **942 Differences in Ventilation Among Trauma Cases Intubated using Succinylcholine Versus Rocuronium**

Elhaam Anvar MD University of Arizona College of Medicine; Adam M. Field MD University of Arizona College of Medicine; Tomas Nuno PhD University of Arizona; Jeffrey P. Tolson University of Arizona College of Medicine; Isabelle Chea BS University of Arizona College of Medicine Tucson / Department of Emergency Medicine; Stephen M. Davidson University of Arizona College of Medicine; Taylor M. Drake University of Arizona College of Medicine; Seth E. Cohen University of Arizona College of Medicine; Joshua J. Gormley University of Arizona College of Medicine.

Introduction: In the early care of patients with traumatic brain injury (TBI), intubation with hyperventilation has been associated with increased mortality. However, when rapid sequence intubation is performed, maintaining normal ventilation patterns can be difficult when the neuromuscular blocking agents used to facilitate intubation wear off. The

aim of this study was to determine if use of either succinylcholine or rocuronium as the primary neuromuscular blocker to facilitate intubation was associated with hyperventilation. Methods: This study was a retrospective review of prospectively collected quality improvement data from a convenience sample of severe TBI cases intubated in the emergency department (ED). Vital sign data was recorded every two minutes, for 40 minutes after intubation, using a standardized data collection tool. Mean end tidal carbon dioxide (EtCO<sub>2</sub>) during post-intubation minute 1-5 (T1), minute 6-24 (T2), and minute 25-40 (T3) was compared between cases with succinylcholine use (Succ) and cases with rocuronium use (Roc). A secondary analysis evaluated differences in heart rate (HR), respiratory rate (RR), lowest and highest EtCO<sub>2</sub>. Simple descriptive statistics were used to compare the two groups. Results: 103 cases were identified and 58 excluded for incomplete data or no paralytic in the ED, leaving 14 cases with Roc use and 35 cases Succ use. The mean EtCO<sub>2</sub> in the Roc/Succ group during each interval was: T1, 33.5/31.6; T2, 34.5/32.9; T3, 34.5/34.8 p-values were all > 0.47. Average RR was: T1; 19.3/19.8 (p= 0.748), T2; 17.3/20.7 (p= 0.0729), T3; 17.3/20.1 (p= 0.304). No significant differences were detected between the Roc/Succ group in mean HR, lowest or highest EtCO<sub>2</sub> during any study interval. Conclusion: Rates of hyperventilation, as measured by mean EtCO<sub>2</sub>, were not significantly different between patients intubated using rocuronium vs. succinylcholine during any of the study periods evaluated. Respiratory rates were higher in patients intubated using Succinylcholine during minute 6-24 of patient care but this finding did not reach statistical significance. Further study is needed to identify effective methods of preventing hyperventilation in the ED post intubation period.

#### **1041 Mortality and Complication Rates in Adult Trauma Patients Receiving Tranexamic Acid in the Post-CRASH-2 Era**

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**Background.** The CRASH-2 trial demonstrated that tranexamic acid (TXA) in adults with significant traumatic hemorrhage safely reduces mortality. Given the CRASH-2 trial did not include US sites, our objective was to evaluate patient characteristics, TXA dosing strategies, and incidence of mortality and adverse events in adult trauma patients receiving TXA at a US level 1 trauma center in the post-CRASH-2 era. **Methods.** We conducted a retrospective study at a US level 1 trauma center that included patients aged 18 years or older who received TXA after an acute injury from July 2014 to June 2017. We excluded patients who received TXA for non-trauma indications, patients who received TXA 8 hours or longer after the time of injury, and patients with cardiac arrest at the time of ED arrival. Our primary outcome measures were in-hospital death and acute thromboembolic events within 28 days from injury. Abstractors were trained to collect data from the trauma registry and hospital medical records. Descriptive statistics were used to characterize the study population overall. Non-normal interval data were reported with medians and interquartile ranges. **Results.** After excluding 48 patients, we included 273 patients with a mean age of 43.8 years. The mean time of administration of TXA from time of injury was 1.55 hours with 229 patients (83.9%) receiving TXA within 3 hours. The overall mortality within 28 days from injury was 12.8% (95% CI 8.9%-16.7%), which was similar compared to the CRASH-2 trial (14.5% [95% CI 13.9%-15.2%]). The incidence of acute thromboembolic events was 6.6% (95% CI 3.7%-9.5%), which was higher than the CRASH-2 trial (2.0% [95% CI 1.73%-2.27%]). Patients in our cohort also received surgery (64.8% vs. 47.9%) and blood transfusions (74.0% vs. 50.4%) more frequently than the CRASH-2 cohort. **Conclusions.** Adult trauma patients receiving TXA had similar incidences of death but higher incidences of thromboembolic events compared to the CRASH-2 trial. Variation in patient characteristics, injury severity, TXA dosing, surgery and transfusion rates could explain these observed differences.

