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ORAL ABSTRACT PRESENTATION - MORNING SESSION

12. (16) Time to Awakening and Delayed Awakening After Post Cardiac Arrest Therapeutic Hypothermia
Katie Zanyk McLean¹, Julie VanRaemdonck², Diane Capoccia², Carman Turkelson², William Devlin², Kelly N. Sawyer², Robert Swor³. ºOakland University William Beaumont School of Medicine, Rochester, MI; ªWilliam Beaumont Hospital, Royal Oak, MI

Background: Much emphasis is placed on who survives after cardiac arrest and how to optimize “good” outcome. A body of knowledge is evolving describing prolonged periods of coma prior to awakening. Some centers advocate for a 72 hour period of observation to determine awakening, but there is still little data to guide policy makers. Objectives: The purpose of this study was to describe the time to awakening of patients who receive post-arrest therapeutic hypothermia (TH) for non-traumatic cardiac arrest. Methods: This was a retrospective chart review of adult patients treated with post-arrest TH between January 2006 and June 2013 at two large, academic community hospitals. We included patients sustaining an arrest in the field or in the ED after arrival. Transfer patients were excluded. We queried a prospectively collected quality improvement database regarding characteristics of patients who survived to hospital discharge for demographics, Utstein characteristics, and post-arrest treatment variables. We reported intervals from hospital arrival (EMS Cases), return of spontaneous circulation (ROSC), and rewarming to 36 degrees Celsius until time of Glasgow Coma Scale of >9 (awake) as recorded by ICU nurses. We defined a “good” outcome as discharge cerebral performance category (CPC) of 1 or 2. Descriptive statistics are presented. Results: During the study period, 214 patients were included and 75 (34.9%) survived to hospital discharge (EMS arrest=54, ED arrest=13). Survivors were more often male (61.8%), had an average age 60.0 years, and most often had a VF arrest (70.6%). Overall 45 (68.1%) had a good outcome. The number of patients and intervals to awakening are reported in the table. Although shorter ROSC-awake and rewarm-awake intervals were associated with good outcomes, of patients with ROSC-awake> 72 hours, 10 of 16 had good outcomes. Amongst patients with rewarm-awake>72 hours 2 of 4 had good outcomes. Conclusion: Using GCS>9 as a measure, awakening more than 72 hours after ROSC was not uncommon and is often associated with a good outcome. Although most patients awoke within 72 hours of rewarming, we identified patients with good outcomes after this period of observation. Further work is needed to identify predictors of which TH patients who will have delayed awakening.

2. (74) Analysis of Low Risk Chest Pain patients who were discharged from the Emergency Department using a formal Acute Coronary Syndrome Protocol
Vijaya Arun Kumar, Michael Antonioli, Andrew Kulek, Craig McLendon, Samaa Rizk, Nino Papale, Brian Reed, Tamam Mohamad, Brian O'Neil, Phillip Levy. Wayne State University, Detroit, MI

Background: Patients presenting to the emergency department (ED) with chest pain (CP) are often admitted to the hospital; however, this is an inefficient use of resources as a majority end up not having acute coronary syndrome (ACS). To improve upon this, our institution initiated an evidence based ACS protocol, a principal component of which involves discharge of low risk CP patients from the ED. Objectives: To evaluate the utilization of outpatient diagnostic testing post-protocol initiation and compare patients based on adherence with follow-up after ED discharge. Methods: This was a retrospective analysis of low-risk CP (TIMI risk score 0
or 1) patients who were discharged home from the ED with pre-arranged follow-up in an affiliated cardiology clinic within 48 hours. Electronic medical records were reviewed and outpatient cardiac testing was recorded for CP patients seen over a 6 months period. Comparison of demographics and outcomes (ED recidivism and mortality within 6 months of index visit) based on adherence with follow up were made. Results: Of the 261 patients who were included, 93 (36%) were compliant with outpatient follow-up. Among those who followed up, 33% were felt to have non-cardiac CP without any further testing, 37% of them had an EKG obtained, 39% had a 2-D echocardiogram performed, 39% underwent stress testing, 24% had a myocardial perfusion study, and 2% had coronary computed tomographic angiogram. Four (4%) patients required cardiac catheterization with percutaneous intervention done in only 1 (1%). Patients who were compliant with follow up were more likely to be female (53% vs. 36%; p = 0.007), insured (74% vs. 48%; p< 0.0001), non-African-American (24% vs. 15%; p= 0.01) and had reported more than 1 episode of CP in the prior week (50% vs. 12%; p = 0.04). Of those who followed up, 11 (12%) had an ED revisit within 6 months for CP (vs.15 (9%) in non compliant patients; p = 0.45) and there were no deaths recorded in either group. Conclusion: Post-initiation of our ACS protocol, compliance with outpatient follow-up was poor, particularly among uninsured, African American men. While the data suggest effective identification of patients who are truly low-risk, a better understanding of factors contributing to low compliance with follow up is needed.

3. (68) Prehospital Assessment With Ultrasound In Emergencies - PAUSE II - Implementation in the Field
Kevin P. Rooney1, Bryan Sloane2, Shadi Lahham2, John Christian Fox2. 1Henry Ford Hospital, Detroit, MI; 2Univeristy of California, Irvine, Irvine, CA

Background: Point-of-care ultrasound (US) has already proven its utility in the ED. It is becoming more compact, affordable and now transmissible via electronic networks - excellent in austere environments. Its study in the prehospital setting is limited. We previously published on paramedics’ ability to perform basic scans and recognize pneumothorax, pericardial effusion and cardiac standstill under classroom conditions. In this study, we trained paramedics to use cardiac US in the field. Objectives: To determine whether paramedics are capable of obtaining cardiac US scans. The primary outcome was a percentage of paramedic scans judged as adequate for clinical decision making. An important secondary outcome was whether paramedics can correctly identify cardiac activity (or lack thereof) in cardiac arrest patients. Methods: This was a prospective educational intervention using a convenience sample of professional paramedics from a large EMS group. It was approved by our IRB. Paramedics first participated in a 3-hour session on point-of-care US that included didactics, hands-on training and a final test. No paramedic had previous US experience. The paramedics then used US during dispatch calls and saved scans for these chief complaints: chest pain, dyspnea, loss of consciousness, trauma, cardiac arrest. The scans were later evaluated by two US fellowship-trained emergency physicians using a previously-published adequacy measure for focused echocardiography. Results: Paramedics obtained adequate scans 81% of the time. In total, 17/21 studies were adequate for clinical decision making. Two scans were of inadequate diagnostic quality and two videos were corrupted. Without the corrupted files, adequate scans were obtained 89% of the time. One arrest study has been logged to-date. Paramedics correctly identified this case as cardiac standstill. Conclusion: The study is ongoing but paramedics have so far shown that they are able to perform adequate US studies in the prehospital setting. Follow up studies can involve video transmission to receiving EDs so physicians might direct resuscitative efforts or allow paramedics to cease ACLS in cases of cardiac standstill. The prehospital US protocol can also be applied to
other emergent pathologies. Focus should be on improving outcomes in survival, quality and resource allocation.

4. (128) Initial Fluid Challenge For Hypovolemic Septic Shock Patients: Are The New Guidelines That Much Harder? James H. Paxton¹, Cheryl Courage², Nicholas Morelli², Nathaniel Hunt¹. ¹Wayne State University, Detroit, MI; ²Sinai-Grace Hospital, Detroit, MI

**Background:** Recent revisions to the Surviving Sepsis Campaign (SSC) guidelines suggest more aggressive initial fluid challenge for hypovolemic septic shock patients than called for by the 2008 SSC guidelines. **Objectives:** The primary objective of this study was to determine institutional compliance with the 2008 SSC guidelines for the administration of parenteral antibiotics within 1 hour, and initial fluid challenge of 1 liter crystalloid fluid bolus within 6 hours of sepsis diagnosis for septic shock patients. The secondary objective was to determine compliance with the 2012 SSC guidelines for the same population of patients. **Methods:** A retrospective chart review was conducted including all adult patients admitted to an urban Level II trauma center from the ED with an admission diagnosis of septic shock (SS) between June 1st, 2011 and September 31st, 2012. Data on time of fluid and antibiotic administration were obtained from the electronic medical record. **Results:** We identified 83 patients who met inclusion criteria. Mean age was 69.5 years (SD=15.2). The median Sequential Organ Failure Assessment and Charlson Comorbidity Index scores were 11 (mean=10.6, SD=3) and 6 (mean=6.37, SD=2.28), respectively. Median time from sepsis diagnosis to initiation of antibiotics was 76 minutes (mean=101.7; SD=85.9). Only 40% (32/80) of patients received antibiotics within 1 hour of sepsis diagnosis. Two sets of blood cultures were obtained before antibiotic administration in 94% (78/83) of patients. Mean fluid infusion within 3 and 6 hours of sepsis diagnosis was 2257.23 mL (SD=1193.71; 31.66 mL/kg) and 2989.76 mL (SD=1450.34; 41.8 mL/kg), respectively. Nearly all patients (n=81; 97.6%) received at least 1 liter of fluid within 6 hours of sepsis diagnosis. Almost half of the patients (49.4%) received ≥ 30 mL/kg initial fluid challenge within 3 hours of sepsis diagnosis. **Conclusion:** Current practice at our institution provided adequate initial fluid challenge according to 2008 SSC campaign guidelines for nearly all septic shock patients. However, more than half of all eligible patients did not receive the initial fluid challenge volume recommended by 2012 SSC guidelines. In order to comply with 2012 SSC guidelines, earlier and more aggressive fluid infusion may be warranted in appropriate hypovolemic patients with presumed septic shock.

5. (6) Headache’s Pain Score Directly Proportional Return To The ED Within 7 Days, Inversely Proportional To Severity Of Underlying Diagnosis Jessica A. Schwarz, Erik P. Hess, Waqas Gilani, Tyler VanDyck, Stuart Ostby, Sarah L. Gondela, M. Fernanda Bellolio. Mayo Clinic, Rochester, MN

**Background:** Headaches are a common chief complaint in the emergency department (ED). Accordingly, the extensive range of headache presentations creates a serious complication to the routine and vital process of correctly differentiating grave from benign underlying headache etiologies. **Objectives:** Our objective was to identify associations in headache patients to assess potential correlates to severity of illness. In particular, we evaluated associations between the final diagnosis, pain score, and return to the ED within 7 days, as assigned to patients presenting to the ED with headache. **Methods:** We analyzed a database of a consecutive cohort of 5113 patients presenting to an academic emergency department between 2011 and 2013. We included patients presenting with non-traumatic headache older than 15 years of age with recorded pain scores on a
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scale from 0 to 10. Return rates were recorded if within 7 days of presentation. We then grouped patients by final diagnosis into four categories: (1) benign headache [migraine, cluster, tension], (2) intracranial hemorrhage, (3) headache with neurologic symptoms and (4) other [all other non-intracranial hemorrhage and non-neurologic mediated etiologies]. Associations were evaluated using JMP software version 10.0. Means, medians, parametric chi-square, and variance tests were used for statistical analysis of the data.

Results: Out of 5113 patients who presented with headache, 4273 had pain score recorded and were included. Mean (SD) pain score for benign headache was 7.1 (2.7), intracranial hemorrhage 5.7 (3.2), headaches with associated neurologic symptoms 5.0 (3.4), and all other diagnoses 6.2 (3.0), p<0.0001. There were 258 (6.0%) patients who returned to the ED within 7 days. The mean (SD) pain score of patients who returned to the ED was 7.9 (2.2) versus those who did not return 6.7 (2.9), p<0.0001. The return rate was 7.2% benign headache, 1.9% intracranial hemorrhage, 1.8% headaches with associated neurologic symptoms, and 3.2% other diagnoses, p<0.0001. Conclusion: In this cohort of over 4000 patients with headache, pain score was found to be inversely proportional to severity of underlying etiology. Specifically, those with final diagnoses of benign headache appear to have higher pain scores. Remarkably, patients with benign headaches were also more likely to return to the ED.

6. (100) Collaborative Teaching of Medical and Nursing Students in Acute Cardiac Arrest Simulation Dave Milzman. Georgetown U School of Medicine, Washington, DC

Background: The importance of effective collaboration among health care professionals from each specialty field is fundamental to successful patient care. When contributions from both nurses and physicians are well coordinated, the individual patient benefits from the communication. The objective of this study is to evaluate the experiences of both medical and nursing students after joint collaboration in a simulated cardiac arrest scenario. It is anticipated that constructive communication between health care professionals with different specialty training will enhance patient care and safety, as well as foster cost savings and less overlap of services. Nursing and medical students have minimal experience learning in an interprofessional environment, without initial communication until much later in their careers. With early exposure to team-oriented professional training, students will gain a deeper understanding of the roles required of themselves and their colleagues. Objectives: Can medical and nursing students train collaboratively to improve skill learning.

Methods: Both medical and nursing students were exposed to a cardiac arrest educational model in a simulated environment, and then completed a survey of their experiences before and after the simulation. Any student with significant prior experience or a prior degree in health care was excluded. Results: A total of 55 medical and 42 senior nursing students were included in the cardiac arrest training simulation. Pre-event confidence in success was moderate with mean 3.5 on 5 point likert scale by med students and 3.2 by nursing students with noted success of program, with increased numbers at completion; 4.8 and 4.9 , respectively, (p<0.01). After the simulation was completed, students documented an increased understanding of the benefits of interprofessional education. They also felt more positive about their collaboration and problem solving skills. Conclusion: Interprofessional education between nursing and medical students fosters important principles in effective collaboration for high quality patient care. Students showed improved skills and positive attitudes after training in this education model.
7. (96) Layer-By-Layer Coatings of Zinc Oxide Nanoparticles Inhibit Staphylococcal Biofilm Growth

Matthew J. McGuffie, Jin Hong, Nicholas A. Kotov, John G. Younger, J. S. VanEpps. University of Michigan, Ann Arbor, MI

Abstract:

Background: Half of the 2 million annual healthcare-associated infections in the U.S. can be attributed to indwelling medical devices. Since many devices (e.g., central lines, endotracheal tubes, and urinary catheters) are implanted in the emergency department, emergency physicians must now be worried that infections of these devices are currently viewed as medical errors. We have previously demonstrated that zinc oxide (ZnO) in the form of nanoparticle (NP) suspensions have shape-specific antimicrobial properties. Therefore, materials coated with ZnO-NPs have the potential to resist colonization and infection. Objectives: Our objective for this study was to determine if layer-by-layer coatings of ZnO-NPs would inhibit bacterial biofilm growth. Methods: 96-well plate lids fit with polystyrene pegs (Calgary Biofilm Device) were coated with alternating layers of ZnO-NPs and polystyrene sulfonate. Coated and uncoated pegs were submerged in media inoculated with Staphylococcus epidermidis, Staphylococcus. aureus, or Escherichia coli for 18 hours at 37°C. Quantitative culture was then performed to determine the colony forming units (CFUs) present on each peg. Biofilm formation was also evaluated qualitatively by scanning electron microscopy. Quantitative comparisons were made using mixed-effects one-way ANOVA. Results: There was >95% reduction in S. aureus >97% reduction in S. epidermidis (p<10-3) recovered from pegs coated with ZnO-NPs when compared to bare pegs. There were no statistical differences with regard to particle shape. coli biofilm growth was not significantly inhibited ZnO-NP coatings. Conclusion: ZnO-NPs are novel but inexpensive antimicrobial agents. We developed a simple layer-by-layer technique to coat materials with ZnO-NPs and demonstrate their efficacy in reducing staphylococcal biofilm growth. Future work will evaluate mechanisms of action and optimize the technique for clinically relevant materials.

8. (98) Can You Intubate Better Than A 5th Grader: The Value Of Video Laryngoscopy in Med Student Teaching

Dave Milzman. Georgetown U School of Medicine, Washington, DC

Abstract:

Background: During training med students may receive introductory experience with advanced resuscitation skills. ETI (endotracheal intubation) is important advanced skill that many students never attempt. Recent studies on Video Laryngoscopy (VL) have demonstrated improvements in both the safety and success of intubation in the ED and ICU. Prior studies on both physician and medical student endotracheal intubation (ETI) have not compared multi-level success of VL in simulation studies. Objectives: To determine in VL is viable rapid method for instruction in endotracheal intubation for inexperienced learners. Methods: 3 groups with differing experience in intubation were selected, one group of of non medical students aged 10-18 (5th Grd) were compared to first year medical students (1stMed) and intubation experienced EM and anesthesia residents (EMA Rez). A 20 min brief teaching on-line course was devised and made available to all study participants. Exclusion criteria included any person in the 5th Grd or 1 Med who had prior intubation attempts and EMA rez who did not have 25 successful ETI. metrics included 8 critical actions for ETI and mean time (best
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of 3 attempts) for successful manikin ETI placement. Power analysis found 32 subjects were need in each group and 1 SD was 22 sec difference. **Results:** 88 subjects completed study: 20 5th grad, 50 1Med and 18 EMA Rez. for knowing critical actions EMA Rez had a mean score of 98% (SD 7%) compared to 85.5% (SD 11%) for 5thGrd and 90% (SD 8.5%) for 1 Med: EMA Rez VS non MD was P < 0.02. Time for successful placement of ETT with VL was not different for means between the three groups with single best time of 3 tries actually showed marked improvement for the in-experienced groups: EMA rez 21(SD 10 sec) 1 Med 27 sec (SD 15 ) and 5thgrad 29 sec (SD 14). **Conclusion:** By using VL, the actual skill of ETI can be learned by nearly anyone. Certainly, sim success does not guarantee clinical success in actual patients but it is an important start and better than no useful experience. The ease and simple understanding of VL makes it an important step in taking the mystery out of ETI.