### **1108 Ground Level Falls and Trauma Team Activation in Patients Over 65 Years of Age**

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**Objective:** Ground level falls in older patients now account for over 50% of trauma activations. Older patients who fall are a heterogeneous group of patients with underlying comorbidities. The optimal team to initially evaluate older patients after a fall is unknown. The objective of this study was to identify differences in Emergency Department (ED) evaluation and treatment in older patients after ground level falls. **Methods:** This was a retrospective chart review from a single, level one trauma center. An ICD10 search identified all patients over 65 years of age presenting to the ED following a ground level fall from 07/01/2017 to 05/31/2018. Prisoners, transfer patients, and those with Glasgow Coma Scale (GCS) scores < 14 were excluded. Demographics, comorbidities, ED examination findings, diagnostic studies, and diagnoses were all abstracted following accepted chart review guidelines. Charleston comorbidity index (CCI) and injury severity score (ISS) were both calculated. Primary outcomes were admission to the hospital and obtaining an ED abdominal computed tomography (CT). Multivariate analyses were performed to identify the contribution of trauma team activation on the outcomes. Inter-rater reliability of data abstraction was measured using the kappa statistic. **Results:** A total of 250 patients (152, [61%] female) with a mean age of 80.4 ±8.8 years were included. The trauma team was activated in 117 (47%) cases. 157 (63%) were admitted and 81 (32%) underwent an ED abdominal CT. After controlling for patient age, CCI, GCS score, syncope, ISS, trauma activation was associated with admission, odds ratio = 2.64, 95% CI 1.39, 4.99. Similarly, trauma team activation was associated with ED abdominal CT scan, odds ratio = 3.30, 95% CI 1.51, 7.22. Inter-rater reliability was excellent with kappa values >0.8. **Conclusion:** Evaluation by the trauma team is associated with hospital admission and ED abdominal CT scanning in elderly patients with ground level falls. Future work should identify indications for trauma team activation in elderly patients after ground level falls.

### **1230 Underreporting of Alcohol Use in Trauma Patients: A Retrospective Analysis**

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**Background:** This study assessed the inconsistencies between self-reported alcohol consumption and blood alcohol content (BAC) in trauma patients. We aimed to identify the incidence of positive BAC in trauma patients who reported a zero score on the Alcohol Use Disorders Identification Test (AUDIT). We also sought to identify characteristics of individuals who were likely to negate alcohol use, yet yielded a positive BAC, to improve our ability to provide alcohol screening and healthcare to these at-risk alcohol consumers. **Methods:** We conducted a retrospective study from 2010-2018 at a university-based, level-one trauma emergency department. We identified 2,581 adult trauma patients who reported a zero score on the AUDIT from the trauma registry. We collected BAC, age, gender, race, education level, mechanism of injury, language and injury severity score (ISS) from patient charts, and used descriptive analyses and multivariate logistic regression to analyze the data. **Results:** One hundred and thirty-one (5.08%) trauma patients who reported AUDIT of zero had a positive BAC. We found that being male (OR 1.53), assaulted or injured from a penetrating mechanism (OR 2.29) and having an ISS greater than 25 (OR 3.76) were independent positive predictors of trauma patients who reported an AUDIT of zero and had a positive BAC. Age (OR 0.99) was an independent negative predictor of trauma patients who reported an AUDIT of zero and had a positive BAC in this cohort. **Conclusions:** Inaccurate self-reporting of alcohol drinking behavior does exist in trauma patients. A composite of objective alcohol screening modalities, in addition to AUDIT, is needed to screen for alcohol use in this population. Healthcare providers should remain highly suspicious of alcohol-related injuries in individuals with the identified characteristics.

### 1253 Correlation Between Alcohol Use Disorders, Blood Alcohol Content, and Length of Stay in Trauma Patients

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Background: Established literature has suggested that patients with an alcohol use disorder (AUD) have an increased risk of developing complications during their hospital stays. However, how AUD impacts length of stay (LOS) and increases the utilization of hospital resources remains inconclusive. This study aimed to identify the associations between self-reported alcohol consumption, blood alcohol content (BAC), and hospital LOS including intensive care unit (ICU) LOS in the trauma patient population. Methods: We conducted a retrospective study from 2010-2018 at a university-based, level-one trauma emergency department. We identified 1,689 adult trauma patients who completed the Alcohol Use Disorders Identification Test (AUDIT), a validated alcohol self-reporting survey, and were admitted to the ICU. We retrieved BAC, age, gender, LOS, and injury severity score (ISS) from the patient charts. We used student's t-test or analysis of variance (ANOVA) and independent samples Kruskal-Wallis H test if necessary. Partial Eta squared was considered as a measure of effect size for ANOVA. Results: ISS was significantly associated with both higher hospital LOS ( $\chi^2(2) = 49.2, P < 0.001, \text{Eta squared} = 0.15$ ) and ICU LOS ( $\chi^2(2) = 161.6, P < 0.001, \text{Eta squared} = 0.10$ ). After adjusting for ISS, there was no statistically significant association between AUDIT and ICU LOS ( $P = 0.31, \text{partial Eta squared} = 0.002$ ) or hospital LOS ( $P = 0.53, \text{partial Eta squared} = 0.001$ ). Furthermore, we found no significant association between BAC and ICU LOS ( $P = 0.63$ ) or hospital LOS ( $P = 0.19$ ). Conclusions: Our study found no associations between AUDIT, BAC and both hospital and ICU LOS even though literature supported an increased risk of medical complications in AUD patients.