9. (37) **Concern for Malpractice Litigation and the Ordering of Computed Tomography Imaging by Emergency Physicians: an Example of Defensive Medicine** Gregory Hymel, Michael C. Plewa. Mercy St. Vincent Medical Center, Toledo, OH

**Background:** When ordering computed tomography (CT) imaging, emergency physicians (EPs) must balance the benefits of accurate diagnosis and reduced threat of malpractice litigation with the risks of increased through-put time, cost and radiation exposure. Retrospective studies suggest physicians order CT imaging for “defensive” reasons, i.e.: to avoid litigation risk, in 5-25% of cases. **Objectives:** Our goal was to prospectively estimate the frequency for emergency clinical cases that EPs 1) would not order the CT if unable to be named in a malpractice lawsuit, and 2) did not order the CT personally but at request of a consultant. **Methods:** An anonymous, voluntary survey of attending EPs at 2 hospital emergency departments was distributed over a 3 month time period. Variables included type of CT, indication, and yes or no response to the above questions. Data are described with mean, odds ratios (OR) and 95% confidence intervals. **Results:** 204 surveys were returned for 288 CT scans, representing approximately 14% of scans ordered during the study period. Type of scan included 108 head, 49 cervical spine, 47 chest and 84 abdomen scans. Indications were trauma 48%, exclusion of pulmonary embolism 9%, headache 8%, kidney stone 5%, appendicitis 4%, stroke 3%, exclusion of aortic disease 2%, and other 19%. Overall, 21% (16-27%) indicated the EPs would not order the CT if unable to be named in a lawsuit. For 12% (8-17%), the CT was ordered by a consultant, with nearly half, 46% (28-65%), deemed unnecessary if unable to be named in a lawsuit. The likelihood of “defensive” ordering of CT imaging was greater when the CT was ordered by a consultant, OR 4.79 (1.95-11.81). The unadjusted ORs were not significant for CT scan type or indication. **Conclusion:** Limitations include small sample size, low survey response rate and small number of institutions involved. EPs may order CT scans primarily to avoid malpractice litigation risk approximately one in five times. CT scans are more likely to be for “defensive” reason if ordered by a consultant.


**Background:** Risk factors for requiring more than one dose of epinephrine for the treatment of anaphylaxis are poorly understood. **Objectives:** The objective of this study was to identify risk factors associated with the need for multiple doses of epinephrine during an anaphylactic reaction. **Methods:** Patients who presented to
the emergency department (ED) and met diagnostic criteria for anaphylaxis from April 2008 to May 2014 at an academic medical center with 80,000 annual patient visits were included. We collected data on allergic history, presenting signs and symptoms, anaphylaxis management and disposition. Univariate and stepwise multivariable logistic regression models were utilized to approximate associations between predictor variables and the requirement for multiple doses of epinephrine. In order to estimate the strength and direction of each association, odds ratios (OR) with corresponding 95% confidence intervals (CIs) were calculated. The study was approved by the institutional review board. **Results:** Among 634 patients with anaphylaxis, 46 patients (7%) required more than one dose of epinephrine to treat their reaction. In univariate analysis, hypotension (OR 2.5 [95% CI, 1.1-5.8]; P=0.05) was associated with increased risk of requiring multiple doses of epinephrine. In multivariable analysis, a prior history of anaphylaxis (OR 2.2 [95% CI 1.1-4.1]; p=0.019), a history of asthma (OR 1.9 [95% CI 1.0-3.6]; p=0.049), or the presence of flushing or diaphoresis (OR 2.5 [95% CI 1.3-4.6]; p=0.044) were associated with the need for more than a single dose of epinephrine. The presence of gastrointestinal symptoms (OR 0.4 [95% CI 0.2-0.8]; p=0.008) was negatively associated with the need for more than one dose of epinephrine. **Conclusion:** Overall, 7% of patients required more than one dose of epinephrine. Patients with a history of asthma or prior anaphylaxis, or with symptoms of flushing were more likely to need multiple doses of epinephrine. Emergency physicians should be aware that these factors may increase the likelihood for need for additional doses of epinephrine to treat an anaphylactic reaction. They should also ensure that patients with anaphylaxis are prescribed more than one dose of self-injectable epinephrine.

11. (89) **Use of a Simple Stress Testing Algorithm for Observation Unit Chest Pain Patients Reduces Radiation Exposure and is Cost-Effective** Lindsay Goodell, Charlene Babcock, Shraddha Patel, Gerald Cohen, Julie Simon, Margarita Pena. St. John Hospital and Medical Center, Detroit, MI

**Background:** There has been recent importance placed on decreasing the amount of radiation exposure due to medical procedures. Studies demonstrate that non-nuclear stress test (Non-NucST) options are reliable alternatives with lower costs for the evaluation of ED patients with chest pain compared to nuclear stress testing (NucST). **Objectives:** The objective of this project is to use cost-effective analysis to determine if the implementation of a simple stress test algorithm both promotes Non-NucST options for low and intermediate risk chest pain patients placed in an observation unit (OU), but is also more cost-effective when compared to NucST. **Methods:** A retrospective analysis of patients undergoing stress testing between Jan 2008 and Sept 2009 in our institution’s OU was completed. A stress test algorithm was implemented in Nov 2008 that had 4 stress test options based on patient risk and ambulatory status. Three of the testing options were Non-NucST; gated exercise stress testing (GXT), dobutamine stress echo (DOB), and stress echo (ECHO). The NucST was chosen only for patients with certain previous cardiac conditions. Patients were separated into a pre-algorithm group (stress testing completed between Jan-Sept 2008) and a post-algorithm group (stress testing completed between Jan-Sept 2009). Proportions and outcomes were obtained from a random sample of 100 patients from Non-Nuc ST and Nuc-ST for both study periods. TreeAgePro analysis and Chi-square statistics were used. **Results:** There were a total of 1584 patients who underwent stress testing included in the pre-algorithm group and 1645 patients in the post-algorithm group. Nuc-ST was ordered in 41% of patients in the pre-algorithm group and 22% in the post-algorithm group (p<0.001). Of the Non-NucST completed, the proportion of GXT decreased from 32% to 10%, DOB increased from 26% to 38%, and ECHO increased from 1% to 30%. The average cost per-patient in the pre-algorithm period was $745, and the average cost per-patient in the post-
algorithm period was $584. This resulted in an average cost savings of $170 per patient, and a yearly cost savings of almost $373,000. **Conclusion:** Implementation of a simple stress testing algorithm for OU patients promotes the use of Non-NucST options thereby reducing radiation exposure, and is also more cost-effective when compared to Nuc-ST.

**MODERATED POSTER PRESENTATION – COHORT I**

(76) **Predicting Return of Spontaneous Circulation using Cerebral Oximetry and End Tidal CO₂**  
*Craig J. Thomas, Brian Reed, Patrick Medado, Scott Millis, Brian O’Neil. Wayne State University, Detroit, MI*

**Background:** Previous literature has identified ETCO₂ as a good predictor of ROSC. Cerebral Oximetry (CerOx) utilizes near infrared spectroscopy to non-invasively measure regional O₂ saturation of the frontal lobes of the brain. **Objectives:** The objective of this study is to compare the predictive value of simultaneously measured ETCO₂ and CerOx for ROSC during CPR. **Methods:** We conducted an IRB approved, prospective study on a convenience sample of subjects suffering cardiac arrest. Subjects were monitored with ETCO₂ and CerOx simultaneously during CPR performed in the ED. We analyzed the data using logistic regression modeling and ROC curve analysis. **Results:** We analyzed 135 events. Mean age was 64.5±15.6 years. 90 (66.7%) were witnessed arrests with 78 (57.8%) receiving bystander CPR. Average downtime was 24.9±15.0 minutes. ROSC was achieved in 39 (28.9%) of these subjects. Initial rhythm presented as 58 (43.0%) asystole, 52 (38.5%) PEA and 25 (18.5%) VF/VT. A series of binary logistic regression models were run in which various derivations of ETCO₂ and CerOx were simultaneously entered into the model to predict ROSC. CerOx, but not ETCO₂, proved to be a significant predictor in determining ROSC for the following variables: regression slope during the full code [CerOx p<0.000, ETCO₂ p<0.386], regression slope during the last 5 minutes of the resuscitation [CerOx p<0.000, ETCO₂ p<0.749], maximum value recorded during resuscitation [CerOx p<0.000, ETCO₂ p<0.858]. Both CerOx and ETCO₂ proved to be significant predictors of ROSC for the following variables: last value recorded during resuscitation [CerOx p<0.000, ETCO₂ p<0.009], the change from first value recorded to last value recorded [CerOx p<0.000, ETCO₂ p<0.000]. CerOx also proved to be a better predictor of ROSC than ETCO₂ when utilizing a ROC curve analysis: last values recorded [CerOx, AUC=0.856; ETCO₂, AUC=0.761] and maximum values recorded [CerOx, AUC=0.802; ETCO₂, AUC=0.630]. **Conclusion:** CerOx is a better predictor of ROSC than ETCO₂ when analyzed by the whole resuscitation effort, the last five minutes, the maximum value, the last value recorded, and the change in values from first to last recordings during CPR. The maximum and last values of CerOx are good diagnostic tests for predicting ROSC.

(63) **The Effect Of Ems Pre-hospital Catheterization Lab Activation On Mortality, Reperfusion, Length Of Stay, Door To Balloon Time, And Cost For St-elevation Myocardial Infarction (stemi) Patients**  
*John B. Silva¹, Robert Swor², Kelly Sawyer², Aveh Bastani³. ¹Oakland University William Beaumont School of Medicine, Auburn Hills, MI; ²Beaumont Hospital, Royal Oak, MI; ³Beaumont Hospital, Troy, MI*

**Background:** Reports in the literature have demonstrated that both EMS transport and EMS EKGs decrease the time to reperfusion in ST- elevated myocardial Infarction (STEMI) patients. However, little work has been done to evaluate the independent impact of pre-hospital activation of the cardiac catheterization lab (PREACT) in decreasing the time to reperfusion, and no literature exists documenting PREACT’s impact on patient
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outcomes. **Objectives:** Our primary objective was to compare PREACT vs standard ED catheterization lab activation (EDACT) on EMS STEMI patients in regards to: 1) 30 day Mortality, 2) Reperfusion, 3) Length of stay (LOS), 4) Door to balloon time (D2B), and 5) Cost of Treatment. **Methods:** This retrospective cohort study analyzed data collected from Beaumont Health System’s two suburban, Emergency Departments (ED) and included all EMS-transported STEMI patients from May 2006 to January 2012. We defined PREACT as EMS STEMI cases in which the AMI team was activated prior to hospital arrival. Activation of the AMI team after arrival to hospital was considered EDACT. Data was extracted to evaluate patient demographics, clinical course, and throughput metrics as well as cost. Our primary outcome is 30-day mortality and our secondary outcomes include LOS, D2B, and total hospital costs. **Results:** In this study we analyzed data from 531 EMS-transported STEMI patients over a 6-year period (2006-2012). Of these, 232 (43.6%) were PREACT. The PREACT and EDACT cohorts were similar with regard to age, gender, and history of prior CAD. PREACT resulted in a significant reduction in D2B (mean 53.3 min vs 77.9 min, p<0.001) and essentially all patients were reperfused within the recommended 90 minutes (97.0% vs 77.9%, p<0.001). Interestingly, PREACT patients were shown to be less likely to sustain a cardiac arrest (14.7% vs 24.7%, p=0.008) and trended toward a decreased rate of cardiogenic shock (30.2% vs 41.1%, p=0.07). Despite earlier reperfusion, there was no significant decrease in the overall 30-day mortality rate (7.6% vs 8.7%, p=0.75), LOS (5.0 days vs 5.9 days, 95% CI Diff (-2.0, 0.35)), or hospital costs ($20,880 vs $24,618, 95% CI Diff (-$8,899, $1,222)). **Conclusion:** Despite improved time to reperfusion, EMS pre-activation did not significantly improve mortality, decrease LOS, or reduce costs for STEMI patients.

(85) **Physician Perception in Predicting Good Neurological Outcomes in Patients Resuscitated from Cardiac Arrest** Sean McCormick, Thomas Engel, Craig J. Thomas, Patrick Medado, Brian Reed, Scott Millis, Brian O’Neil. Wayne State University, Detroit, MI

**Background:** Optimizing outcome in cardiac arrest patients remains a primary goal at the forefront of emergency medicine. Studies have shown that initial neurological exam, medical history, and most peri-arrest variables are unreliable predictors of neurological outcome in patients resuscitated from cardiac arrest. Currently emergency medicine (EM) physicians make management decisions regarding the care these patients based on an unstandardized bedside perception. **Objectives:** Determine if unstructured EM physician perception is a reliable predictor of neurological outcomes in patients resuscitated from cardiac arrest. **Methods:** Subjects were a convenience sample of non-traumatic cardiac arrest patients, from a large, urban emergency department, who were resuscitated from cardiac arrest. EM physicians rated the patient’s probably of leaving the hospital as “normal or near normal” on a scale from 0 to 100. In cases where more than one physician was involved in the patient’s care, the mean of their scores was used. A good neurological outcome was defined as a Cerebral Performance Category (CPC) score of 1 or 2 at the time of discharge. Utstein criteria motivated the choice of model variables, including age, gender, race, location, witnessed, bystander CPR, downtime, and initial rhythm. Logistic regression was used to analyze the results. **Results:** The study enrolled 43 subjects, of which 12 (27.9%) had good neurological outcomes. An additional 4 (9.3%) subjects were discharged alive, but with poor neurological outcomes based on CPC score. Mean age was 59 (± 15.2), mean downtime was 25:37 (± 10:12), 26 (60.5%) were male, and 33 (76.7%) were African American. Out of hospital arrest accounted for 30 (69.8%) cases, with 32 (74.4%) witnessed arrests, and 26 (60.5%) arrests receiving immediate CPR. Initial rhythms for the study population were; VF/VT = 8 (18.6%); PEA = 19 (44.2%);
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and asystole = 16 (37.2%). A logistic regression model showed that physician ratings were a significant predictor of neurologic outcome (p < 0.005). ROC curve analysis found an AUC of 0.80, indicating physician predictions is a good model. Physician predictions had a NPV value of 81% and a PPV of 63%.

**Conclusion:** EM physician unstructured perception was shown to be a reliable ultra early predictor of neurological outcomes in patients resuscitated from cardiac arrest.

(48) **Usefulness of Google Alerts in Surveillance of School Cardiac Arrests** Amanda A. Mahoney¹, Robert A. Swor². ¹Oakland University William Beaumont School of Medicine, Rochester Hills, MI; ²William Beaumont Hospital, Royal Oak, MI

**Background:** Online news media have been a useful source of initial data in tracking infectious disease outbreaks. Cardiac arrests occurring in schools are highly-reported events, and currently no agency specifically tracks cardiac arrests occurring on school property. **Objectives:** To determine whether Google Alerts could be used to track the incidence of highly-reported events, such as cardiac arrests occurring in schools; and to describe demographics and clinical information one might gather from such reports. **Methods:** A new Google Alert was created for articles with keywords “school” and “cardiac arrest” beginning in January 2013. Consecutive alerts were archived, and retrospectively reviewed for all alerts received during the calendar year 2013 and presented in English. We included events occurring on school property in the US in 2013. We performed a structured review capturing patient demographics, location of event, treatment rendered and patient outcome. **Results:** We reviewed 194 news articles and video clips. Of these, 43 discussed cardiac events involving schools. We identified 35 unique events and 27 occurred in the US. For 22 events, the news source clearly stated the cardiac arrest occurred on school property. Of these events, 77% (17/22) involved individuals 18 or younger, with the majority (14/17, 82.5%) being male. Considering patients of all ages, 68% of events (15/22) occurred on a high school campus. Of the 17 cardiac arrests involving patients under 18, 53% (9/17) occurred during physical activity. 6 arrests (35%) occurred in a classroom or office. 1 was unwitnessed. Details were not available for 1 arrest. Bystander CPR was performed in 12 cases (54.5%) and an AED was present in 12 cases. In all cases where an AED was present, the patient was resuscitated. Thirteen patients (65%) were resuscitated. Hospital outcomes data and specific diagnoses were not consistently reported. **Conclusion:** Media reports from Google Alerts identified a higher number of school arrests than exist in published literature on school cardiac arrest. These reports preferentially describe pediatric events, and report higher rates of AED use and successful resuscitation. Google Alerts may be a useful adjunct for surveillance of school emergencies, but media reports lack necessary detail to monitor response to cardiac emergencies in schools.

(80) **Trending Cerebral Oximetry and Vital Signs Post Cardiac Arrest to Predict Neurological Outcome** Marcus Jamil, Craig J. Thomas, Tom Engel, Brian Reed, Patrick Medado, Brian O’Neil. Wayne State University, Detroit, MI

**Background:** Currently there is no early predictor of neurologic outcome following resuscitation from cardiac arrest, this prognosticator could drive patient care and direct resource utilization. Cerebral oximetry (CerOx) non-invasively monitors regional brain oxygen saturation. It correlates well with jugular venous saturation and is predictive of neurologic outcome. **Objectives:** Determine if Cerebral Oximetry patterns can predict good
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neurologic outcome in the first 12 hours after ROSC. Methods: CerOx data was collected continuously from ROSC through 24 hours. All vital signs we recorded for the first 24 hours. Cohorts of patients were broken up into cooled with bad outcome (CBO), cooled with good outcome (CGO), uncooled with bad outcome (UBO), and uncooled with good outcome (UGO). Good neurologic outcome (GNO) was defined as a CPC of < 3. Pearson Correlations were performed on MAP and CerOx for each group. Results: Data was collected on 66 subjects. 51 patients were cooled with 16% (8/51) with good outcomes. 15 patients were not cooled and 67% (10/15), had good outcomes. Correlation of CerOx and MAP over the first 5 hours post-ROSC revealed no correlation in UGO r = 0.1 and a strong negative correlation in UBO, r=-0.75. CGO group had a large negative correlation, r = -0.78, and the CBO had r = 0.29, a moderate correlation. Both cohorts with good neurologic outcome had increasing MAPs within the first 4 hours. The data suggest a lack of autoregulation in those with poor outcomes. Note the UBO had high correlation during decreasing MAP while the CGO had it during MAP elevation. Conclusion: Lack of correlation between MAP and CerOx, or little change in CerOx with elevated MAP, portends a better outcome, potentially due to intact autoregulation. Early changes in MAP are associated with outcome.