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3:30pm Pinot B Infectious Disease

### 696 Signal-To-Cutoff Ratio Of Human Immunodeficiency Virus Screening Tests Helps Predict Confirmation of Infection

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Background: Human immunodeficiency virus (HIV) screening in U.S. emergency departments (ED) most often utilizes a rapid test algorithm that screens using an HIV antigen/antibody test followed by reflex confirmation using an HIV antibody differentiation assay and an HIV RNA test to resolve discrepant results. Confirmatory results, however, are not available to treating emergency physicians who must decide whether to disclose reactive HIV antigen/antibody results during the ED visit as “preliminary” or defer disclosure until HIV status is confirmed. The purpose of this study was to determine the ability of the signal-to-cutoff (S/CO) ratio in distinguishing between likely true positive and likely false positive reactive HIV antigen/antibody tests in an urban ED population. Methods: Retrospective chart review of all patients in a single ED in Oakland, CA with a first-time reactive HIV antigen/antibody screening test from April 2014 to November 2018. Patients with a previous HIV diagnosis and those with missing S/CO values or incomplete results preventing determination of HIV status were excluded. Results: A total of 171 patients with a first-time reactive HIV antigen/antibody test were identified. Of these, 144 (84.2%) were confirmed HIV positive (true positive) (non-acute  $n=126$ , acute  $n=13$ , stage unknown  $n=5$ ) and 27 (15.8%) were confirmed HIV negative (false positive). The lowest S/CO ratio for HIV positive patients was 1.8 (median 638, range 1.8 to 1,868) while the highest S/CO ratio for HIV negative patients was 1,154 (median 1.7, range 1.1 to 1,154); 14 of the 27 (51.9%) HIV negative patients had a S/CO below 1.8. Patients with acute HIV infection had lower S/CO ratios (median 24.4, range 4.4 to 619) than those with non-acute HIV infection (median 685, range 2.7 to 1,729). The optimal S/CO ratio was found to be 14.7 (Youden's index 0.83) with 9/144 (6.3%) of the HIV positive patients having a S/CO below 14.7 and 3/27 (11.1%) of the HIV negative patients having

a S/CO above 14.7. Conclusion: When combined with clinical impression, the S/CO may be helpful in tailoring preliminary result disclosure based on a high or low likelihood of having HIV infection. Deferring ED disclosure for patients very unlikely to have HIV infection (S/CO ratios < 1.8) and counseling on the likelihood of a false positive result for S/CO ratios below 14.7 may be a reasonable strategy.

### **700 Missed Opportunities For Hepatitis C Virus Screening For Emergency Department Patients Who Inject Drugs**

Douglas AE. White MD Alameda Health System–Highland Hospital; Carly Russell MS Alameda Health System–Highland Hospital; Abigail Crocker BA Alameda Health System–Highland Hospital; Helen Lozier BA Alameda Health System–Highland Hospital; Amy Avishay BA Alameda Health System–Highland Hospital; Kellie Basham BA Alameda Health System–Highland Hospital; Melanie Teruya BA Alameda Health System–Highland Hospital; Nalani Wakinekona BA Alameda Health System–Highland Hospital; Martha Montgomery MD Alameda Health System–Highland Hospital.

Background: In the U.S., hepatitis C virus (HCV) infection affects over 5 million people and is the leading cause of death by an infectious disease. The primary risk factor for new HCV infections in the U.S. is injection drug use (IDU). Identifying and curing HCV infection among the IDU population, therefore, is critical to ending the epidemic. Since 2017, an opt-out, nontargeted screening program in our emergency department (ED) tests adult patients for HCV infection who are undergoing blood testing as part of their evaluation. It is unknown, however, how well this program screens IDU patients compared with non-IDU patients. Methods: This was a cross sectional survey study at an urban, academic ED in Oakland, CA with an annual census of 65,000 visits. A closed-response survey was developed to determine IDU status using a validated questionnaire and administered by trained research assistants to all registered adult patients during 4-hour blocks of time. Medical record data from the surveyed ED visit was abstracted. The primary outcome compared the proportion of IDU and non-IDU patients screened for HCV infection in our ED. Results: During the study, 880 patients were approached and consented for survey administration, and 863 (98.1%) patients completed the survey, of which 95 (11.0%) were IDU and 768 (89.0%) were non-IDU. The prevalence of self-reported HCV infection among IDU and non-IDU patients was 51.6% and 2.5%, respectively. Among the 795 patients without self-reported HCV infection, blood tests were performed during 56.5% of the visits for IDU patients compared with 68.1% of the visits for non-IDU patients (difference 11.6%, 95% confidence interval [CI] -3.1% to 26.3%). The proportion screened for HCV infection was 21.7% (10/46) for IDU patients compared with 33.0% (247/749) for non-IDU patients (difference 11.2%, 95% CI -1.1% to 23.6%). The proportion of screened patients with a new reactive HCV antibody test was 40.0% (4/10) for IDU patients compared with 0.8% (2/247) for non-IDU patients (difference 39.2%, 95% CI 8.8% to 64.6%). Conclusion: The prevalence of new HCV infection is higher among screened IDU patients than among screened non-IDU patients but there is a trend towards lower rates of blood testing and HCV screening for IDU patients. Targeted screening strategies for this high-risk population are indicated to accompany nontargeted, blood-based screening programs.

### **701 Prevalence of Injection Drug Use And Blood-Borne Viral Infections In An Urban Emergency Department**

Douglas AE. White MD Alameda Health System–Highland Hospital; Carly Russell MS Alameda Health System–Highland Hospital; Abigail Crocker BA Alameda Health System–Highland Hospital; Helen Lozier BA Alameda Health System–Highland Hospital; Nalani Wakinekona BA Alameda Health System–Highland Hospital; Melanie Teruya BA Alameda Health System–Highland Hospital; Kellie Basham BA Alameda Health System–Highland Hospital; Amy Avishay BA Alameda Health System–Highland Hospital; Marisa Zuluaga MD Alameda Health System–Highland Hospital.