(81) Predictors of Mortality After Intubation in the Emergency Department.
Marie M. Kotenko, Fei Lu Ye, Jeffrey Nigl, Charlene Babcock. St. John's Hospital and Medical Center, Detroit, MI

Background: Difficult questions arise in seniors when urgent intubation is needed. Understanding the probability of seniors survival after intubation in the Emergency Department (ED) will help inform clinicians, patients and family members regarding the important decision to place an individual on life support. Mortality rates in intubated patients based on type of illness necessitating ventilator support have yet to be described.

Objectives: To determine the mortality rate of individuals intubated in the ED and to explore what disease states have more favorable outcomes. Methods: A retrospective descriptive analysis using billing data for adult ED intubations performed from 1/1/2010 to 5/15/2014, in a large, urban, teaching ED (118,000 visits/yr) was done. Patients primary discharge diagnoses was used to categorize 12 reasons for intubation (CHF, Respiratory conditions (COPD, Respiratory Failure, etc.), Non-traumatic CNS conditions, Traumatic CNS conditions, Traumatic non-CNS condition, Overdose (opiod, alcohol, and others), Altered Mental Status, Cardiac reasons (AMI, etc.), Cardiac Arrest, Sepsis, seizures and other). Variables collected include gender, age, length of stay, insurance and disposition status (home, rehab hospital, nursing home, hospice, or death).

Results: The overall mortality rate of the 1559 ED intubated patients was 34% (535/1559, 95% CI=32, 37%), and greatest for those intubated following cardiac arrest (98%, 164/168, 95% CI=94, 99%), dropped sharply next for sepsis (35%, 87/242, 95% CI=30, 42%) and was smallest for patients intubated for non-head trauma (16%, 15/92 95% CI: 10%, 25%). The length of stay (LOS) following intubation was greatest for patients with non-trauma head conditions (12 days, StDev=10.7) and shortest for patients with Cardiac Arrest (1.2 days, StDev=2.0). The average age was youngest for traumatic head injuries (48, StDev=21 yrs) and oldest for patients with sepsis (68, StDev=16 yrs). Conclusion: Mortality following intubation in the ED is high at 34%. Survival rate varies depending on disease process requiring intubation. This information may be helpful for patients/families anticipating the risk of death.
(66) Anticoagulation Use in Recent-Onset Atrial Fibrillation Patients in a Large Suburban Emergency Department Before Targeted Oral Anticoagulants Became Easily Available

J. Andrew Hartshorn1, Julie Le1, Kristen McElreath2, Julie VanRaemdonck2, Kelly N. Sawyer2, Robert A. Swor2, Carol L. Clark2. 1Oakland University William Beaumont School of Medicine, Rochester, MI; 2Department of Emergency Medicine, William Beaumont Hospital-Royal Oak, Royal Oak, MI

Background: The Emergency Department (ED) treatment of recent-onset atrial fibrillation (rAfib), atrial fibrillation <48 hours duration, is evolving in the United States. CHA2DS2-VASc (CHADV) and HAS-BLED (HB) scores have been used to evaluate the risk of stroke and anticoagulation related hemorrhage, respectively. Increasingly aggressive ED care of rAfib, including use of targeted oral anticoagulants (TOACs) and ED discharge, will make appropriate risk stratification and anticoagulation of ED patients even more important. TOACs became available starting in late 2011. Objectives: The objective of our study was to examine the use of ED anticoagulation in patients with rAfib presenting to a large suburban ED. Methods: We performed a retrospective study of ED patients presenting to a large academic suburban ED in 2011. A structured chart review abstracted clinician’s determination of AF onset <48 hours of ED (rAfib). Data elements including demographics, ED treatment, CHADV, HB scores, and ED discharge anticoagulation were also abstracted. Anticoagulation was defined as use of heparin, enoxaparin, or dabigatran but not antiplatelet medications. Descriptive characteristics are reported. Results: 916 patients with the ED discharge diagnosis of Afib were identified. Of these, 200 patients with rAfib, duration <48 hours, were identified. 46% of our population was female, with an average age of 65.3 (+/- 15.8). 127/200 (63.5%) had a CHADV ≥ 2 and 42/200 (21.0%) had a HB score ≥ 3. For rAfib CHADV ≥ 2 patients, 59/127 (46.4%) were not anticoagulated in the ED. For patients with rAfib CHADV < 2, 38/73 (52%), including 16/38 (45.7%) with a CHADV=0, were anticoagulated in the ED. Conclusion: Our study showed that ED anticoagulation was often not consistent with suggested guidelines for anticoagulation in rAfib patients. With the shift towards more aggressive treatment of rAfib in the ED and ED discharge of these patients, ED physicians will need to have an in depth understanding of treatment guidelines and appropriate use of anticoagulation.

(39) Decreasing Radiation Exposure in Patients Undergoing Stress Testing Through Process Improvement

Riley M. Jakob, Gerald Cohen, Ashley Bowerman, Susan Szpunar, Margarita E. Pena. St. John Hospital & Medical Center, Detroit, MI

Background: Clinicians are urged to decrease radiation exposure from medical procedures. Non-nuclear stress test (Non-NucST) options are reliable alternatives for evaluation of ED patients with chest pain. Objectives: Our goals were to implement a simple ST algorithm promoting Non-Nuc ST options for patients placed in an ED observation unit (EDOU) and measure use of nuclear ST (NucST) versus Non-NucST options and then compare 30-day major adverse cardiac events (MACE). Methods: A ST algorithm was introduced favoring Non-NucST options in October and November 2009. Aggregate data from patients presenting to the EDOU, inpatient and outpatient settings were analyzed during four similar time periods: January to September 2008 (period 1), 2009 (2), 2010 (3), and 2011 (4). The latter two settings were used as controls. A random sample of 713 EDOU patients over the first 3 time periods was used to compare outcomes and 30 day outcomes. Data were
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analyzed using the chi-squared test and analysis of variance with multiple comparisons using the Bonferroni correction of the p-value. **Results:** A total of 17,565 ST were performed during the four time periods. NucST use in the EDOU setting decreased from period 1 to 2 (40.7% vs. 22.1%, \( p < 0.0001 \)), remained low in period 3 (22.1%, \( p=0.99 \)), and further decreased in period 4 (18%, \( p<0.0001 \)). NucST use in the inpatient and outpatient setting remained over 37% and 30%, respectively. Random sample patients were similar in age and presence of cardiac disease. The 30-day MACE rates were similar and less than 1%. **Conclusion:** Use of a simple ST algorithm for EDOU chest pain patients promotes use of Non-NucST options therefore reducing radiation exposure to this subset of patients without any compromise in MACE.

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(64) **Disposition and Treatment of Recent-Onset Atrial Fibrillation in a US Emergency Department** J. Andrew Hartshorn\(^1\), Julie Le\(^2\), Kristen McElreath\(^3\), Kelly N. Sawyer\(^2\), Robert A. Swor\(^2\), Carol L. Clark\(^2\). \(^1\)Oakland University William Beaumont School of Medicine, Rochester, MI; \(^2\)Department of Emergency Medicine, William Beaumont Hospital-Royal Oak, Royal Oak, MI

**Background:** Atrial fibrillation (AF) is the most common sustained cardiac rhythm disturbance in adults and is the most common dysrhythmia diagnosed in United States emergency departments (EDs). A large body of research out of Canada has indicated the importance of aggressive treatment of recent-onset AF (rAfib) patients, combined with appropriate follow-up. Although these strategies have resulted in low ED adverse events and 30-day thromboembolic event rates, overall there remains limited US data pertaining to the optimal management of these patients. **Objectives:** Our objective in this study was to describe emergency management and disposition of rAfib in a large US academic ED. **Methods:** We performed a retrospective review of patients presenting to a large, academic community ED in 2011 diagnosed with atrial fibrillation (AF). A structured chart review was performed to abstract the treating clinician’s determination of whether onset of AF was <48 hours (rAfib). Data elements including demographics, ED treatment, rate of successful cardioversion (spontaneous, pharmacological, or electrical), and disposition were collected. We stratified physician management of patients at risk for stroke and anti-coagulation related hemorrhage by calculating CHA2DS2-VASc (CHADV) and HAS-BLED (HB) scores. Chi-squares and odds ratios were calculated. **Results:** Of
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916 patients with an ED discharge diagnosis of AF, we identified 200 patients with rAfib (46% female, average age 65.3 [±/15.8]). Most (162, 81.0%) patients were admitted or observed and a minority (41, 20.5%) were discharged after ED treatment. Successful cardioversion occurred in 97 patients (49%). A majority (127, 63.5%) had significant risk factors for stroke (CHADV >2), and a minority (42, 21%) had a HB score > 3. Patients who were successfully cardioverted in the ED were far more likely to be discharged (34.3% vs. 6.9%), OR (95%CI) =7.0 (2.9, 16.8), although the majority of those patients were still admitted (63, 65.0%). A majority of patients at low risk for stroke (CHADV scores < 2) (47, 64.3%) were admitted. **Conclusion:** Compared to non-US studies, this institution admitted a large percentage of rAfib patients, with a majority of low risk patients being admitted.

(93) Hypertension and Usual Source of Care Among Older Americans
Alexander T. Janke, Aaron M. Brody, Daniel L. Overbeek, Phillip D. Levy. Wayne State University School of Medicine, Detroit, MI

**Background:** Past research has demonstrated benefits of having a usual source of care (USC), particularly for management of hypertension (HTN). **Objectives:** To characterize the relationship between USC and the prevalence, awareness, treatment, and control of HTN among older Americans. **Methods:** Public data were accessed from the 2010 and 2012 waves of the Health and Retirement Study, a population-based prospective cohort study of approximately 22,000 Americans ages 51 and older. Respondents were divided by reported source of care into those with a USC (‘clinic,’ ‘doctor’s office,’ ‘hospital outpatient department,’ or ‘other’) and without (‘none’ or ‘hospital emergency department [ED]’). Summary statistics and multivariable logistic regression were used to evaluate how USC relates to prevalence (defined as systolic average ≥140 mmHg or diastolic average ≥90 mmHg over three in-home readings performed by trained interviewers, or self-report of taking antihypertensive medication), awareness, self-report of treatment, and measured control of HTN. Analyses were adjusted for complex sampling design. **Results:** 15.1% (95% CI 14.0% to 16.2%) of the sample reported not having a USC. Prevalence of hypertension was not statistically significantly different for those with and without a USC. Among those with HTN in this group, 77.3% were aware of their condition and 67.5% reported taking antihypertensive medication, versus 85.0% (95% CI for difference 5.4% to 10.1%) and 80.7% (95% CI for difference 10.2% to 16.2%), respectively, among those with a USC. Among those taking medication, 57.5% had both systolic averages <140 mmHg and diastolic averages <90 mmHg, versus 65.7% (95% CI for difference 4.6% to 11.8%) among those with a USC. After adjusting for age, race, gender, education, and insurance status, lack of a USC predicted lower prevalence, awareness and treatment (Table 1). Among individuals without a USC, those who listed the ED were more likely to be African American, publicly insured, less educated, and rate their own health as fair or poor (Table 2). **Conclusion:** Among older Americans, those without a USC have lower rates of awareness, treatment, and control of HTN. Within this group, differences exist between respondents listing the ED as their USC and those reporting no USC. These differences may inform future initiatives to address HTN.
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**Recent-Onset Atrial Fibrillation and 6-Month Cardiovascular-Related Emergency Department Visits and Admissions**


**Background:** A significant body of knowledge from Canada has advocated for aggressive ED treatment of recent-onset atrial fibrillation (rAfib), atrial fibrillation <48 hours in duration, with discharge and subsequent outpatient management. Cardioversion in the Emergency Department (ED) has been suggested as a safe and effective therapy for rAfib. There remains limited data from the United States regarding optimal care of these patients. **Objectives:** The objective of this study was to evaluate rAfib patients presenting to a large academic suburban ED and examine the effect of ED cardioversion on their 6-month cardiovascular-related ED visits and readmissions. **Methods:** We performed a retrospective study of ED patients presenting to large suburban academic ED in 2011 with ED discharge ICD-9 CM code Atrial Fibrillation (427.32) or Atrial Flutter (427.41). A structured chart review abstracted clinician’s determination of AF onset <48 hours of ED (rAfib). Data elements including demographics, ED treatment, rate of successful cardioversion (spontaneous, pharmacological, or electrical), ED disposition, and 6 month revisits were abstracted. Physician management of patients at risk for stroke and anti-coagulation related hemorrhage were stratified by calculating CHA2DS2-VASc (CHADV) and HAS-BLED (HB) scores. 6-month cardiovascular (CV) related return ED visits and admissions (6madmit) were abstracted. Chi-squares and odds ratios were calculated. **Results:** Of 916 patients with an ED discharge diagnosis of AF we identified 200 patients with rAfib. Most (159, 79.5%) patients were admitted or observed and a minority (41, 20.5%) were discharged after ED treatment. Successful ED cardioversion occurred in 97 patients (49%). Overall 101 (50.5%) had one or more ED revisits (range 1-10) and 75 (37.5%) had one or more readmissions (range 1-8). ED cardioversion did not significantly decrease rates of CV-related ED visits (5.5% vs. 54.5%), OR (95%CI)= 0.70(.40,1.22). **Conclusion:** In our population, patients at higher risk of stroke (CHADV ≥2) had higher rates of 6-month cardiovascular-related admission. Initial successful ED cardioversion did not decrease the rate of ED return or admission within 6 months. Patients with a lower CHADV Score (CHADV<2), had a twofold (but not significant) lower rate of 6-month admission.

**The Acceptability of Text Message Medication Reminders in Urban African American Emergency Department Patients with Uncontrolled Hypertension**

**Lorraine Buius**, **Aaron M. Brody**, **Rachelle Dawood**, **Lynn Marie Mango**, **Loren Schwiebert**, **Hossein Yarandi**, **Nancy Artinian**, **Phillip Levy**. 

**Background:** Hypertension (HTN) disproportionately affects African Americans, who are at a higher risk of developing cardiovascular morbidity from this condition. Blood pressure (BP) control rates are low in this population, and access to primary care is limited. Text message (TM) based interventions have shown promise in improving adherence to medical therapy for a variety of health conditions. Mobile phone penetration is high among African Americans, thus a TM intervention has the potential to improve health outcomes in this group. **Objectives:** The primary objective of this analysis was to evaluate the acceptability of a TM based intervention aimed at improving medication adherence and BP control in hypertensive African Americans recruited from an urban emergency department (ED). **Methods:** Randomized controlled trial of daily,
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Automated TM medication reminders for 30 days. The number and timing of messages were customizable by participants. We recruited a convenience sample of 65 African American patients with uncontrolled HTN from an urban ED. Participants were randomized equally between usual care and the intervention group. **Results:** 65 subjects were recruited for the study; 29 were randomized to the intervention group, and completed the study. In this group, the median age (SD) was 45.5 (7.5), 62% were female, and 27% had health insurance. 65% had an income of less than $20,000/year, 34% had post high school education, and only 31% had full time employment. Baseline blood pressure (SD) was 165 (17) / 97 (11) mmHg. 37% of the control and 43% of the intervention group were adherent according to pill counts, but this difference was not statistically significant. Both groups exhibited improved blood pressure at one-month follow-up (systolic: -17.6 vs. -19.4 mm Hg; diastolic: -4.0 and -5.3 mm Hg) but no significant differences between groups were found. The vast majority of participants (Figure) were satisfied with the TM intervention. **Conclusion:** While we found no difference in medication adherence or blood pressure control with use of a TM based medication adherence intervention, feasibility of use among the target population was clear and participant satisfaction with the approach was high. TM support has potential as an ED intervention to encourage adherence to medical therapy in high-risk populations.

**(8) Risk Stratification of Pulmonary Embolism in the Emergency Department: There is Room for Improvement**

Amanda Stahl1, Kelly Sawyer2, Robert Swor2, Lihua Qu2. 1Oakland University William Beaumont School of Medicine, Rochester, MI; 2William Beaumont Hospital, Royal Oak, MI

**Background:** Patients diagnosed with pulmonary embolism (PE), who also have right ventricular (RV) dysfunction and/or myocardial injury, are at a higher risk for morbidity and mortality compared to those without. Risk stratification is suggested for treatment timely decision-making. **Objectives:** Our objective is to describe the risk stratification of PE patients in our emergency department (ED). **Methods:** We performed a retrospective study of adult patients presenting to the ED in a large, community academic health system who were diagnosed with PE from August 2007 to May 2013. Patients were identified based on admission ICD diagnosis codes and included if CT angiography in the ED was positive for PE. Structured chart review was used to collect demographics, diagnostic testing performed, and medications administered during the ED stay, as well as short term outcomes, including death or cardiac arrest after admission. Troponin I < 0.04 ng/mL and BNP < 100 pg/mL were considered as normal. CT reports were reviewed manually for signs of RV strain, including assessment of RV size, reflux of contrast (into IVC or hepatic veins), and deviation of the interventricular septum. Descriptive statistics are presented. **Results:** Our population included 1,337 patients with acute PE (mean age 62.0 years (SD 17.17) and 46.6% female). Few patients ultimately died (n=27) or suffered cardiac arrest (n=9). In total, 79% and 48% had troponin and BNP testing, respectively. Signs of RV strain were documented as present in only 131 (9.8%) CT studies, with the vast majority of reports lacking mention of RV size or function. In those with RV strain on CT, 19/20 echocardiography studies confirmed +RV strain. Of patients with +RV strain on CT or echo (n=167), 125 (74.9%) had initially abnormal biomarkers. Only 17 (15.2%) of these physiologically significant PEs received tPA. Of patients with strain unmentioned on CT (n=1108), 245 (22.1%) had no biomarker testing despite +RV strain on echo (n=5) and central PE on CT (n=16). Patients from this group accounted for 4 arrests and 5 deaths overall. **Conclusion:** ED risk stratification of patients diagnosed with PE remains low. Implementation of a standardized protocol for risk stratification in
the ED, including structured CT interpretation for RV strain, may be a key effort toward patient-centered outcomes in this population.