Background: The opioid epidemic has led to increasing rates of injection drug use (IDU) and complications from using needles, including an increased incidence of human immunodeficiency virus (HIV) and hepatitis C virus (HCV) infections. Understanding the prevalence of IDU and blood-borne viral infections among emergency department (ED) patients are important determinants of the need for public health interventions, including identification and treatment of both substance use disorder and HIV and HCV infections. Methods: This was a cross sectional survey study at an urban, academic ED in Oakland, CA with an annual census of 65,000 visits. A closed-response survey was developed to assess

patterns of IDU as well as HIV and HCV infection status using a validated questionnaire and administered by trained research assistants to all registered adult patients during 4-hour blocks of time. We compared patients that have ever used injection drugs with those that have never used injection drugs. Results: During the study, 880 patients were approached and consented for survey administration, and 863 (98.1%) patients completed the survey, of which 95 (11.0%) reported IDU and 768 (89.0%) reported no IDU. The median age of IDU patients was 55 years, with 74.2% male and 76.8% minorities while the median age of non-IDU patients was 47 years, with 52.3% male and 87.8% minorities. Compared with non-IDU patients, the prevalence of HCV infection among IDU patients was 51.6% vs 2.5% (difference 49.1%; 95% confidence interval [CI] 39.0% to 59.2%) and the prevalence of HIV infection was 9.5% vs 1.6% (difference 7.9%; 95% CI 2.0% to 13.9%). Of IDU patients with HCV infection, 21 (42.9%) reported prior treatment, of whom 14 (66.7%) reported cure and 7 (33.3%) reported treatment in progress; while of non-IDU patients with HCV infection, 9 (47.4%) reported prior treatment, of whom 8 (88.9%) reported cure and 1 (11.1%) reported treatment in progress. Of IDU patients with HIV infection, 6 (66.7%) reported being in care and on antiretroviral medications compared with 9 (75.0%) of non-IDU patients. Conclusion: A high prevalence of ED patients use injection drugs, and these patients self-report a high prevalence of HIV and HCV infection. Emergency departments are in a unique position to engage with this population with regards to substance use treatment as well as screening and reengagement for HIV and HCV infection.

### **1219 Rapid Host mRNA-Based Discrimination Between Bacterial and Viral Infection**

David C. Rawling PhD Inflammatrix, Inc; Wensheng Nie PhD Inflammatrix Inc; Melissa Chief Medical Officer PhD Inflammatrix Inc; Mark Eshoo PhD Inflammatrix Inc; Jonathan Romanowsky MBA Inflammatrix; Oliver Liesenfeld MD Inflammatrix Inc; Karl Hecker Inflammatrix, Inc.; Timothy E. Sweeney MD, PhD Inflammatrix, Inc.

Background: Improving outcomes for patients with bacterial infection depends on early and accurate diagnosis followed by antibiotic treatment. Available diagnostic methods are too slow or limited in scope to meet these needs, leading to over-prescription of antibiotics and antimicrobial resistance. To address this, we have identified 7 host response mRNA biomarkers (HostDx™ Fever) that demonstrate an AUROC of 0.91-0.93 for discriminating bacterial from viral infection across independent cohorts. To measure these markers on a clinically relevant timescale, we have developed ultra-rapid proof-of-concept loop-mediated isothermal amplification (LAMP) assays. We demonstrate quantitative expression analysis and verification of performance in patient samples. Methods: LAMP primers were designed to amplify target mRNA and exclude DNA amplification by targeting primers to splice junctions. Solutions were identified for 3 biomarkers and one housekeeping gene. The quantitative dynamic range of the assays was determined using serially diluted control material to assess variance and linearity as a function of input. Relative abundance of targeted mRNA biomarkers in total RNA extracted from preserved patient blood samples was quantitatively measured and evaluated to determine concordance with an amplification-independent gold standard (NanoString nCounter). Results: Primer solutions were iteratively optimized to achieve rapid turnaround times and mRNA specificity. All assays demonstrated a log-linear relationship to template input over a 6-log dynamic range, with a limit of quantitation around 103 copies. We measured the abundance of our markers in clinical samples using optimized assays and achieved a mean time to result of 12.2 minutes. HostDx Fever scores calculated based on LAMP and nCounter SPRINT measurements were well correlated ( $r = 0.93$ ). Conclusions: Accurate and rapid quantitation of mRNA expression levels across a dynamic range spanning at least 6 orders of magnitude is attainable with LAMP technology. The HostDx Fever LAMP assay panel is compatible with any platform capable of quantitative, time-resolved fluorescent detection at constant temperature and number of parallel reactions commensurate with the number of targeted biomarkers. This approach enables early and accurate diagnosis of acute infections and antibiotic prescription.

### **1237 Multiplexing of an 18-Host-Gene Signature Using Rapid PCR for Better Antibiotics Decision**

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for Immunity, Transplantation and Infection (ITI); Jonathan Romanowsky MBA Inflammatrix; Oliver Liesenfeld MD Inflammatrix Inc.