(99) Utility of Screening ECG in Acute Hyperkalemia: Low Sensitivity of the Usual Findings

Dave Milzman. Georgetown U School of Medicine, Washington, DC

**Background:** Hyperkalemia remains an important concern when discovered in patients and has been reported in up to 10% of emergency and ICU patient populations. On detection, Hyperkalemia illicits an immediate treatment response from physicians due to its potentially life threatening electrolyte change. ECG has been thought to be a valid screening tool to detect patients at greatest risk for sudden decompensation. Few studies have actually detailed the accuracy of the ECG at being clinically useful and saving lives. **Objectives:** To determine if an ECG is a valuable test for detecting serious cases of hyperkalemia that require immediate intervention. **Methods:** A review of all consecutive ED patients was performed from 2 University Hospitals over 6 months was performed. Cases selected had a documented serum potassium concentration 6.0 with a coincident ECG (recorded within 1 h of lab draw; before therapy). Detailed review of the medical chart for all identified cases including comorbid diagnoses, medication use, presence of underlying kidney disease, and treatment of hyperkalemia. Lab data were obtained from the electronic medical record. Specific elements collected included serum potassium and electrolyte levels, serum creatinine, and GFR was determined for all patients. ECGs coincident to the time of the hyperkalemia were reviewed and compared with baseline and follow-up ECGs when available. **Results:** A total of 1,200 patients for 2013 were reviewed and 340 met inclusion criteria: 68% had CKD, 21% had no CKD, with 9% undetermined. Mean Age 59.9 (95% CI: 56.0-64.2) Mean K+ 6.55 (95% CI: 6.3-6.8) Mean Cr 5.9 (95% CI: 5.4-6.3) 31% of patients had new ECG abnormalities with the exception of rate changes c/w new tachy or bradycardia: 17% had these non-specific changes without any other change. "classic" inclusion criteria, ECG changes were 22% sensitive for hyperkalemia. In a cohort of 100 patients with normal serum K+ (3.6-5.5) specificity of hyperkalemic ECG changes was 32%. In patients with normal creatine and renal function, ECG changes proved more accurate than pts with CKD. (p < .01) **Conclusion:** The 'classic' ECG findings in hyperkalemia failed to prove useful as an accurate screening tool, other measures are needed.

MODERATED POSTER PRESENTATION – COHORT III

(78) Pediatric Appendicitis, Ultrasound, and Interfacility Transfer

Nathaniel P. Bonfanti, Mark Favot, Cheryl Courage, Yamen Nackoud, Andrew Moonian. Sinai Grace Hospital, Detroit, MI

**Background:** The American College of Radiology's appropriate use criteria identifies ultrasound as the test-of-choice in patients 14 years or younger for suspected acute appendicitis. The authors do not have this test available for children in our Emergency Department. Ultrasound requires an inter-facility transfer to the pediatric hospital. **Objectives:** This study examines the role of ultrasound in identifying patients with acute appendicitis. We hypothesize a population of this group would benefit from this test, decreasing transfers. **Methods:** This is an IRB approved retrospective cohort. Study sites are a community ED without pediatrics and a pediatric hospital with surgical capability. Eligibility was defined by age 16 years and under. The time period
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was 2006 to 2012. Billing codes identified transfers and abdominal work-up. Appendicitis was diagnosed by pathology. Length of stay (LOS) was defined as time to ED disposition summing the time in both EDs from arrival at the initial site. Surgical consult at the pediatric center was an independent variable. **Results:** 296 patients were included. 14.9% were discharged as acute appendicitis. Mean age of the participants was 9.7 years, 51% were female. 137 had an ultrasound during their workup (table 1). Surgical consult was obtained 139 times. 42 patients were diagnosed with acute appendicitis. The sample’s mean LOS was 8.0 hours (SD: 4.2 hours). LOS was 23 minutes longer for those with acute appendicitis. Those who had ultrasound spent a mean 21 minutes longer in the ED, but this was not significant. 53 patients had an ultrasound, but had no surgical consult. 103 patients transferred did not have ultrasound or surgical consult. Of these, 31% had a diagnosis of gastritis. **Conclusion:** In our treatment setting, ultrasound is utilized equally with a surgical consult in suspected appendicitis. It represents no significant increase in LOS. Measurements of LOS account for time spent waiting for or in transit, and registering in a second facility. Despite the clinical concerns of the primary ED more than one-third of transfers were not evaluated at the second ED to rule out acute appendicitis. Ultrasound may offer a method to reduce transfers in the low risk population.

**Room for Intravascular Volume Expansion in ED Stroke Management**

*Joseph Miller, Lauren Rodriguez, Alex Lee, Michael DeVisser, Yuqing Gao, Julian Suszanski, Christopher Lewandowski. Henry Ford Health System, Detroit, MI*

**Background:** The hypertensive response in acute stroke may mask patients who could benefit from volume expansion and potentially improve cerebral perfusion to ischemic tissue. There is little data regarding volume depletion in ischemic stroke. **Objectives:** To determine the incidence of stroke patients that might benefit from volume expansion using sonographic markers of volume status compared to common clinical markers. **Methods:** This was a prospective cohort study inclusive of suspected ischemic stroke patients with a NIHSS ≥ 4 and symptoms onset < 24 hours. Exclusion criteria were pregnancy, age < 18 and hemorrhage on head CT. Trained investigators performed a sonographic assessment of volemic status. An IVC collapsibility index (IVC-CI) > 50% was used to define subjects that may benefit from volume expansion. Investigators collected additional demographic and clinical information, including laboratory markers of dehydration (elevated BUN/Cr ratio, hemoconcentration or high serum osmolality). Investigators gave a standardized questionnaire to the treating clinicians, who were blinded to the IVC-CI, to indicate their gestalt regarding the patient’s volemic status. The analysis excluded subjects ultimately diagnosed with a stroke mimic. Analysis incorporated descriptive and regression statistics. The local IRB approved the study. **Results:** Enrollment included 23 subjects; mean age was 64 years, 89% Black, 68% female, and 95% with preexisting HTN. The mean NIHSS was 9.2, the mean time from onset of symptoms 309 minutes and the mean presenting SBP 170 ± 31 mmHg. 68% of subjects had a cortical infarct on MRI and the remaining had lacunar infarcts. The mean IVC-CI was 70 ± 21% and 84% (95% CI 68 - 100%) of subjects had IVC-CI > 50%. Traditional laboratory markers of dehydration were present in 5% of subjects. Treating physician gestalt classified 29% as subjects as hypovolemic. There was no correlation between IVC-CI and SBP, NIHSS, infarct location or laboratory markers of dehydration (r = 0.04 - 0.29, p > 0.23). **Conclusion:** This pilot study suggests that despite being hypertensive, the majority of ED stroke patients can tolerate volume expansion. Future studies may identify which patients have improvement in cerebral perfusion with volume expansion.
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(79) Comparison of Ultrasound and Plain Radiography for the Detection of Long Bone Fractures
Mike Bagan, Amit Bahl, Abigail Brackney, Steven Joseph. William Beaumont Hospital, Royal Oak, MI

Background: Ultrasound may be a useful imaging tool for extremity injury assessment. Objectives: To compare EM residents’ ability to identify long bone fractures via two imaging modalities; ultrasound (US) versus plain radiography (Xray). Methods: This was an IRB-approved, randomized prospective study. Subjects were 40 EM residents. Five types of fracture (transverse, comminuted, avulsion, oblique, buckle) were induced in 5 store-bought chicken legs; 5 legs were left as unfractured controls. All ten chicken legs were imaged by US (short & long axis video clips) and Xray (AP & lateral views). Subjects were randomized to US or Xray, and to viewing order. Subjects decided yes/no if there was a fracture (primary endpoint). If yes to fracture, subjects identified the location and type of fracture (secondary endpoints). Mean proportions and standard deviations (SD) were analyzed using paired T-test and linear models (SAS version 9.3, R software version 2.15.2). A p-value of 0.05 was considered significant. Results: The primary endpoint had a higher mean proportion in the US arm than the Xray arm, 0.89 (0.11) vs. 0.75 (0.11). For the secondary endpoints, fracture type was higher in the Xray arm, 0.52 (0.12) vs. 0.51 (0.13); while that of fracture location was higher in the US arm, 1.00 (0.03) vs. 0.97 (0.09). Paired T-tests comparing difference in proportions revealed a significant difference (p<0.001) for the primary endpoint, however no significant difference for either secondary endpoint (fracture type p=0.5903; fracture location p=0.1173). However closer analysis shows that subtle cortical defects were better identified by US than Xray (0.78 vs. 0.51 for buckle; 0.92 vs. 0.55 for avulsion). A linear model using difference in proportions for correct answers was performed using covariates of PGY level, number of prior US scans, and to which arm subjects were randomized; only PGY level (p<0.0001) and number of completed scans (p<0.0146) were statistically significant. Conclusion: This study shows that subjects were better able to identify fractures using US compared to Xray, especially as level of US and ED experience increased. These results encourage the use of US for the assessment of isolated extremity injury, particularly when the injury is diaphyseal and the clinical suspicion for subtle fracture is high.

(28) Non-Invasive Testing for Volume Responsiveness
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Background: Recent developments in technology, such as the Nexfin HD® device, allow for non-invasive hemodynamic monitoring. While there is validation of the device’s effectiveness in measuring volume responsiveness in mechanically ventilated patients, there is little information about this application in spontaneously breathing patients. Objectives: To determine the feasibility of applying non-invasive technology (Nexfin HD®) to spontaneously breathing patients to determine volume responsiveness. Methods: In this IRB approved study, healthy, non-pregnant subjects were recruited. After a 12 hour fast and obtaining informed consent, a peripheral IV was placed and the Nexfin device attached to continuously measure hemodynamic parameters. First, subjects executed a passive leg maneuver (PLR), which simulates a 500 mL bolus of colloid. Second, subjects received a rapid 500 mL crystalloid bolus. If participants were fluid responsive, defined as a ≥13% improvement in stroke volume (SV) with the crystalloid bolus, an additional 500 mL bolus was administered. Data was graphically analyzed to determine trough and plateau SV trends, from which 120 second averages were obtained to determine changes in SV between baseline and volume loading.
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maneuvers. **Results:** Among the 41 subjects included in the study (23 female, 18 male, mean age 30 ± 11 years), the mean change in SV with the initial crystalloid bolus was 11.7% (95% CI 9.8 - 13.1). Forty subjects completed the PLR and initial crystalloid bolus. Twenty-two (55%) subjects demonstrated a ≥ 13% improvement in SV with the crystalloid bolus, and 12 (30%) subjects demonstrated volume responsiveness with the PLR (Figure 1). The mean PLR response for the overall cohort was 10% (95% CI 7.8 - 12). The odds ratio for a ≥ 13% SV response with the PLR predicting a fluid bolus ≥ 13% SV response was 3.5 (95% CI 0.8 - 15.6). Figure 2 shows the SV changes over the entire study protocol for individual subjects, including additional fluid boluses. **Conclusion:** It is feasible to monitor SV changes in spontaneously breathing patients to determine volume responsiveness. Future studies will determine the performance of these measurements in acutely ill, non-ventilated patients requiring volume resuscitation.

(14) **Relationship between Anatomic Location and Failure Rate of Emergency Department Placed Peripheral Intravenous Catheters**

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**Background:** The majority of patients admitted to the hospital through the emergency department (ED) have a peripheral intravenous catheter (PIV) placed pre-hospital or in the ED. An unknown percentage of these PIVs are removed or replaced after patients are admitted to the hospital. **Objectives:** The primary outcome of this prospective cohort study was to determine if PIVs placed in the hand, wrist, forearm, antecubital fossa, or upper arm had differing failure rates. The effects of PIV gauge, patient gender, and prehospital vs. emergency department placement on PIV failure rate were secondary outcomes. **Methods:** Adult patients who received a PIV and were admitted from the ED to the hospital (observation unit, ward, intensive care unit, or operating room) were enrolled in the study. Data including PIV placement time, gauge, anatomic location, removal time, reason for removal, patient age, and gender were recorded. PIV failure was defined as a PIV needing to be replaced prior to 96 hours. PIVs that were replaced prior to 96 hours due to the patient being discharged from the hospital, patient death, or the patient receiving a central line were not considered failures. **Results:** 1431 separate PIVs were analyzed. PIVs placed in forearm failed the least often with a failure rate of 38.1%. PIVs were more likely to fail in women (50.6%) than men (40.9%). There was no statistically significant difference in failure rates for pre-hospital placed vs. ED placed PIVs. **Conclusion:** Our data show that PIVs placed in the forearm are less likely to fail than IVs placed in other anatomic locations in the upper extremity. This held true even when controlling for PIV gauge, patient age, and gender. To our knowledge this is the first published data on PIV failure rates based on anatomic location. Interestingly, PIVs fail more often in women than men for unknown reasons. Additionally, PIVs placed pre-hospital fail at similar rates as those placed in the ED. Changes in PIV placement and replacement practices may be implemented based on this data, decreasing the number of PIVs that need to be replaced. This may decrease patient discomfort and lower health care expenditures.

(7) **Should the Emergency Department Antibiogram differ from the Hospital Wide Published Antibiogram? A Look at Urine Culture Sensitivity**

*Darrius Guiden MD, Daniel Breznau, Fadi Daouk MD, George Delgado Jr. PharmD*

**Introduction:** Infection with a resistant organism has been associated with increased morbidity and mortality. Periodically, hospitals summarize antimicrobial susceptibilities that have been determined from samples...
submitted to its laboratory in what is known as an antibiogram. Clinicians use these local susceptibility patterns as a guide for selecting appropriate empiric antibiotic therapy, monitoring resistance trends, and preventing administration of ineffective antibiotics. However, hospital-wide antibiograms could over estimate resistance patterns in the ambulatory population. A department specific antibiogram could prevent administration of broad spectrum antibiotics to patients that have infections that can be treated with narrow spectrum antibiotics. Over use of broad spectrum antibiotics is a leading factor predisposing patients to developing resistant organisms. Broaderspectrum antibiotic use, when a narrower spectrum drug would suffice, has the potential to add cost and pressure for selecting antibiotic-resistant bacterial strains. Research Question: Does the antibiogram of patients presenting to the Emergency Department differ from the hospital wide antibiogram for patients with positive urine cultures? Hypothesis Statement: The hospital wide antibiogram recommends more broad coverage antibiotics than needed to treat infections in patients presenting to the Emergency Department with a suspected urinary tract infection. Methods & Materials: Retrospective review of ED urine culture report results from January 2011- December 2012. We expect to collect data from at least 150-200 records in that time period. Data collected: Patient age, gender, and de-identified urine culture results (organism identification, antibiotic susceptibility), and the suggested Antibiogram antibiotic will be collected. Sample urine culture report: 1 Patel, G., et al. "Gram-Negative Resistance in the Intensive Care Unit." Journal of Pharmacy Practice 18.2 (2005). 2 Dahle, K., et al. "Clinical Value of an Ambulatory-Based Antibiogram for Uropathogens in Children." Journal of Pediatric Infectious Diseases Society 1.4 (2012) Statistical analysis: This is a descriptive study to report specific bacterium’s susceptibility to a particular antibiotic. Frequencies and percentages will be reported. Predicted Results: A different angiogram for the ED will help improve antibiotic selection for treating Emergency Department patients with suspected urinary tract infections. Results: These results compare E.Coli susceptibility in primarily ambulatory patients that present to the ED with published hospital wide antibiogram percentage susceptibilities. The four most commonly prescribed antibiotics for E. Coli are compared: Discussion: In this study, the ED susceptibility pattern is similar to the published antibiotic susceptibility pattern on the hospital wide antibiogram. In this study, ambulatory ED patients did not have E. Coli susceptibility patterns more sensitive to more narrow spectrum antibiotics. This result conflicts with the hypothesis that ED ambulatory patients would have infections that were more susceptible to more narrow spectrum antibiotics. In this study, it seems reasonable to comply with the hospital wide published antibiogram susceptibility patterns when selecting the appropriate antibiotic for treating patients that present with likely E. Coli infections in the emergency department.

(97) Initial Experiments Using A Fluid And Thermal Model Of The Superior Vena Cava And Dialysis Catheter For Treatment Of Infection By Heating
Ian Richardson, John Younger. University of Michigan, Ann Arbor, MI

Background: Biofilm formation on dialysis catheters causes central line infections and a range of clinical complications. Treatment with antibiotics has proven to be ineffective and thus infected catheters must be surgically removed. Previous work has shown that heating staphylococcal biofilms to 45°C can increase the efficacy of vancomycin ten-fold. Likewise, heating the catheter may be able to augment antibiotic treatment for central line infections due to biofilm formation. Objectives: In order to determine the feasibility and safety of catheter heating, this work sought to determine the thermal properties of a Coviden Palindrome 14.5 Fr
catheter including its response to heating and its ability to be accurately controlled. **Methods:** We constructed a flow- and thermally-representative model of the superior vena cava (SVC) which was perfused at 2.2 L/min of heated water (37 °C) using a centrifugal pump. The catheter was heated by pumping water (60°C) through a lumen of the catheter using a slaved peristaltic pump receiving voltage commands from a computer. The temperature of the model SVC and the catheter were monitored by imbedding resistance temperature detectors in the second lumen of the catheter and into the interior of the SVC. The process was automated and controlled using LabVIEW and its native proportional-integral-derivative controller. **Results:** The catheter was successfully heated by the automated system and adhered to the changing set points with speed and accuracy (see example performance tracing, below). **Conclusion:** These data suggest that catheters are capable of being heated and controlled precisely in an in vitro model of the SVC to achieve temperatures known to be antibacterial against staphylococci. This result will allow future investigations into the viability of catheter heating for clinical application.

(73) **Thermal Augmentation of Vancomycin Against Staphylococcal Biofilms**

*Rachael Sturtevant, Prannda Sharma, Leonid Pavlovsky, Michael J. Solomon, John G. Younger. University of Michigan, Ann Arbor, MI*

**Background:** Biofilm colonization of medical devices such as central venous catheters remains a common and costly source of bloodstream infections. In the present study, planktonic cultures and biofilms of Staphylococcus epidermidis and S. aureus were examined for vancomycin sensitivity with and without supplemental heat treatment. **Objectives:** To determine the growth characteristics, viability, and stress response of S. epidermidis and S. aureus under a combination of 45oC and vancomycin. **Methods:** Growth curves were obtained for planktonic cultures over a range of temperatures (25-50oC) without vancomycin. Expression of a molecular chaperone (hsp60) and a cell-wall biosynthesis enzyme (murAB/Z) was monitored via real-time RT-PCR. Cell wall thickness was measured following transmission electron microscopy (TEM). Planktonic cultures and biofilms were treated with vancomycin and heat (45oC) or vancomycin without heat (37oC). Biofilms were stained for live and dead bacteria and were measured immediately and 10 hours post-treatment. **Results:** Growth rates decreased sharply at 45oC. Viability of planktonic cultures was significantly decreased when heat was used compared to controls. Clinical isolates of S. epidermidis showed remarkable heat sensitivity, whereas S. aureus isolates showed some degree of thermotolerance. Expression of both hsp60 and murAB/Z was significantly increased by heat treatment alone (p < 0.01). An increase in expression of both genes was observed when vancomycin was used with heat treatment; however this result was not statistically significant. Under TEM, cell walls were thicker in heat treated cells, and this effect was reduced in the presence of vancomycin (p < 0.05). Biofilm live cell:dead cell ratios were also significantly decreased by 10 hours post-treatment. In all experiments, S. epidermidis exhibited greater thermal sensitivity than S. aureus. **Conclusion:** The results of this study give an indication that these staphylococcal species are more susceptible to vancomycin with supplemental heat treatment, both planktonically and as biofilms. As removal of implanted medical devices can be difficult or undesirable, heat may warrant further consideration as an adjunctive treatment.
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(75) Extracellular DNA Binding Protein HU in Staphylococcus epidermidis Biofilms
Prannda Sharma, Mahesh Ganesan, Elizabeth J. Stewart, Michael J. Solomon, John G. Younger. University of Michigan, Ann Arbor, MI

Background: S. epidermidis forms biofilm on implanted devices that lead to nosocomial bloodstream infections. Here we investigated the role of DNA binding protein HU, a histone-like protein that can modify extracellular DNA (eDNA) in biofilms, and possibly impart mechanical stability to the biofilm. Objectives: To identify the functional and immunologic characteristics of HU protein and to understand how HU affects the solution properties of eDNA during HU-DNA interaction. Methods: After cloning and expression, recombinant S. epidermidis HU (rSeHU) complex formation with DNA was shown by both gel mobility shift (EMSA), dynamic light scattering (DLS) and by confocal microscopy. Results: Binding of HU stiffened and expanded the solution structure of bacterial DNA according to both EMSA and DLS, with ratios of HU to nucleotides of > 1:150. Both point mutation (pro86ala) and chemical acetylation of HU abrogated this effect. Within intact biofilm evaluated with confocal scanning laser microscopy, HU became an increasingly prevalent part of the film matrix over the first 48 hours of growth. Pretreatment with a novel anti-HU antibody decreased biofilm formation to an extent comparable to DNase treatment. Interestingly, we found 70% of the healthy human volunteers to have anti-HU IgG titers. Staining of mature biofilms with human serum revealed distinctly different patterns of IgG binding to biofilm structures between subjects with and without pre-existing titers. Conclusion: Our data show that HU is an integral part of the mature biofilm that interacts with eDNA and significantly affects the solution behavior of eDNA in S. epidermidis biofilms. Antibody therapy against HU limits biofilm formation. A significant portion of healthy subjects showed specific immunity against this bacterial protein, suggesting an important role in host-pathogen interaction.

(129) Poly(aminoethyl Methacrylate) Based Ph Sensitive Cationic Antimicrobial Polymer Inhibits Staphylococcus Aureus In Infected Wound Condition Irrespective Of Bacteria-surface Charge And Hydrophobicity
Sungyoup Hong, John Younger. University of Michigan, Ann Arbor, MI

Background: Acid mantle in skin protect from bacterial skin infection, infected skin, however, is going to neutral pH when there is an apparent infection. Antimicrobial polymers employ their bactericidal effect by targeting bacterial cell walls and/or membranes. But Staphylococcus aureus (S aureus) is reported resistant to antimicrobial polymer due to its surface hydrophobicity.

Objectives: We developed cationic poly(aminoethyl methacrylate) which active in infected skin pH (7.5) and inactive in acid mantle on the normal skin (pH=5.5). Anti-S. aureus function of the polymer was evaluated at different pH (5.5, 6.5 and 7.5) conditions. Methods: Bacterial cultures were made by diluting an overnight culture of S. aureus and adjust an optical densities at 600 nm with 0.01. Antibacterial polymer was added in dichloromethane from 200 ųg/ml to 0 ųg/ml. The absorbance was measured at every 60 min for 24 hours spectrophotometer and 95 % confidence intervals were calculated in RStudio. Minimal inhibitory concentrations were acquired from minimal concentration with no rise in growth curves. MIC50, MIC90, and MBC were acquired from Agar plate culture with serial dilution of cultures. Zeta potential for bacterial surface electricity and bacterial wall hydrophobicity were measured with Malvern zeta sizer and BATH technique.
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respectively with early stationary phase bacterial cultures. **Results:** MIC for the polymer were 10-15 μg/ml in pH 7.5 and 6.5 MHB but the MIC values are above 200 μg/ml in acidic condition with pH 5.5. MIC, MIC50, MIC90 and MBC values was not influenced by bacterial zeta potential and hydrophobicity. **Conclusion:** Poly(aminoethyl methacrylate) antimicrobial polymer have strong antibacterial properties in physiologic skin pH but it is attenuated at acidic skin pH. This fact reflects the pH sensitive antimicrobial polymer to cure the bacterial infection but no toxicity to skin cells in acidic skin pH.

**MODERATED POSTER PRESENTATION – COHORT IV**

(67) **A Standardized Non-Traumatic Headache Treatment Guideline Reduces Emergency Department Patient Length Of Stay**

*Elizabeth Walter, Larshan Perinpam, Bo E. Madsen, Michael J. Laughlin, Jessica Westphal, Maria Rudis, David M. Nestler, Laura E. Walker, Ronna L. Campbell. Mayo Clinic, Rochester, MN*

**Background:** Patients with a non-traumatic headache often have extended lengths of stay (LOS) due to a prolonged time to effective analgesia. **Objectives:** The purpose of this study is to compare patient outcomes pre- and post-implementation of a standardized headache treatment guideline. **Methods:** This is a retrospective comparative non-randomized pre-implementation/post-implementation study. We implemented a standardized headache treatment guideline developed to improve and standardize abortive therapy for non-traumatic headache in January 2013. The study was conducted at a tertiary care ED from March 2012 through July 2012 (pre-guideline) and March 2013 through July 2013 (post-guideline) in order to include a 3 months run in period. We included adult patients who presented with a chief complaint of migraine or headache and excluded patients with trauma or secondary causes of headache. A retrospective health records review was conducted. Primary outcome was the LOS. Secondary outcome measures included rates of hospital admission, ED readmission within 72 hours, neurology consultation, head CTs, and number of patients who left without being seen (LWBS). The effects of the guideline on length of stay after adjusting for age and sex were evaluated using multiple linear regression models. Continuous data are expressed as medians with interquartile ranges (IQR). Categorical data are summarized with frequency counts and percentages. All tests were two-sided, and p-values <0.05 were considered statistically significant.

**Results:** A total of 579 patients were enrolled in this study (298 pre-implementation, 281 post-implementation). Groups were similar in age (39 vs 38 years [p=0.16]) and gender (71% vs 76% female [p=0.11]). ED visit median length of stay was reduced post guideline implementation (4.2 hours [IQR 3.1-5.4] vs. 3.7 hours [IQR 2.7-5.0], p<0.001). There were no significant difference in hospital admission rates (7% vs 6%), head CT rates (41% vs 40%), neurology consultation rates (11% vs 9%), 72 hour return rates (9% vs 5%), or number of patients who LWBS (n=1 vs n=0) between the two periods (p=NS for all comparisons). **Conclusion:** Implementation of a standardized non-traumatic headache treatment guideline was associated with a significant reduction in LOS in patients presenting with non-traumatic headache.
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(94) Comparison of Quantitative EEG with Current Clinical Decision Rules for Head CT Utilization in Acute Mild Traumatic Brain Injury in the Emergency Department
Syed I. Ayaz1, Craig Thomas1, Andrew Kulek1, Rosa Tolomello1, Valerie Mika1, Patrick Medado1, Claire Pearson1, Leslie Prichep2, Brian J. O’Neil1. 1Wayne State University, Detroit, MI; 2New York University, NYC, NY

Background: An overwhelming majority of patients presenting with mild traumatic brain injury (>1million cases/year) routinely undergo a Head CT in the Emergency Departments (ED) and 70% of those scanned are found to have a negative head CT. This occurs primarily because of zero tolerance for missed acute traumatic intracranial lesion and because the current clinical decision rules for the use of CT in mTBI have high sensitivity at the expense of poor specificity (that is, low false negative rate and a high false positive rate). Objectives: We compared the performance of a hand-held Quantitative Electroencephalogram (QEEG) acquisition device to New Orleans Criteria (NOC), Canadian CT Head Rule (CCHR) and National Emergency X-Radiography Utilization Study II (NEXUS II) Rule in predicting intracranial lesions on Head CT in acute mild TBI in the ED.

Methods: Patients between 18-80 years of age who presented to the ED with acute blunt head trauma were enrolled in this prospective observational study at two urban academic EDs in Detroit, Michigan. Data was collected for 10 minutes from frontal leads to determine a QEEG discriminant score that could maximally classify intracranial lesions on Head CT. Results: 152 patients were enrolled from July 2012 to February 2013. 17.1% had acute traumatic intracranial lesions on Head CT. QEEG discriminant score of ≥31 was found to be a good cut-off (AUC=0.84, 95% CI 0.76-0.93) to classify patients with positive head CT. The sensitivity of QEEG discriminant score was 92.3 (95% CI 73.4-98.6) while the specificity was 57.1 (95% CI 48.0-65.8). The sensitivity and specificity of the decision rules were as follows: NOC 96.1 (95% CI 78.4-99.7) and 15.8 (95% CI 10.1-23.6); CCHR 46.1 (95% CI 27.1-66.2) and 86.5 (95% CI 78.9-91.7); NEXUS II 96.1 (95% CI 78.4-99.7) and 31.7 (95% CI 23.9-40.7). Conclusion: At a sensitivity of greater than 90%, QEEG discriminant score had better specificity than NOC and NEXUS II. Only CCHR had better specificity than QEEG discriminant score but at the cost of low (<50%) sensitivity.

(40) Privately Insured Medical Patients Are More Likely to Have a Head CT
Emily M. Fortin1, Jacob Dickinson2, Sheng Qui3, Jerry Fisher2, Charlene Irvin Babcock2. 1Central Michigan University College of Medicine, Mount Pleasant, MI; 2St. John Hospital and Medical Center, Detroit, MI; 3University of Michigan, Ann Arbor, MI

Background: Unnecessary radiation from excess CT scans can contribute to an increased risk of cancer. A previous study suggested overuse disparity in white pediatric trauma patients with minor head injuries (study did not control for insurance status). Objectives: To determine if race or insurance status impact probability of obtaining a head CT in medical patients with a normal mental status. Methods: Using the 2009 and 2010 NHAMCS database, the following variables were analyzed: Race (Black, White, Other), EMS Arrival, Triage category (1-5), admission status (admitted vs discharged), gender, age (<15 yrs, 15-24, 25-44, 45-64, 65-74, 75 yrs and older), initial systolic blood pressure (SBP <100, 100-159, >159), and insurance status (self pay, Medicaid, Medicare, private insurance). Patients with injuries were excluded. All patients included had GCS=15. Data analyzed in SAS (v9.3) using Chi Square and logistic regression. Results: There were 9649 unweighted observations, equating to 39149072 weighted visits. In univariate analysis, HeadCT more likely if admitted (13.3%, discharged 5.4%, p<.0001), Medicare (10.7%, Private Insurance 7.7%, Medicaid 3.5%, and
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Self Pay 4.1%, p<.0001), EMS arrival (13.1% compared to 5.4% non-EMS arrival, p<.0001), Triage category Immediate (6.3% decreasing to non-urgent 3.2%, p<.0001), and older (75 and older 14.5%, decreasing to 0.9% for <15 yrs, p<.0001). In logistic regression, race (White vs. Black OR=0.964, 95%CI=0.734-1.266) no longer significant, but there was disparity based on insurance status with privately insured patients (vs. self pay) more likely to receive a HeadCT (OR=1.870, 95%CI=1.350-2.591). This may represent underutilization in uninsured, as all patients had normal mental status, it more likely may raise concerns regarding overuse disparity of HeadCT in insured. **Conclusion:** This study controlled for race and insurance, variables related to severity of presentation (EMS Arrival, initial SBP, triage category, and admission status), age, and focused on a population not as likely to need CT (non-traumatic with normal mental status), yet found privately insured patients were most likely to receive a Head CT compared with uninsured. Race (after controlling for insurance status) did not have increased probability of HeadCT. Further study in this area is warranted.

(70) **Validation Of The Ottawa Subarachnoid Hemorrhage Rule In A Cohort Of 5409 ED Patients Presenting With Headache**

Elizabeth Walter, Larshan Perinpam, Bo E. Madsen, Michael J. Laughlin, Jessica Westphal, Maria Rudis, David M. Nestler, Laura E. Walker, Ronna L. Campbell. Mayo Clinic, Rochester, MN

**Background:** Headache accounts for 4% of Emergency Department (ED) visits, with up to 6% incidence of subarachnoid hemorrhage (SAH). The Ottawa SAH clinical decision rule aims to identify those patients requiring further investigation among all ED patients with acute headache. The rule applies to alert patients who present with headache reaching maximal intensity within one hour. Exclusion criteria include head trauma within seven days, new neurologic deficits, and any prior history of cerebral aneurysm, SAH, hydrocephalus, cerebral neoplasm, or established recurrent headache syndrome. The presence of any of the following indicates the need for further investigation: age 40 or older, neck pain or stiffness, witnessed loss of consciousness, onset during exertion, thunderclap character, or limited neck flexion. **Objectives:** To externally validate the Ottawa SAH rule. **Methods:** We reviewed electronic medical records of all patients presenting to the ED with headache from January 2011 to November 2013. Patients who did not provide research consent were excluded. The rule was applied to patients with headaches described as acute or sudden in onset, or reaching maximal intensity within one hour. Exclusion criteria and diagnostic criteria for SAH were consistent with the original study. Patients were followed for repeat visits within seven days of initial presentation. **Results:** Among 5409 patient visits in the study period, 375 were excluded for lack of research consent. The remaining 5034 records were reviewed for applicability of the rule (Figure 1). 1521 patients met exclusion criteria. An additional 3059 had headache of gradual onset, unknown onset, or time to maximal intensity greater than one hour. The rule was applied to the remaining 454 patients (9.0%). There were nine cases of SAH, yielding an incidence of 2.0% (95% CI 1.0%-3.9%) in the eligible cohort. The sensitivity for SAH was 100% (95% CI 62.9%-100%), specificity was 7.6% (95% CI 5.4%-10.6%), PPV was 2.1% (95% CI 1.0%-4.2%), and NPV was 100% (95% CI 87.4%-100%). **Conclusion:** The Ottawa SAH rule is fairly simple and 100% sensitive to identify SAH in the eligible cohort. However, its low specificity and applicability to only a minority of ED patients with headache (9%) reduces its potential impact on practice.
(50) White And Privately Insured Medical Patients Are More Likely To Have A Non-head CT Scan In The Ed Madeline Palmer¹, Fahad Syed², Sheng Qui³, Charlene Irvine Babcock². ¹Central Michigan University College of Medicine, Mt Pleasant, MI; ²St Johns Hospital and Medical Center, Detroit, MI; ³University of Michigan, Ann Arbor, MI

**Background:** A recent study found disparity in white pediatric minor head injuries, but this study did not control for insurance status. It is unknown if race or insurance status impact non-head CT utilization in non-traumatically injured patients. **Objectives:** To determine if there is disparity based on race or insurance in non-head CT scans ordered in medical Emergency department patients. **Methods:** An IRB approved retrospective observational analysis of 2010 NHAMCS database, selecting only medical patients (no trauma), the following variables were analyzed: Race (Black, White, Other), EMS Arrival , Triage category (1-5), admission status (admitted vs discharged), gender, Age (<15 yrs, 15-24, 25-44, 45-64, 65-74, and 75 yrs and older), initial systolic blood pressure (SBP <100, 100-159, and 159 12.3% decreasing to hypotensive 3.3%, P<.001). **Results:** RESULTS: In univariate analysis, CT scans were more common if Initial systolic blood pressure >159 mmHg (12.3% decreasing to hypotensive 3.3%, P<.001), in admitted patients (13.25%, discharged 6.57%, p<.001), Medicare (12.2%, Private Insurance 11.9%, Medicaid 5.5%, and Self Pay 9.7%, p<.001), White (10.5%, Black 6.5% and Other 9.6%, p=.0001), arrival by ambulance (11.8%, compared to no ambulance 9.1%, p<.001) , older (75 and older 12.5%, decreasing to 1.6% for under 15 yrs, p<.001) and Urgent triage category (12.9%, p<.001). In logistic regression, there were more non-head CT scans done if patient was White (vs. Black, OR=1.6, 95%CI=1.3-1.9), and privately insured patients (vs. self pay OR=1.3, 95%CI=1.1-1.6). After controlling for age and severity of presentation, in non-traumatized patients, white and privately insured patients are significantly more likely to have a non-head CT scan. One limitation of the study is diagnosis was not included in analysis. However, given that severity of illness presentation is controlled for (EMS arrival, admission status, initial SBP, triage category), the results of this study may suggest some disparity exists. It is not clear if the disparity is under-utilization in Black and Uninsured, or over-utilization in Whites and privately insured. **Conclusion:** We found race and insurance to be factors affecting the probability of non-head CT scans in ED patients. Whether this represents overuse or underuse disparity, further study is necessary.