**Background:** Physicians in outpatient settings and hospitals struggle with diagnosing acute infections and sepsis. This struggle has led to antimicrobial resistance, high mortality, and significant cost. Current diagnostic tests that require the pathogen to be present in blood are not sensitive enough. Recently, host response-based molecular diagnostics have emerged and are considered as a novel alternative or complimentary approach. From public and private microarray and next generation sequencing (NGS) data, we have previously developed, using bioinformatics tools, and validated an 18-gene signature set (11-gene sepsis panel and 8-gene fever panel) that can robustly distinguish between (i) noninfected, (ii) bacterial, and (iii) viral infection. Here we describe the translation of the 18-gene set into a rapid TaqMan multiplex qPCR assays. The signature set is being developed as a cartridge-based, sample-to-answer, quantitative assay with a turnaround time of less than 30 minutes. **Methods:** To convert the biomarker set into rapid qPCR assays, 18 target genes were divided into groups of 4- or 5-plexes (RREB1 included as housekeeping control). Multiplex assays were verified and optimized in both singleplex and multiplex formats. Total RNA was extracted from blood samples collected in PAXgene® Blood RNA tubes from 21 patients (9 bacterial infections, 6 viral infections, 6 healthy controls), and used as templates for testing in parallel on the QuantStudio™ qPCR System and the NanoString nCounter® SPRINT, the latter being an amplification-independent gene quantitation platform. **Results:** A correlation R value of 0.98 was obtained between the TaqMan PCR and NanoString platform across the 21 clinical samples tested. More importantly, based on calculated metascores from a subset of 11 genes, infected and noninfected individuals could be differentiated. Metascores from the other 8 genes differentiated bacterial from viral infected samples with high diagnostic accuracy. **Conclusion:** An 18-gene signature set was successfully converted into multiplex TaqMan assays. As a rapid and accurate test, it promises to provide actionable results for improved antibiotics decision making for patients with suspected acute infections.

## **2000 Identifying Potential Biological Markers to Predict Hospitalization in Chikungunya Positive Patients in Puerto Rico**

Isabel Algaze Gonzalez, MD Emergency Medicine Department, University of California Irvine Medical Center; Dianna Hidalgo School of Biological Sciences, University of California Irvine; Victor Cisneros MD, MPH Emergency Medicine Department, University of California Irvine Medical Center; Juan Gonzalez MD Emergency Medicine Department, University of Puerto Rico.

**Objective:** Chikungunya fever (CHIKF) is a mosquito-borne alpha-viral disease that is endemic to tropical regions. Factors like age, pain intensity, and atypical symptoms like hyperalgesic symptoms, gastrointestinal symptoms, neurological symptoms, damage to mucous membranes, and malaise have been associated with the severity of the disease, yet limited research has been performed identifying an association between clinical manifestations and hospitalized patients. Available research studies found an association between increased age and hospitalization. The goal of this study was to identify other potential markers to use as criteria for hospitalization of patients with a confirmed case of Chikungunya fever. **Methods:** We performed a prospective study with patients who presented to Emergency Department at the University of Puerto Rico Hospital located in Carolina, P.R. with documented fever ( $\geq 38.0^{\circ}\text{C}$ ) or history of fever lasting less than or equal to 7 days from 2012 to 2015. Data was collected using the Sentinel Enhanced Dengue Surveillance System (SEDSS) under the supervision of the Center of Disease Control (CDC). A total of 172 CHIKV-positive patients were identified, from which we recorded admission status, clinical manifestations, comorbidities, medical history, and distribution of age. **Results:** Statistical analyses showed a significant difference in patient with skin rash among patients who were hospitalized versus released ( $p=0.04$ ). The data analysis also found that the age distribution was significantly different when comparing admitted versus released patients ( $p=0.0001$ ), where average age of admitted patients was much younger (9.5 years old) than the average age of the released patients (22.6 years old). **Conclusion:** This study showed that extreme young age and rash at presentation were significant factors found in hospitalized patients. These may potentially be used as markers for criteria of hospitalization.



## **2001 Rapid Multiplex Testing for Upper Respiratory Pathogens in the Emergency Department: A Randomized Controlled Trial**

Grant Tatro UC Davis Emergency Medicine; Heejung Bang; Chris Polage MD; Simson Hon; Benjamin Mooso; Eduard Poltavskiy; Larissa May MD MPH UC Davis Emergency Medicine.

Background: Acute respiratory tract infections (ARTI) are a common cause of Emergency Department (ED) visits and often result in unnecessary treatment with antibiotics due in part to lack of rapid diagnostic tests that result during the ED visit. Objectives: To evaluate the impact of a rapid, multi-respiratory pathogen molecular test (BioFire Film Array Respiratory Panel-RP) reported during the ED visit ( $\leq 2$  hrs) compared to usual care in an ED with limited use of single organism rapid tests (e.g., influenza, RSV). Primary outcomes include antibiotic and antiviral prescription, with secondary outcomes of disposition and length of stay. Methods: Pilot randomized clinical trial of patients receiving a rapid RP test during the ED visit versus usual care. Patients were eligible if they were  $\geq 12$  months of age and presented with signs or symptoms of upper respiratory infection or influenza like illness and were not on antibiotics at the time of enrollment. ClinicalTrials.gov number, NCT02957136. Results: Of 191 patients enrolled, 93(49%) patients received RP testing and 98(51%) received usual care. In the RP test group, 61(66%) patients had one or more viruses detected during the ED visit. In the control group, 7(7%) patients had a virus detected by existing single organism tests during the ED visit and an additional 13(14%) patients had a virus detected after the ED visit. Antibiotic treatment was given to 20(22%) RP test patients and 33(34%) usual care patients during the ED visit (95% CI -0.25 to 0.004;  $p=0.061$ ); 9 RP test patients with a virus detected received antibiotics for a presumed concomitant bacterial infection or were discharged before RP test results. There was no significant difference in antiviral use, length of stay or patient disposition between the two groups ( $p's > 0.5$ ). Conclusion: Rapid RP panel testing was associated with a trend towards decreased antibiotic use, with virus positive patients without concomitantly diagnosed bacterial infection having a very low rate of antibiotic prescription. Rapid diagnostic tests may need to be combined with antimicrobial stewardship to maximize the impact on reducing unnecessary antibiotics in viral infections in acute care settings.