(9) Stroke Diagnosis: Accuracy of Initial Emergency Medicine Physician Assessment Claire Pearson, MD, MPH; Valerie Mika, MS; Rosa Tolomello, MS I; Samaa Rizk, Syed Imran Ayaz, MBBS; Karin Przyklenk, PhD; Robert Welch, MD, MS

**Introduction:** Rapid and accurate diagnoses of patients with symptoms of stroke is vital. Currently, risk-stratification is based on history, physical exam, and imaging; but, other conditions exhibit similar symptoms; for example, transient ischemic attack (TIA) and stroke mimics. Furthermore, time constraints may confound prompt diagnosis and treatment of stroke, especially in the crucial early phase of ED care. **Objective:** We aimed to determine whether ED physicians correctly diagnose and differentiate stroke, TIA, and stroke mimics, based on initial presenting symptoms. We compared the initial physician diagnosis to the final neurology disposition. This information will be used to assess other diagnostic modalities of potential use in the early evaluation of patients. **Methods:** This IRB approved prospective convenience sample evaluated patients (≥ 18 years of age) with symptoms of stroke (< 12 hours in duration) treated in a large academic inner-city ED. Patient demographic information, medical history, and imaging studies were collected. The ED physicians’
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initial diagnoses (stroke, TIA, or stroke mimic) were obtained prior to final ED disposition. The primary outcomes of interest were; (1) final discharge diagnosis and (2) the initial ED physician agreement with final diagnosis. **Results:** We included 134 patients with a mean (+ SD) age 53.6 ± 12.7, 54% were female (95% CI 38%, 55%), and 85 % (78%, 91%) were black. Stroke was the final diagnoses in 35 patients (26.1%), TIA in 42 (31.3%), and stroke mimic in 57 (42.5%). Computed tomography (CT) scan was the first diagnostic imaging modality for all patients. The ED physicians’ diagnoses were 88.3% sensitive (79.0%, 94.5%) and 54.4% specific (40.7%, 67.6%) for stroke and TIA compared to mimics. **Conclusion:** ED physicians’ initial diagnoses were reasonably sensitive (>80%) for stroke and TIA, but stroke mimic occurs very frequently. Given the objective of rapid diagnosis and treatment of acute stroke and TIA, the need to differentiate stroke and TIA from stroke mimics continues to be an important goal. Improved diagnostic tools that can distinguish these events are still needed; increased use of more rapid advanced MRI imaging may improve diagnostic accuracy.

(47) **Role of Neuroimaging in Pediatric Ataxia**

Maureen Luetje, Rajan Arora, Nirupama Kannikeswaran, Lalitha Sivaswamy. Children's Hospital of Michigan, Detroit, MI

**Background:** Ataxia-related complaints are varied in severity of disease and urgency of treatment. There is no clear protocol to the approach of ataxia work-up and with the increasing detection of this symptom it has become imperative to develop guidelines for ataxia management. **Objectives:** To evaluate the utility of neuroimaging in children who present to the pediatric emergency department (PED) with acute and sub-acute onset ataxia. Neuroimaging is performed on many patients to rule out serious intracranial pathology due to the dramatic nature of presentation and difficulty in localizing the disease process. However, there is little evidence that such imaging is necessary. **Methods:** A retrospective review of electronic medical records over a 5 year period of children 2-18 years of age presenting with acute or sub-acute ataxia to a PED. We defined acute ataxia as onset of symptoms within 72 hours of presentation and sub-acute as symptom onset within 7 days of presentation in children with no underlying neurological disease. Radiological findings that resulted in subsequent intervention were categorized as clinically significant. Study subjects were identified utilizing ICD-9 codes. Patient demographics, historical features, physical examination findings and laboratory results that led the examining physician to consider imaging were analyzed. **Results:** A total of 141 subjects were eligible for analysis. The top three causes of ataxia were infectious/post infectious (36.2%), ingestion (18.4%) and ataxia NOS (12.8%). Neuroimaging was performed in 96 children (68%). Logistic regression analysis of factors predictive of neuroimaging being obtained is shown in table 1. Forty-two of 96 (43.7%) imaging studies showed abnormal findings. However, clinically significant radiological findings, which impacted treatment, such a tumor, multiple sclerosis or stroke was present in only 16 /96 (16.6%) children. All children with clinically significant neuroimaging had focal neurological findings on examination. **Conclusion:** The yield of routine neuroimaging is low in children who present with acute/sub-acute ataxia. The most important predictor of clinically significant intracranial pathology is an abnormal neurological examination. A detailed neurologic exam can reduce the number of neuroimaging studies performed for ataxia.

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2014 Midwest Regional SAEM - Detroit, MI
(10) Patterns of CT and MRI Utilization for the Evaluation of Patients with Stroke Symptoms in the Emergency Department.
Heather Bowman, MD, Claire Pearson, MD, MPH, Robert Welch, MD, MS. Wayne State University, Detroit, MI

Background: Between 1980 and 2006 there was a six-fold increase in annual per capita radiation exposure and future estimates are that 2 percent of cancers will be caused by radiation from CT exposure. Non-contrast computed tomography (CT) is the primary imaging modality used to evaluate patients for bleeding and eligibility for early stroke therapy. Magnetic resonance imaging (MRI) is, however, felt to be superior to CT and the 2010 American Academy of Neurology (AAN) guidelines recommended MRI over CT for diagnosis of acute ischemic stroke. The goal of this study is to examine changing patterns of CT and MRI use for the initial evaluation of patients with stroke symptoms treated in the emergency department (ED).

Methods: The National Hospital Ambulatory Medical Care Surveys data from 2006-2010 was used to determine national estimates of CT and MRI use for patients with an admitting diagnosis of stroke or other cerebrovascular disorders (henceforth referred to as “stroke”). Patient visits were identified using ICD-9 admitting codes having a high positive predictive value for a diagnosis of stroke. The recommended survey sample analysis (weighting and accounting for the complex survey sample design) was used to determine means, proportions, and appropriate standard errors. For categories such as gender, domain analysis was utilized. Rao-Scott chi-square was used to determine changes in imaging study use during the study period. Results: There were an estimated 625.7 million total ED visits between years 2006 - 2010. Overall, patients mean age was 36.8 years (95% confidence interval 36.2 - 37.3 years) with 54.5% (54.1% - 55.0%) female and 23.4% (20.7% - 26.1%) black. This study’s target stroke patient population included 3.48 million patients; the mean age was 68.3 (66.8 - 69.8) years, 52.4% (47.8% - 57.0%) were female, and 13.5% (10.1% - 16.9%) were black. CT scan was the imaging study used in 84.5% (81.7%-87.3%) of patients where in 11.2% (8.1%-14.4%) an MRI was performed. Frequency of CT use remained constant, ranging from 82.6% in 2006 to 89.5% in 2010 (p=0.55). The use of MRI as the imaging study began to increase (8.5% in 2006 to 13.3% in 2007) but the trend did not continue and MRI use had dropped back down to 8.6% of cases in 2010; (p=0.68). MRI use remained well below that of CT. Discussion: Both CT and MRI use as the diagnostic modality for patients with suspected stroke did not significantly change over the years 2006 - 2010. There initially seemed to be a slight increase in the proportion of MRI scans but the trend did not continue. This finding may be a result of sampling error but could also be a result of other factors. MRI is still not available for rapid assessment in many hospitals and the demand for more rapid assessment and treatment of stroke of patients dictate the need for utilizing the most rapid diagnostic study available; all despite the recognition of the superiority of MRI. Further research is needed to evaluate what decisions play into deciding which imaging study to use in stroke evaluation and if the use of MRI has increase since 2010 given increased availability and the dissemination and implementation of the AAN guidelines.
(1) Fighting in the National Hockey League: Fists of Fury but Few Fractures

Jack Lally, Georgetown, Jeremy Altman, Georgetown, Aidan Neustadt, Georgetown, Alan Neustadt, PhD, U of Maryland, Ray Mitchell, MD, Georgetown, Dave Milzman. Georgetown U School of Medicine, Washington, DC

Background: There is great debate on the merits and dangers of fighting in the NHL (pro hockey). This study is one of the better reviews to determine if there is a different rate of metacarpal fractures when punches are thrown by two professional hockey players on ice (NHL sample) compared to a control sample of similar cohort of (ED and Trauma Center) Patients who traded punches on land. Objectives: to determine if there is a significant rate of hand fractures from fighting in the NHL. Methods: The public domain web sites exist for all National Hockey League fights (hockey-fights.com) as well as the availability of all injury reports for each NHL team. The impetus behind this comparative research was to identify actual injury rates for NHL players involved in fights. From available footage on the internet 28% of all NHL fights were observed for number of punches thrown. Injury rates from fights were determined. The electronic medical records of the Emergency department (amalga) as well as trauma registry was reviewed for the years 2010-2012 to identify patients involved in assaults and those with resultant metacarpal fractures. A cohort was developed and compared to the rates of metacarpal fractures in the NHL group of combatants. Direct comparison of rates was performed using student t and fisher’s exact test with p =0.05. Results: The NHL group included all 614 fights from the 2009-2010 season from 1,372 games. These 1,228 combatants (with up to 109 being the same participant, but subsequent fights) resulted in 24 hand injuries and 9 metacarpal fractures. The NHL rate of fracture per participant was 0.75% compared to the cohort Land fight group of for 590 patients with 490 metacarpal fractures for a rate of 81%; P<.01. The number of punches per fight averaged 3.5 for the land group and 6.8 for the NHL group. The table below highlights injuries from four fighters that actually suffered hand fractures based on punches and where punches lace Conclusion: Professional (NHL) hockey players benefit greatly from the physics of fighting on ice with a many fold lower rate of significant metacarpal injury from throwing many punches without injury compared to similar combatants on land. There are limitations to this comparison but the strikingly low rate of injury is remarkable.

(88) Does An Increase In Concealed Weapon Permits Result In Increased Firearm Violence?

Joseph Romain, Ashley Bowerman, Jeffrey Nigl, Charlene I. Babcock. University of Michigan, Ann Arbor, MI; St. John Hospital and Medical Center, Detroit, MI

Background: In July, 2001, Michigan (MI) enacted a new law regarding carrying a concealed weapon (CCW) that substantially increased the number of CCW permits approved. Before the law, there were 52,000 people in Michigan authorized to carry a concealed weapon in MI. Now, there are approximately 276,000 CCW permits approved. How this may have affected the number of firearm related injuries presenting to the ED is unknown. Some experts warned that increased CCW permits would increase firearm violence, yet others argued that perpetrator fear of victim carrying a CCW may actually be a deterrent to firearm related violence. Objectives: To compare the number of firearm related ED patient visits (GUN) before and after the new CCW law at an Urban, Level I teaching hospital. Methods: A retrospective observational study using a computerized chief complaint log (EMAP) at a large urban teaching hospital (115,000 ED visits/yr). EMAP creates a charting template based on over several hundred different chief complaints. All firearm related complaints were extracted for 18 months before the law was enacted, and for 11 years after the law was enacted. The
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The proportion of firearm related ED visits / 1000 ED patients was evaluated using Chi square and linear regression. **Results:** In the 18 months before the CWP law there were 4.7 GUN/1000 ED visits. After the CCW law, the annual GUN/1000 ED visits ranged from a high of 4.45 to a low of 3.01 GUN /1000 ED visits. The average was 3.64 GUN/1000 ED visits (SD +/- 0.53). Using only the 2002-2013 data, GUN visits/1000 ED visits has a slope of -3.61 and a r=-0.53 suggesting strong negative correlation. **Conclusion:** Although this single site observational study is not empowered to imply any causality, as there was no substantial firearm prevention program in our area for the past years, it is likely that the CCW law did not result in an increase in GUN visits. Further studies to validate this finding are necessary before generalizations can be made.

**MODERATED POSTER PRESENTATION – COHORT V**

(6) The Effects of Etomidate Administration in Mechanically Ventilated Patients with Severe Sepsis and Septic Shock

Elizabeth Giesler, Robert Sherwin, Cheryl Courage, Shawn Stewart, Anna Fiorvento, Ashley Powell, Suprat S. Wilson. Detroit Receivicing Hospital, Detroit, MI, Wayne State University, Detroit, MI

**Background:** Due to multiple concerns there has been ongoing debate concerning the ideal regimen rapid sequence intubation (RSI) in patients with severe sepsis/ septic shock. 

Objectives: The objective of this study was to describe the association between etomidate dosing (low versus high) use during RSI and patient centered outcomes in septic patients requiring intubation in the emergency department (ED) 

**Methods:** This was a retrospective cohort study of patients seen at Detroit Medical Center emergency departments with ICD-9 diagnosis codes of severe sepsis, septic shock requiring mechanical ventilation from January 2008 to December 2012. Patients were divided into two groups: those who received doses of etomidate < 0.25 mg/kg (low dose group) and ≥ 0.25 mg/kg (high dose group) based on actual body weight (ABW). The primary outcome was the incidence of hypotension, defined as a decrease of systolic blood pressure (SBP) within 3 hours ≥ 20% from baseline. Secondary outcomes were mortality, ventilator days, and emergency department (ED), intensive care unit (ICU), and hospital length of stay (LOS). **Results:** One hundred and seventy three patients were identified and charts reviewed, of which 61 (35%) received an etomidate dose < 0.25 mg/kg and 112 (65%) received ≥ 0.25 mg/kg. In the study sample, 60.1% were male with a mean age of 65.5±15.6 years, and the median SOFA score was 9. The average etomidate dose used was 0.28 mg/kg. The incidence of hypotension was similar between patients that received high dose etomidate versus those that received low dose (38% vs. 28%; p=0.95). The use of stress dose corticosteroids did not impact the incidence of hypotension vs. no steroid use (37.8% vs 24.2%; p=0.086). Mortality rates were similar between the low dose and high dose etomidate groups (45.9% vs 33.1%; p=0.95). There were no differences between the groups (low, high) with respect to ED LOS (mean 5.9 ± SD 4.9 vs. 4.9 ± 4.9 hours; p=0.95), ICU LOS (5.3 ± 7.7 vs. 5.6 ± 4.4 days; p=0.53), hospital LOS (9.9 ± 12.4 vs. 10.2 ± 6.8 days; p=0.67), or ventilator days (4.4 ± 4.6 vs. 4.9 ±4.3 days; p=0.15), respectively. **Conclusions:** The use of etomidate in sepsis/septic shock is controversial. Based on the findings of this retrospective study, the dosing of etomidate (low versus high) did not negatively impact hemodynamics, length of stay, ventilator days or mortality.
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(107) An Analysis of 11 Patients with Sickle Cell Anemia Presenting to an Urban Emergency Department with Severe Sepsis or Septic Shock
Rosalyn Chi1, James M. Walter2, James J. Walter1. 1University of Chicago Section of Emergency Medicine, Chicago, IL; 2Northwestern University Division of Pulmonary and Critical Care, Chicago, IL

Background: The management of patients with sickle cell disease (SCD) presenting to an emergency department (ED) with severe sepsis or septic shock has not been described previously. Objectives: We hypothesized that severe sepsis and septic shock would be under recognized in this population, resulting in delays in care. Methods: This is a retrospective review of all adult patients with SCD presenting with severe sepsis or septic shock to an urban ED over a 5-year period (2009-13). Results: The cohort included 11 patients. The mean age was 37.4 years (range 19 to 68). The presenting complaints were non-specific, including fever, malaise, pain, shortness of breath, and abdominal symptoms. Nine (9) patients met the criteria for severe sepsis on presentation and 2 were in septic shock. In 5 patients, there was no mention of sepsis in the ED record, and the terms “severe sepsis” and “septic shock” were not used for any patient. Nine (9) of the patients had an initial lactate level drawn; the median time to first lactate result was 2.8 hours (range 0.5 to 8.8 hours); only 2 patients had more than one lactate level in the first 6 hours. The median time to complete antibiotic administration was 7 hours (range 1.8 to 10.3), with only 2 patients receiving all antibiotics ordered within 3 hours. During the first 6 hours of care, the median volume of normal saline infused was 1.0 L (range 0 to 7). The final infectious disease diagnoses on hospital discharge included pneumonia, MRSA endocarditis, biliary sepsis, pneumococcal septicemia, osteomyelitis, pseudomonas urinary tract infection, and septic thrombophlebitis. Acute chest syndrome (ACS) and multiorgan involvement were common. One (1) patient died. Conclusion: The presentation of SCD patients to an ED with severe sepsis or septic shock is an uncommon event. Since the initial symptoms and signs are often non-specific and mimic more common problems (e.g. pain crises, ACS), severe sepsis or septic shock may be underrecognized and undertreated in EDs. To improve ED care of these patients, ED clinicians should routinely use the terms “severe sepsis” and “septic shock” for patients meeting these definitions, thus facilitating early recognition.

(4) Use of Computerized Sepsis Care Plans Improved Resuscitation Parameters in Patients with Severe Sepsis and Septic Shock
Elizabeth Giesler, Robert Sherwin, Cheryl Courage, Shawn Stewart, Anna Fiorvento, Ashley Powell, Suprat S. Wilson. Detroit Receiving Hospital, Detroit, MI, Wayne State University, Detroit, MI

Background: Current guidelines recommend use of sepsis care bundles & plans to optimize care. At our institution, computerized sepsis alerts (SA) & sepsis care plans (SP) have been implemented. Objectives: The objective of this study was to describe the use of computerized SA & SP and the association with outcomes. Methods: This was a retrospective cohort study of patients seen at 2 EDs from Jan 2011 to Dec 2012. Patients were included if either SA or SP were utilized and had a sepsis diagnosis based on ICD-9 admission codes. Study endpoints included 1) blood cultures (cx) drawn prior to antibiotics (abx); 2) appropriateness of abx regimen; 3) abx administration (admin) w/in 3 hrs; 4) appropriate resuscitation (defined as ≥ 30 ml/kg of crystalloids w/in 3 hrs), & 5) meet resuscitation endpoints (e.g. MAP ≥ 65 & CVP ≥ 8 mmHg w/in 12 hrs). Two groups were defined: patients that used SP & those that did not. Results: A total of 166 patients were included of which 34% (57/166) had a SP used while 66% (109/166) did not. (Table 1) The mean age was 65±16 yrs, 59%
were male and the median (IQR) SOFA score was 9.8 (7,12). Overall, 9% (n=15) did not have blood cultures drawn prior to abx admin and 19.6% (n=32) had inappropriate empiric abx regimens. These tended to occur less often in patients in whom the SP was used (blood cx not drawn before abx admin [4/15 (27%) vs. 11/15 (73%); p=NS] and inappropriate empiric abx regimens [12/32 (38%) vs. 20/32 (62%); p=NS]). Administration of abx within 3 hrs was seen more frequently in SP group [48/57 (84%) vs. 77/109 (71%); p=0.054]. Inappropriate resuscitation w/in 3 hrs occurred less in those when SP were used [3/8 (38%) vs. 5/8 (62.5%); p=NS]. The use of SP increased the frequencies of patients reaching endpoints of MAP ≥ 65 w/in 12 hrs [52/163 (95%) vs. 91/163 (84%); p=0.058] and CVP ≥ 8 mmHg within 12 hrs [20/22 (91%) vs. 35/49 (71%); p=0.06]. The use of SP did not affect mortality 40% vs. 48%; p=NS), ventilator days [mean±SD 5.7±1.4 vs. 6.7±1.9 days; p=0.7], ED LOS [6.3±1.5 vs. 6.5±4.6 hrs; p=0.5], ICU LOS [7.3±1.7 vs. 8.3±2.6 days; p=0.5], or hospital LOS [11.3±1.6 vs. 13.2±3.9 days; p=0.05], respectively. Conclusions: The overall use of computerized SP was low in our study group. Its use demonstrated a trend in enhanced compliance with sepsis guideline parameters.

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Table 1: Distribution of sepsis patients with regard to sepsis alerts and sepsis plan use.

(127) Defining The ‘Golden Hour’: How Much Fluid Do Septic Shock Patients Need In The First Hour?
James H. Paxton1, Cheryl Courage2, Nathaniel Hunt1, Robert Sherwin1. 1Wayne State University, Detroit, MI; 2Sinai-Grace Hospital, Detroit, MI

Background: Early fluid challenge and antimicrobial administration are essential in the treatment of septic shock (SS) patients. Delayed vascular access can prevent appropriate care for SS patients. Objectives: The primary objective of this study was to determine time to adequate vascular access (AVA; either a central venous line or 2 peripheral IV lines) in the treatment of SS in the emergency department (ED). Secondary objectives included determination of time elapsed to empiric antibiotic and IV fluid challenge from time of ED arrival. Methods: A retrospective chart review was conducted including all adult patients admitted to an urban Level II trauma center from the ED with an admission diagnosis of SS between June 1st, 2011 and September 31st, 2012. Data on time to AVA, fluid administration, and antibiotic administration were obtained from the electronic medical record. Results: We identified 96 patients who met inclusion criteria. Median time from diagnosis to AVA was 30.5 minutes (mean=75 min, SD=127.0), with 34% of patients still without AVA 1 hour after SS diagnosis. Median time from diagnosis to antibiotic administration was 69.5 minutes (SD=84.9), and only 43.8% of patients received antibiotics within 1 hour of diagnosis. The median volume of IV fluid infused within 1 hour of SS diagnosis was 18.6 mL/kg (SD=14.6). Patients who survived to hospital discharge received significantly more fluid during their first hour in the ED than patients who died prior to hospital discharge (20.1 ml/kg vs. 12.7 ml/kg; t(1)=2.5, p<.05). We observed a 41.5% decrease in mortality among patients who received greater than 10 ml/kg of IV fluid within their first hour in the ED (p<.01). At later time points (2, 4, or 6 hours after ED arrival), no mortality difference was observed. Conclusion: Early fluid resuscitation within 1 hour of ED arrival is associated with reduced inpatient mortality among septic shock patients. Based upon our data, there may also be a critical threshold for the volume of IV fluid infused that is related to mortality. Strategies for earlier vascular access and antibiotic administration are needed.
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(7) How Frequent Are Adverse Events In Procedural Sedation? A Systematic Review And Meta-analysis

Background: The frequency of adverse events during procedural sedation (PS) in the Emergency Department (ED) is not well known. Objectives: Conduct a systematic review and meta-analysis to determine the rates of adverse events during PS. Methods: A librarian conducted search of 7 electronic databases including MEDLINE, EMBASE, EBSCO, CINAHL, CENTRAL, Cochrane Database, Web of Science and Scopus from inception to Dec 2013. There were no restriction by study type or language. Original studies that reported adverse event rates during PS were included. Abstracts identified were independently assessed by 2 reviewers in duplicate for potential inclusion and searched the references of eligible articles. Outcomes of interest were mortality, intubation, apnea, laryngospasm, aspiration, hypotension, hypoxia and agitation. The quality of studies was appraised using the Cochrane Collaboration bias tool and Newcastle Ottawa scale. We report frequencies with 95% confidence intervals (CI). Interobserver reliability was assessed with Cohen’s kappa. Results: Total of 1346 titles were retrieved of which 77 were selected for inclusion (kappa = 0.99, 95% CI 0.98-1.0). The 77 studies (31 clinical trials and 46 cohort studies) included 17179 patients and 17348 sedations. The most common adverse events were subclinical respiratory depression in 999 of 7623 patients (13.1%) and hypoxia in 641 of 9564 (6.7%). The rate of serious adverse events was low, 0.18% (95% CI 0 to 0.4%) for laryngospasm (2 events/1113 patients), 0.05% (95% CI 0 to 0.11%) for intubation (2 events/4325 patients), 0.04% (95% CI 0 to 0.1%) for aspiration (1 event/2619 patients), and 4.1% (95% CI 3.5 to 4.7%) for apnea. Hypotension was present in 2.0% (95% CI 1.6 to 2.3%), bradycardia in 1.4% (95% CI 0.8 to 2.0%), nausea or vomiting in 2.2% (95% CI 1.8 to 2.6%), hypoxia in 6.7% (95% CI 6.2 to 7.2%), hypoventilation in 7.4% (95% CI 5.9 to 8.9%). The rate of end-tidal CO2 change >10 mmHg was 13.1% (95% CI 12.4 to 13.9%). Conclusion: Serious adverse events like laryngospasm, intubation and aspiration were uncommon, with event rates 1 in 1000 to 1 in 10000 range. Events like apnea, hypotension, bradycardia, vomiting and hypoxia were 1 to 10 in 100 range. This data will better inform and empower physicians to weigh the risks and benefits of PS and facilitate truly informed patient consent.

(5) The Effect of Short-term Neuromuscular Blocker Administration in Septic Patients Requiring Mechanical Ventilation
Elizabeth Giesler, Suprat Wilson, Anna Fiorvento, Shawn Stewart, Ashley Powell, Cheryl Courage, Robert Sherwin. Detroit Receiving Hospital, Detroit, MI, Wayne State University, Detroit, MI

Background: The use of short-term neuromuscular blockers (NMB) post-intubation is a common practice in the ED, though there is little evidence concerning this practice. Objectives: The objective of this study was to assess the association of post-intubation short term NMB administration on patient outcomes in severe sepsis & septic shock patients requiring mechanical ventilation in the ED. Methods: This was a retrospective cohort study of patients seen at Detroit Medical Center EDs with ICD-9 diagnosis codes of sepsis, septic shock & MV from Jan 2008 to Dec 2012. Patients were divided into 2 groups: 1) those who received NMB and 2) those who received no NMB post-intubation. Short-term use of a NMB post-intubation was defined as administration within 12 hours of intubation & bolus administration of NMBs (no continuous infusions); vecuronium &
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rocuronium were the NMBs used in this study. The primary outcome was all-cause in-hospital mortality. Secondary outcomes were number of ventilator days, ED, ICU, & hospital LOS, vasopressor requirements, & occurrence of pressure ulcerations in the first 72 hrs of admission. Results: Of the 254 patients identified, 85 (33.5%) received a NMB post-intubation. Overall, 57.4% were male, the average age was 65.7 yrs old & 39.4% were from a nursing home. SOFA scores were significantly lower in the NMB group vs. the no NMB (median 8 (7,11) vs. 10 (8, 12); p=0.001). The unadjusted mortality was lower in patients who received a NMB following intubation versus those who did not (28.2% vs. 48.5%, respectively; p=0.02). Logistic regression analysis was performed to predict mortality while controlling for NMB use, SOFA score, etomidate administration, time to antibiotics, volume resuscitation, MAP greater than 65mmHg, lactate, & appropriate antibiotic coverage. The model was not statistically significant, X2=4.66, p=0.79, & Nagelkerke R squared was 0.37. The only significant predictor was SOFA score (p=0.003). There were no differences between those who received NMB and no NMB in the ED LOS (mean 5.9 ± SD 4.9 vs. 5.2 ± 4.9 hours; p=NS), ICU LOS (5.8 ± 6.3 vs. 5.7 ± 6.1 days; p=NS), hospital LOS (11.3 ± 9.4 vs. 9.5 ± 8.9 days; p=NS), or ventilator days (4.6 ± 4.8 vs. 4.3 ±5.1 days; p=NS), respectively. The occurrence of pressure ulcerations was not significant between the groups (5.9% vs. 4.2%; p=NS). Conclusions: Based on the findings of this retrospective study, bolus administration of NMBs following intubation does not appear to be harmful.

(95) Prescription Patterns of Analgesics in Mild Traumatic Brain Injury in the Emergency Department
Syed I. Ayaz, Andrew Kulek, Rosa Tolomello, Samaa Rizk, Craig McLendon, Jonathon Ottolini, Valerie Mika, Patrick Medado, Brian J. O’Neil, Claire Pearson. Wayne State University, Detroit, MI

Background: Over 85% of the 1.5 million traumatic brain injuries that occur in the United States annually are considered mild. Most of these mild traumatic brain injury (mTBI) patients seek initial care in an emergency department (ED). Headache and pain are the most common presenting symptoms in these patients and frequently limit a patient’s return to normal daily functions. ED physicians often do not treat headache after mTBI because of the fear that analgesics can mask the symptoms of rising intracranial pressure, or inhibit platelet function that could lead to intracranial bleeding. However, the likelihood of intracranial hemorrhage or neurological worsening is rare in patients who have had a negative head CT. Objectives: To evaluate the analgesic prescribing patterns of ED physicians in isolated mild TBI. Methods: Males and females between 18-80 years, presenting to the ED with isolated mTBI and complaining of pain were included in this prospective observational study. Patients with abnormal neurological exams, positive head CT, orthopedic injuries, and with no documented pain score were excluded. We defined analgesic medications as acetaminophen, opiates, and non-steroidal anti-inflammatory drugs. Descriptive statistics were used to analyze the data. Results: 295 patients were enrolled at two large urban academic Emergency Departments. Average age was 37.9 years (SD±14.8) with 51.5% males. 81.3% were African Americans, 12.8% Caucasians, and 3% were Hispanics. 41.6% did not receive any analgesics. 33.8% were given opioid analgesics, 23.3% were given Acetaminophen in the ED. 27% of the patients who were given opioid analgesics in the ED had an abnormal ethanol level or had a positive drug screen. Initial mean pain score in the ED was 7.0 (SD±2.1) on a scale of 1-10. Mean pain score in patients who were given no analgesia was 6.6 (SD±2.1), while in patients that were given analgesics, the score was 7.3 (SD±2.0). Conclusion: Significant number of patients (41.6%) did not receive even simple analgesia (acetaminophen) in the ED. All of these patients had isolated head injuries and were complaining of pain (mean pain score of 6.6) and had normal Head CTs and Neurological exams. Opiate
prescription rate of the ED physicians in mild isolated TBI in our departments is much higher (33.8%) than the national average (<5%).

(9) Safety And Effectiveness Of Topical Anesthetics In Corneal Abrasions: Systematic Review And Meta-analysis
Henrique A. Puls, Daniel Cabrera, Mohammad Hassan Murad, Patricia J. Erwin, M. Fernanda Bellolio. Mayo Clinic, Rochester, MN

Background: Topical anesthetics are used in the Emergency Department to relieve eye pain and allow eye examinations in patients with corneal abrasions. There is concern for delayed corneal healing, which is associated with long-term use, so outpatient use is not recommended. Objectives: To systematically study the effectiveness and complications associated with the short term use of topical anesthetics in the Emergency Department management of corneal abrasions. Methods: Four electronic databases were searched from inception until April 2014. We included studies of any design or language in patients older than 16 years using topical anesthetics for less than 72 hours. Postoperative patients were not included. Results: A total of 144 patients (72 intervention and 72 control) from five studies (two randomized trials and three case-reports) were included. Compared to patients who did not use topical anesthetics, meta-analysis showed no significant difference in pain scores (standardized mean difference: -1.01; 95% CI: -2.39 to 0.38), corneal healing (OR: 1.31; 95% CI: 0.53 to 3.27), or persistent symptoms (OR: 0.98; 95% CI: 0.06 to 16.69). The two trials reported no adverse effects; however, three case reports reported several. Conclusion: In patients with corneal abrasion using short term local anesthetics, there was no difference compared to placebo in terms of pain, persistent symptoms and corneal healing. Data on safety are sparse and the use of this treatment is currently not supported by evidence.

(3) Is There a Relationship Between Discharge Prescriptions and Recidivism In Patients Presenting to the ED with Chronic Back Pain?
Nathan Egger, Rajesh Patel, Cheryl Courage, Erin Brennen, Duane Robinson, Melissa Barton, Robert Sherwin. Sinai-Grace Hospital, Detroit Medical Center, Detroit, MI; 2Wayne State University School of Medicine, Detroit, MI

Background: Despite consensus recommendations, OPRs are commonly prescribed for chronic non-cancer pain. OPR misuse is a growing problem and is related to many emergency department (ED) visits. Objectives: The objective of this study was to determine if prescription opioid pain relievers (OPRs) from the ED for adult patients with a primary complaint of chronic, non-cancer back pain was related to subsequent ED visits. Methods: A retrospective chart review was performed on all patients presenting to an urban ED during 6 consecutive months of 2011 with a primary ICD-9 code of Lumbago. If a patient had more than one visit during the study period, only the first visit was examined. The number of visits in the previous 12 months was compared to the number of visits in the subsequent 12 months. Inclusion criteria were >= 18 years and documented pain for > 3 months. Patients with active cancer or sickle cell anemia were excluded. Charts were abstracted for demographics, medical history, frequency of ED visits, and clinical information. Results: The sample included 216 patients with a mean age was 46.7 ± 10.9 years and 60% were female. Upon discharge from the ED (Figure 2) approximately half (49%) of patients were prescribed OPRs, 32% were
prescribed NSAIDs and 30% were prescribed muscle relaxants. Patients who received OPR prescriptions had no significant change in number of visits (p = .67; Figure 1). Patients who received a non-OPR prescription had a significant decrease in ED visits (t(59) = 2.39, p = .02). Patients who received no prescription at all (24%) had the largest decrease in ED visit frequency (t(48) = 3.64, p = .001). **Conclusions:** Prescription OPRs are provided to a significant number of patients presenting to the ED with chronic back pain. Our results indicate that giving patients OPR prescription in the ED may contribute to ongoing ED utilization, while withholding an OPR prescription or providing a non-OPR or no prescription may decrease the frequency at which they return to the ED.

(41) Intranasal Opiates: Modifying the Triage Paradigm
Eyad Khattab¹, Paul Rega². ¹Michigan State University, Lansing, MI; ²University of Toledo, Toledo, OH

**Background:** Triage means “to sort.” With regard to disaster triage, the process of sorting patients is based upon the necessity of providing scarce resources expeditiously to those victims who, based upon certain physiologic parameters, are identified as being more critically ill/injured than others. However, the meaning of disaster triage has expanded from its initial objective of sorting out patients to providing certain basic medical interventions. Therefore, the evolution of the triage concept into the domain of expeditious field medicine now allows for the consideration of additional medical interventions during field triage, as long as they are necessary and easily mastered. This now includes pain control (PC). **Objectives:** To incorporate early PC in the triage disaster systems and to discuss the benefits and limitations of intranasal (IN) opiates within a disaster triage setting. **Methods:** The advent of IN analgesia and its positive benefits dictates that adding PC into the triage paradigm should be considered for use by the first responder with the proper training. The best method for incorporating PC is based on the most recent research on emergency triage protocol and the safety and potency of various IN analgesics. **Results:** Triage has evolved from the simple sorting of patients based on their level of criticality to the provision of rudimentary medical interventions. We should consider adding IN analgesia to triage protocols and develop educational offerings to address this addition. Using the IN synthetic opiate sufentanil is preferable because it is one of the most widely studied and utilized opioids administered across nasal mucosa, and has been found to be safe in adults, effective and rapid. Alternatively, fentanyl could be a safer option for children given its lower potency and therapeutic index. **Conclusion:** Previously, PC in triage scenarios have been neglected because of the complexity and risk involved in parenteral administration of an opiate intramuscularly or intravenously. With the development of safe, fast-acting, effective, and affordable IN administration of analgesics, the incorporation of PC into triage systems such as START and SALT is feasible. The addition of PC in triage systems could result in decreased environmental and physical stress, increased victim comfort, and more lives save during disasters.