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**3:30pm Pinot C Clinical Operations/Patient Safety and Quality**

### **645 National Front-End Split-Flow Experience: "Physician in Intake" Characteristics and Outcomes**

Sean S. Michael MD, MBA University of Colorado School of Medicine; Daniel Bickley MD, MBA University of Chicago Pritzker School of Medicine; Kelly J. Bookman MD University of Colorado School of Medicine; Richard Zane MD University of Colorado School of Medicine; Jennifer L. Wiler MD, MBA University of Colorado School of Medicine.

Background: Emergency department crowding has been highlighted as a critical problem in the delivery of acute unscheduled care, prompting numerous proposed countermeasures, including novel front-end ED intake processes. While a physician intake model has been shown to be viable and beneficial in a retrospective study of a single center, it is not yet clear whether this model represents a generalizable solution. We aimed to characterize the current state of front-end process models in a national sample of EDs and quantify their effects on throughput measures. Methods: We performed a descriptive mixed-methods analysis of ED front-end process changes implemented by a cross-section of national institutions, all of whom self-selected to participate in a structured site visit between 2013 and 2017 at the ED where the prior single-center study had been conducted. Study institutions self-reported demographic and operational data, including whether they had implemented any "new front-end processes to replace traditional nurse-based triage." If so, institutions provided a structured description of the new process and reported standard ED operational metrics for the year before and after the process change. Results: Among the 25 institutions participating in site visits, 19 (76%) provided data. Sites were geographically diverse, representing all regions of the United States. Most were urban, academic level 1 trauma centers caring primarily for adults. Thirteen EDs (68%) reported implementing a new intake process to replace traditional nurse-based triage. All were run by attending emergency physicians, and 6 (46%) also included at least one advanced practice provider. Daily total operating hours ranged from 8 to 16 (median 12, IQR 10.25

to 15.85), and the majority performed labs, imaging, and medication administration and directly discharged patients. When considering each site's before and after data as matched pairs, physician-driven intake was associated with a mean decrease in arrival-to-provider time of 25 minutes (95%CI 13-37), ED length of stay of 36 minutes (95%CI 12-59), and left before being seen rate of 1.2% (95%CI 0.6-1.8). Conclusion: In this cross-section of primarily academic EDs, implementing a physician-driven front-end intake process was feasible for the majority and associated with improvement in key operational metrics.

### **680 Assessing the Variability of Opioid Prescribing Rates Among Emergency Department Providers**

Tiffany J. Hwang BS University of California Irvine Health; Sami Borno MS-2 Western University of Health Sciences COMP - Pomona; Nick Newell MS-2; Joan C. Edwards School of Medicine at Marshall University; Soheil Saadat MD, MPH, PhD University of California Irvine Health; Bharath Chakravarthy MD, MPH University of California Irvine Health.

Background: Recent studies show that 65% of emergency physicians underestimate their opioid prescribing practice. In addition, physicians within the same department display disparities in opioid prescribing rates. This raises the question of whether providers agree on deciding factors and frequency of prescribing. We aim to assess the variability of opioid prescribing rates among attending physicians, residents, and nurse practitioners for common discharge diagnoses in the ED. This study explores the acceptable opioid prescription rate for common chief complaints and the level of agreement according to providers. Methods: This is an ongoing survey study at a Level-I Trauma Center, university-based hospital in an urban area. A two-part, anonymous survey was administered to all ED attending physicians, residents, and nurse practitioners. The first part of the survey listed 19 discharge diagnoses common in the ED and asked providers to specify the percentage of cases where prescribing an opioid seemed medically acceptable for each diagnosis. The second part of the survey listed possible factors considered when prescribing an opioid and asked providers to rank, using a Likert scale, the extent that each factor weighs into their decision to prescribe an opioid. Median and the Interquartile Range (IQR) are presented as central and dispersion measures. Results: Preliminary data includes completed surveys from 16 of 63 ED providers. Sick cell crisis, fractures, and renal calculi were the most medically indicated diagnoses for opioid prescriptions (medians: 73%, 73%, 70%). Acute upper respiratory infection and fever were the least medically indicated diagnoses (median: 0%). Sick cell crisis (IQR: 39) followed by Urinary calculi (IQR: 36) and Burns (IQR: 34) displayed the most variability in responders' opinions. Acuity, addiction, likelihood of negative side effects, and hospital policy were the most strongly considered factors for prescribing (median: 4). Conclusions: There is considerable variation in opioid prescribing patterns among ED providers. This can be attributed to differing prescribing patterns or perception of diagnosis severity. Standardized protocols to prescribe opioids in the ED could minimize variability in the prescription pattern and potentially reduce avoidable patients' exposure to the opioids.

### **762 Patient Age and Race Associated with Press Ganey Scores in the Emergency Department**

Moon O. Lee MD MPH Stanford University School of Medicine; Jonathan Altamirano Stanford University School of Medicine; Luis Garcia Stanford University School of Medicine; Michael A. Gisondi MD Stanford University School of Medicine; Nancy E Wang MD Stanford University School of Medicine; Suzanne Lippert Kaiser Permanente; Yvonne Aida. Maldonado Stanford University; Laleh Gharahbaghian MD Stanford University School of Medicine; Ryan Ribeira Stanford University School of Medicine.

Background: Hospitals commonly use patient satisfaction surveys, Press Ganey (PG), for benchmarking physician performance. Objective: To identify patient and physician factors associated with topbox PG scores in the emergency department (ED). Methods: An academic, urban hospital with ED volume >70,000 patients per year. In 2015-2017, ED-PG surveys were sent to discharged ED patients and excluded if they had received a survey from the health system within 7 days or received ED-PG survey within 6 months. Scores ranged from 1 to 5, with 5 being the highest, also known as the topbox score. The outcomes were topbox scores for: "Likelihood to recommend ED" and "Courtesy of the physician." Patient factors were used to construct two generalized estimating equation models, clustered by physician to

account for correlated data. Patient data included: age, gender, race, ethnicity, and ED area of service. The ED has four areas based on patient acuity: Emergent, Urgent, Vertical (urgent but able to sit in a recliner rather than a gurney), and Fast Track (non-urgent). Physician factors included: age, gender, race, ethnicity, and number of years at Stanford. Models were adjusted for patient and physician factors. Results: A total 1,578 surveys without missing data were obtained. For "Likelihood to recommend," topbox scores were more likely among patients age  $\geq 60$  years compared to age  $\leq 40$  years adjusted Odds Ratio (aOR) 1.93 (95% CI 1.52-2.45). Topbox scores were less likely among Asian patients compared to white patients aOR 0.71 (95% CI 0.55-0.91); and Vertical compared to Fast Track aOR 0.60 (95% CI 0.40-0.92). For "Courtesy of physician," topbox scores were more likely among patients age  $\geq 60$  years compared to age  $\leq 40$  years aOR 1.86 (CI 1.44-2.39). Topbox scores were less likely among Asian patients compared to white patients aOR 0.58 (95% CI 0.44-0.76); and Vertical compared to Fast Track aOR 0.61 (95% CI 0.43-0.88). Conclusion: Patient age, patient race, and ED area of service were associated with topbox scores for two questions commonly used to benchmark physicians: "Likelihood to recommend ED" and "Courtesy of physician." We encourage hospitals that use PG topbox scores as financial incentives to understand the contribution of non-service factors to these scores.

### **825 Virtual Reality Scenarios to Navigate Value Judgments for Triage of Interruptions in the Emergency Department**

Henry A. Curtis M.D. Stanford University School of Medicine; Cynthia Peng M.D. Stanford University School of Medicine; Cameron Mozayan M.D. Stanford University School of Medicine; Nada Rizk Stanford University School of Medicine; Jason Lowe M.D Stanford University School of Medicine.

Background: ED physicians are interrupted 10 times per hour. Interruptions for resuscitation of major trauma, stroke, and myocardial infarction promote patient safety by prioritizing the critically ill. However not all interruptions must be immediately addressed. Less time sensitive ones may paradoxically create safety concerns as there is a 18.8% chance that interrupted tasks will not be completed correctly, resulting in errors in medication, patient triage, and delayed diagnosis. Value judgments determine which interruptions should override the current task at hand and which can wait. Immersive virtual reality (VR) clinical scenarios present a novel method of inquiry to frame this triage quandary. Methods: A convenience sample at a conference were enrolled in this observational study. Subjects were immersed in a VR scenario in which the EM resident-patient consultation was frequently interrupted. Their value judgments to prioritize ED interruption (EDI) or uninterrupted patient consultation (UPC) for four interruptions were recorded. They were then exposed to opposing viewpoints via video overlays and asked to reselect their choice of priority. Statistical analysis was conducted using McNemar testing for consistency of responses. Results: A total of 35 participants enrolled. There was no significant difference in the decision of whether to prioritize EDI or UPC in the four VR scenario interruptions. EDI 1, "look at this ECG," demonstrated the largest proportion of subjects (26%) with revised top priority from UPC to EDI. For EDI 2, "patient X needs pain medication," there was the largest proportion (26%) of revised top priority from EDI to UPC. For EDI 4, "please go see a new patient," with the largest proportion (46%) of revised top priority, subjects were most polarized with 8 EDI and 8 UPC choices. Conclusion: There is not universal consensus on when EDI should be prioritized over UPC. Value judgments necessary to choose between these competing priorities may be explored and influenced by immersive VR clinical scenarios.

### **1174 Emergency Department Initiation of Medication Assisted Therapy with Buprenorphine in a County Safety Net Hospital**

Julia Hellman; Eli Bench; Rebecca Trotsky-Sirr; Elissa Moore; Clare Buckingham; Todd Schneberk.

Background: Emergency Departments (EDs) are well-situated to identify and treat acute Opioid Use Disorder (OUD) and connect patients with evidence-based medication-assisted treatment (MAT). Los Angeles County is a large county with a

complex health service system. OUD is a growing issue for Los Angeles County EDs, as prescription opiate-related ED visits increased 171%, and heroin-related ED visits increased 68% over a 7-year period. In response, our ED instituted a buprenorphine referral program. We present an implementation science perspective on these data and the ongoing improvement process. Methods: Our comprehensive MAT pathway includes identification of OUD, naloxone administration, buprenorphine initiation in the ED, referral to co-located urgent care clinic for multidisciplinary follow up. Quantitative data, as well as patient demographic and payment characteristics, were collected. During this time we passively implemented this program in the ED while honing outpatient referral pathways. Results: Preliminary data suggest that over a 5 month period, 157 patients were diagnosed with OUD in the ED. Of these 23 were given or prescribed naloxone and 14 were given or prescribed buprenorphine. 69% (109/157) of the patients were male. 31% (49/157) were homeless. Insurance composition included 50% (78/157) within county service network while the remaining half had out of network Medicaid insurance. Data will be presented as trends over time from monthly data queries and reports. Conclusions: This project offers a proof of concept that MAT can be implemented in a large, county health system ED with only passive intervention on the ED side. An important finding was that Medicaid managed care insurance programs precluded a substantial number of patients from being able to follow up in our internal comprehensive MAT clinic. These data demonstrate the need both for ongoing expansion of ED initiated therapy, and for recruitment of an outside MAT clinic. This experience will be useful for understanding which resources are needed in other safety net systems starting ED-based initiation of MAT.

### **1283 Involuntary holds in ED patients who use methamphetamine**

Charles Murphy MD University of California San Francisco/Zuckerberg San Francisco General Hospital; Maria C. Raven MD, MPH.

Background: Methamphetamine use is increasing in prevalence in the United States and is associated with significant healthcare costs. Amongst the most common reasons patients with methamphetamine intoxication present to the emergency department are psychotic symptoms, agitation and suicidal ideations. As these are common reasons for emergency department patients to be placed on involuntary holds, patients with methamphetamine intoxication may be more likely to be placed on such holds. Despite the frequency of emergency department visits for psychiatric symptoms related to methamphetamine use little has been published on this topic. Methods: We hypothesized patients with methamphetamine positive urine drug screens (UDS) would be more likely to be placed on a short involuntary hold (ED hold, less than 24 hours), but no more likely to be placed on a longer hold (5150, up to 72 hours) than those with no methamphetamine on UDS. We conducted an analysis of all emergency department visits to an urban academic emergency department from June 2017-July 2018. Data were obtained from the electronic medical record. Patients were classified as methamphetamine users based on the results of urine toxicology results. We used logistic regression to estimate the adjusted odds ratio between methamphetamine use and being placed on an ED hold and being placed on a 5150. Results: 3121 patients had urine drug screen (UDS) results available and 1146 (36.7%) of these patients were placed on an involuntary hold. 644 of all UDS (20.6%) were positive for amphetamines. 39.6% of patients with UDS positive for amphetamines were placed on a ED hold compared with 25.2% of those with UDS negative for amphetamines ( $p < 0.00$ ). 26.2% of amphetamine positive patients were placed on a 5150 versus 22.9% of amphetamine negative patients ( $p = 0.074$ ). Logistic regression yielded an adjusted odds ratio of being placed on an ED hold of 2.4 (1.9-3.1,  $p < 0.000$ ) for patients with amphetamine positive UDS, and 1.07 (0.87-1.32,  $p = 0.52$ ) for being placed on a 5150. Conclusions: ED patients with methamphetamine detectable on urine drug screen were more likely to be placed on short involuntary holds but were not more likely to be placed on longer psychiatric holds than those without methamphetamine detected on urine drug screen.

## **2010 Safety of Emergency Department Treatment and Discharge of Patients with Cellulitis Using One Dose Intravenous Dalbavancin who otherwise would Require Hospital Admission**

Samuel Turnipseed MD; Rob Rominski MD; Monica Donnelley Pharm.D; Daniel Lau Pharm.D; James Holmes MD MPH; UC Davis Emergency Medicine.

Background: Dalbavancin is a synthetic lipoglycopeptide antibiotic with activity against gram-positive organisms that cause cellulitis including methicillin-resistant Staphylococcus. It has an extended half-life and can be administered intravenously (IV) as a single dose for soft tissue infection. This long half-life has the potential to increase the percentage of patients with cellulitis who are managed as outpatients, thus potentially avoiding hospital admissions. We hypothesize that patients without sepsis who require admission for IV antibiotics for the treatment of cellulitis can safely be discharged from the emergency department (ED) after 1500 mg of dalbavancin. Methods: This was a retrospective study between 10/17/18 and 12/2018. Inclusion criteria included: 1) patients requiring hospital admission for IV antibiotics for cellulitis, 2) cellulitis with approximately 75cm<sup>2</sup> of erythema, 3) infection highly suspected to be caused by gram positive bacteria, and 4) infectious disease phone consultation. Exclusion criteria included: 1) no clinical signs of sepsis, 2) cellulitis less than 75 cm<sup>2</sup>, and 3) no reliable phone number. Patients were administered 1500 mg of IV dalbavancin in the ED. A photograph of the infection was entered into the chart. The area of infection (erythema) was outlined with a black marker. The patient was discharged from the ED following administration of the dalbavancin. Clinical data reviewed included the following: age, sex, past medical history, imaging studies, and discharge diagnosis. All patients underwent 30 day follow up. Results: 20 patients met inclusion criteria with an average age of 50 years old (range 27-79), 12 (60%) male and 8 female. Specific patient characteristics included: 4 (20%) diabetics, 5 (25%) IV drug users, 5 (25%) alcoholism, 2 (10%) homeless and 1 (5%) HIV. 18 patients (90%; 95% CI 68-99%) had resolution of their symptoms and no recurrence at 30 days. Two (10%) patients returned to the ED and were admitted. One was a 48 year old female with HIV and IV drug use with a missed deep thigh abscess on the initial visit. The second patient was a 38 year old homeless female whose cellulitis did not improve. Both patients had uncomplicated hospital courses. Conclusions: This small study suggests that IV dalbavancin and ED discharge may be a safe treatment alternative compared to IV antibiotics and hospital admission for patients with cellulitis.