(#8) Does triage point-of-care capillary glucose testing decrease ED length of stay and time to treatment in patients with diabetic ketoacidosis?
Joseph Peterson MD, Joseph Khell MD, Nicholas Morelli MD, Cheryl Courage, MA, Michelle Lall MD, Ciara Barclay-Buchanan MD

**Background:** Point-of-care (POC) capillary glucose testing is a quick, non-invasive test using an electronic glucometer to measure a sample of blood from the fingertip. There is limited data in the literature on POC
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testing in triage and its impact on patient care and length of stay (LOS) in the emergency department (ED).

Objectives: The objective of the study was to determine if implementing POC capillary glucose testing at triage for selected patient populations would reduce time to initiation of treatment with intravenous (IV) fluids and IV insulin therapy, as well as overall ED LOS in patients diagnosed with diabetic ketoacidosis (DKA). Methods: We conducted a retrospective chart review of patient encounters before (January 1, 2013-May 31, 2013) and after (June 1, 2013-December 31, 2013) the triage POC glucose testing was implemented at an urban ED. Patients with a final diagnosis of DKA were identified. Fifty patient charts before and 50 after triage POC testing implementation were randomly selected and reviewed. The time to ordering and administering IV fluids and IV insulin, and overall ED LOS were calculated and compared between the groups. Results: The pre-implementation and post-implementation groups consisted of similar race and aged patients (98% African American; mean age: 40 years). The pre-implementation group contained 29 females and 21 males, and the post-implementation group consisted of 17 females and 33 males. The mean ED LOS was not significantly different between groups (pre: 198 min; post: 175 min; p=0.18). There was no significant difference in time to ordering IV fluids (pre: 43 min vs. post: 46 min; p=0.80), nor in mean time to administration of IV fluids (pre: 93 min, post: 82 min; p=0.45). However, times to insulin ordering and administration were significantly shorter for the post-implementation group. The time to insulin ordering was reduced, on average, by 41 minutes (pre: 160 min; post: 119 min; p=0.004). Similarly, time to administration of IV insulin was, on average, 51 minutes less post-implementation (pre: 223 min; post: 172 min; p=0.004). Conclusion: Our results demonstrate the value of glucose testing in triage, with patients receiving orders and administration of insulin about 60 minutes faster; however, ED LOS was not reduced. Further study is necessary to replicate these results with a more controlled design.

MODERATED POSTER PRESENTATION – COHORT VI

(104) ED Nursing Led Team is Key to Improving Patient Satisfaction
Korosh Borhani, Vito Rocco. St. John Macomb-Oakland Hospital, Warren MI

Background: The need to improve quality in the delivery of healthcare has become ever increasing. Hospitals are striving to better define and measure the quality of health care particularly patient satisfaction, which is commonly linked with monetary payments. Measures of quality and patient satisfaction are impacted by various parameters. We strove to impact our patient satisfaction scores at a time with a tight fiscal budget with over a 30% increase in ED annually census and low patient satisfaction scores. Objectives: Observe the impact of patient satisfaction and ED outcome metrics from the implementation of ED Nursing led Team Project as part of ED Quality Improvement process changes. Methods: ED quality improvement project Single institutional community ED with 48 beds Time frame 11 months from April 2013 to Feb 2014. ED Bedside Nursing TEAM - Bedside RN / ED tech / ACL / Patient representative TEAM interaction during patient sign-out any new team member is added (shift change, etc..) Results: Our successful implementation of an ED bedside nursing led team and ED process changes were achievable while maintaining a 25th percentile staffing model. The ED nurses teams reported improvement in confidence in their ability to address important operational issues to the patients. The ED Nursing Led Team has proven they could effectively meet patients’ expectations and partner with ED physicians. This strengthening of relationships and teamwork has proven to be beneficial to patient satisfaction, interpersonal working relationships, and the inter-departmental work morale with
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relative increase in outcome measures from 38% to 65%. In addition, having to have programs focused on patient satisfaction in the ED has been shown to be associated with increases in the likelihood of future repeat patient encounters, word of mouth referrals, and new patient encounters. **Conclusion:** Establishment of an ED Nursing Led Team are instrumental to the improvement of ED Patient’s Satisfaction Survey and ED Quality Metrics.

(44) **Analysis of an Emergency Department Census Before and After a Nearby Emergency Department Closure**

*Lauren Birmingham, Jennifer Frey, Scott Wilber. Summa Health System, Akron, OH*

**Background:** In light of a nearby emergency department (ED) closing, our ED anticipated a census increase and made some departmental changes in preparation for this volume change. An examination of changes in patient volumes was conducted to evaluate the impact of the closure on our ED located 1.8 miles away.

**Objectives:** To compare patient volumes in a large hospital-based ED before and after a smaller, nearby hospital-based ED in the same health system closed. **Methods:** Using deidentified data from our ED’s electronic medical record, the number of patients arriving in the ED, number of patients in the waiting room, age, gender, and acuity levels were analyzed comparing the month before and after the nearby ED closed. Changes in demographics and numbers of arrivals and waiting room patients are reported. Two-tailed student’s t-tests and chi-square tests were conducted to test for statistically significant differences at the α=0.05 level. **Results:** There was an 11% increase in ED visits between May 2014 and June 2014, after a nearby emergency room closed on June 1, 2014 (9,562 versus 10,717 visits). The average length of stay increased slightly from 214.1 to 218.3 minutes, but the difference was not significant. The distribution of gender changed with males making up a larger portion of the ED population after the closure (42.56% versus 44.04%, p=0.0340). The average patient age before the closure was 46.2 years, whereas the average patient age after the closure was 45.9 years (p=0.0414). Prior to the closure 29.9% of visits had an Emergency Severity Index (ESI) score of 4 or 5, whereas after the closure 31.8% of visits were assigned an ESI of 4 or 5, demonstrating a change in the distribution ESI scores (p=0.0012). The average number of people in the waiting room at 7PM went from 4.08 to 7.10 demonstrating the changes seen in the waiting room after the closure. **Conclusion:** The closure of a nearby ED resulted in an increase in our ED visits. Identifying these changes in patient volumes and characteristics has helped our ED adjust unit staffing so that the population can be best served.

(71) **The Use Of Voice-over Internet Protocol (VoIP) For Residency Interviews: The Wave Of The Future?**

*Amrita Vempati, Patricia Nouhan. St. John Hospital and Medical Center, Detroit, MI*

**Background:** Residency applications along with interview travel and hotel expense require increasing funds for the average residency applicant. Emergency Medicine (EM), in particular, is currently among the more competitive specialties. EM candidates feel pressure to apply to a higher number of programs in order to match. In addition, the Electronic Residency Application Service (ERAS) has a crescendo fee schedule that penalizes the applicant with more than ten applications. This environment challenges the EM residency applicant to survive the interview season without incurring debt. **Objectives:** Our research survey examines the use of Voice-Over Internet Protocol (VoIP) methods such as FaceTime or Skype for residency interviews. **Methods:** All interview candidates were anonymously surveyed at an urban EM program with 36 positions.
after the rank order lists were submitted. **Results:** The survey revealed that on average the candidates applied to 59 programs and interviewed at 16 programs. It also showed that 38% of the respondents had financial constraints during interview season. Fifty-five percent of those who replied said they would consider VoIP for interviewing and 32% said that they would select a residency without a physical visit. **Conclusion:** Our results indicate that VoIP interviews are an effective means of assisting programs with high meal and hotel costs. More importantly, our survey indicates that student applicants strapped with the increasing financial burden of escalating application fees and travel expense would find VoIP an attractive adjunct to the in-person interview.

(24) **WIREd for Milestones: A Novel Tool for Resident Evaluation**  
Jumana Nagarwala, Phyllis Vallee, Sudhir Baliga, Jason Folt, Bradley Jaskulka, Julia Hays, Michelle Slezak, Nikhil Goyal. Henry Ford Hospital, Detroit, MI

**Background:** The Next Accreditation System has fundamentally altered the evaluation process for Emergency Medicine (EM) residents by requiring the use of 227 milestones organized within 23 subcompetencies. We developed a novel Web-based Individualized Resident Evaluation (WIRE) instrument to make this milestone-based evaluation process intuitive and quick for our clinical faculty, while providing robust, actionable performance data to residents and residency administrators. Each WIRE form asks faculty to complete a checklist of select behaviors (both positive and negative) exhibited by the resident on that shift. **Objectives:** Our study is designed to: 1. Examine the effectiveness of WIRE in collecting milestone-based resident evaluation data 2. Evaluate faculty practices and effort in using WIRE 3. Evaluate faculty satisfaction with WIRE  
**Methods:** WIRE was deployed on July 1, 2013 and each faculty member was asked to complete one evaluation per resident on each shift. A 15-minute orientation was provided to all faculty, and faculty and residents received monthly reminders to complete WIRE. In April 2014 all faculty were surveyed on their use of WIRE. WIRE data for the period 7/1/13 through 3/31/14 was analyzed using descriptive statistics. **Results:** Milestone-based evaluation data was recorded on 53 residents by 36 faculty. 2,270 WIREs were completed in 9 months, of which 65% (1,478) had additional descriptive comments on faculty opinion of resident performance, 21% (313) of which were discussed with the resident at the time of WIRE completion. Overall 8,616 observations were recorded for 165 distinct milestones. Faculty completed approximately 1.12 WIREs/shift. 69% of faculty completed the WIRE at the end of a shift, and the rest within a few days. 53% of faculty described themselves as “very satisfied” using WIRE to evaluate residents and 39% were “somewhat satisfied” (mean satisfaction 4.4/5). Our experience with WIRE is described in Table 1.

<table>
<thead>
<tr>
<th>Table 1: Experience with the WIRE tool</th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of WIREs per Resident</td>
<td>42.8</td>
<td>48</td>
<td>22.9</td>
<td>5-85</td>
</tr>
<tr>
<td>No. of Milestones observed per WIRE</td>
<td>3.8</td>
<td>4</td>
<td>2.2</td>
<td>1-21</td>
</tr>
<tr>
<td>No. of Milestones observed per Resident</td>
<td>162.6</td>
<td>169</td>
<td>84.6</td>
<td>21-306</td>
</tr>
<tr>
<td>No. of WIREs completed per Staff Physician</td>
<td>63.2</td>
<td>62</td>
<td>37.1</td>
<td>2-192</td>
</tr>
<tr>
<td>Amount of time to complete a WIRE (in minutes)</td>
<td>3.8</td>
<td>2.9</td>
<td>0.5-15</td>
<td></td>
</tr>
</tbody>
</table>
Conclusion: WIRE provides an intuitive and quick method for EM faculty to record resident evaluations using the Milestones framework. It provides robust evaluation data to residents and residency administrators and is quickly adopted with minimal training requirements. As WIRE is completed in close proximity to clinical shifts, it enables specific and timely feedback for residents.

(27) Are Emergency Medicine (EM) Residents Comfortable Caring for Lesbian, Gay, Bisexual and Transgender (LGBT) Patients? What Do We Know?
Joel Moll, Paul Krieger, Sheryl L. Heron, Ben Lee, Grant Johnson, Susan Podolsky, Lisa Moreno-Walton. 1University of Michigan, Ann Arbor, MI; 2Icahn School of Medicine at Mt. Sinai, New York, NY; 3Emory University, Atlanta, GA; 4Louisiana State University, New Orleans, LA

Background: The Institute of Medicine, Department of Health and Human Services, and Joint Commission recently cited the need for education on lesbian, gay, bisexual and transgender (LGBT) health. Deficiencies in care have been documented and serve as barriers for LGBT patients. There are few studies examining resident attitudes toward LGBT patients and none in Emergency Medicine (EM). We sought to examine resident attitudes and comfort when caring for LGBT patients as part of a needs assessment for LGBT health curriculum development by the Academy for Diversity and Inclusion in Emergency Medicine. Objectives: To perform a pilot study at 4 geographically separate academic hospitals to evaluate EM resident attitudes, comfort and behavior in caring for LGBT patients. Methods: A 24-item, anonymous, descriptive survey asked residents about their usual practice and comfort level taking a history and conducting an exam on LGBT patients, and if discriminatory statements by colleagues were observed. Program and personal demographics were included. Results: There were 151 responses to the survey (71% response rate). Less than half of residents (45%) felt comfortable addressing the needs of LGBT patients. When taking a sexual history or evaluating a patient with an abdominal or genitourinary complaint, only 36% and 20% respectively, routinely took an appropriate history. When evaluating transgender patients 22% found discussing sexual behavior and 23% performing a genitourinary exam challenging. Residents reported inappropriate or discriminatory statements by other residents (61%) and faculty (50%). Male residents were 2.3 times more likely to hear discriminatory comments from other residents than females (p=0.01). Neither race nor gender otherwise impacted the results. Conclusion: The majority of EM residents are not comfortable addressing the needs of LGBT patients. EM residents do not routinely take an appropriate history on LGBT patients, and some find it challenging and uncomfortable to care for transgender patients. Discriminatory statements by both residents and faculty are common. This further supports a need for LGBT health curriculum development and implementation in EM residency.

(72) "Let Me Tell You About Me..." Patient Perspectives On Care Providers Self-disclosure In The Emergency Department
Korie Zink Thielker, Sally Santen, Marcia Perry, Kory London, Samantha Williams, Olivia Floto, Raven Kellum, Kaycee Newcomb. University of Michigan, Ann Arbor, MI

Background: As patients become increasingly involved in their medical care, physician-patient communication gains importance. In an attempt to improve health outcomes by increasing patient comfort and trust, some care providers (CPs) use self-disclosure (talking about themselves) as a mode of communication. While some
patients appreciate self-disclosure (SD), others find it irrelevant or intrusive to their care. **Objectives:** The purpose of this study is to explore the impact of Emergency Physician and Physician Assistant SD by examining patient assessment of physician communication skills and subsequent patient satisfaction. **Methods:** Student researchers verbally consented ED patients who were willing to complete the survey. The instrument addressed patients’ perceptions of CP SD and communication skills through 24 items, with 4 open-ended questions. The survey was administered over approximately 12 weeks to 456 patients. **Results:** Patients reported CP SD in 19.4% of interactions. Thirty-six percent of patients indicated that they would like SD, 13% would dislike SD, and 51% would not care. Nonparametric Kruskal-Wallis testing showed that CP SD correlated with more positive patient perception of CP communication skills (p = .005), more positive ratings of CP rapport (p = .016), and higher satisfaction with CP communication (p = .048). A majority of patients reported that they would like hearing about their CP’s experiences with a similar ailment/injury to their chief complaint (64.4%), while less than a majority would like to hear about their CPs education (49%), family (32%), personal life (21%), or an injury/ailment unlike their own (19%). Patients answering open-ended questions (n=339) indicated that they believe that CPs self-disclose to make patients comfortable/at ease (33%), to build rapport (21%), or to relate to the patient (14%). **Conclusion:** In summary, CP self-disclosure in the ED may result in positive patient perceptions of CP communication and higher patient satisfaction ratings. Patients are most interested in SDs that relate to their presenting ailment/injury.

(114) Emergency Medicine Physicians’ Knowledge and Value of Community Based Maternal and Early Childhood Health Programs

*Tamara S. Augustine¹, Marcus Chiodo¹, Cheryl Courage², Melissa Barton³. ¹DMC/Sinai-Grace Hospital, Detroit, MI; ²Wayne State University School of Medicine, Detroit, MI; ³WSU/DMC/Sinai-Grace Hospital, Detroit, MI*

**Background:** The City of Detroit has the highest infant death rate in Michigan. There is strong evidence that the participation of pregnant women in community programs improve outcomes. It is common for new pregnancies to be discovered in the emergency department (ED), however it is unclear how often emergency physicians (EPs) make referrals to community-based prenatal health programs. **Objectives:** The objective of this study was to determine attitudes and reported practices of EPs regarding 1) their perceived ability to offer patients with newly diagnosed pregnancies follow-up prenatal care resources 2) familiarity of local, community-based prenatal programs, and 3) the perceived effectiveness of these types of programs. **Methods:** An online survey of attending and resident physicians was delivered to EPs of a single urban medical center in Detroit, Michigan to determine their baseline knowledge and opinions of EPs awareness of community health programs for mothers they diagnosed with new pregnancies in the ED. **Results:** A total of 42 EPs responded to the survey. The majority (94%) of respondents endorsed that prenatal care was either valuable or very valuable to the well being of a child. One responder stated that it was of limited value. Most physicians (64%) stated that they hardly ever refer to community-based, prenatal health programs, and 48% felt that the discharge instructions given to their patients were inadequate. The largest barrier physicians reported to referring patients to programs was lack of knowledge. A total of 62% of the physicians agreed that the ED in which they work has a moral responsibility to offer referrals to prenatal programs for newly diagnosed pregnancies. Nearly half of respondents (46%) said they would frequently refer and 41% would almost always refer patients to these programs if they had a basic understanding of the local evidence-based programs available locally. **Conclusion:** These data support our hypothesis that physicians do believe in the
benefit of prenatal programs; however, lack of knowledge of programs, how to refer, and of materials available for referral are hindrances to routine referral practices. The next step in this project will be to hold education sessions and provide more material for referrals before reassessing physicians’ attitudes and behavior on this issue.

(138) Filling The Niche Of ED-Public Health Through The Creation Of A Foamed-based Blog
Kiran Faryar, Andrew Ramsey. University of Louisville, Louisville, KY

Background: The ED should be viewed as the foci for public health initiatives, rather than solely as the site for externally generated community health initiatives. To manifest this paradigm shift, it is important for ED personnel to understand the role community health can play in the ED in conjunction with other community resources. There is a paucity of literature exploring public health from the ED perspective. The literature that is available is static and widely distributed across libraries, schools of public health, expertise of individual practitioners, specialties, and the Internet. Objectives: Our objective is to develop practical solutions which can accomplish public health goals within the time-restricted ED patient encounter. An ED-empowered public health movement would identify and disseminate information allowing ED personnel to improve healthcare in ways directly relevant to daily practice. Methods: A FOAMed (free open access meducation) based ED-centric public health blog will be developed by two residents. It will contain ED-public health articles, evidence-based reviews of specific topics, case reports, and other online resources for ED physicians. The website will be introduced to the University of Louisville residency program to gauge initial interest. The website can be found at http://www.edpublichealth.com. Results: Within the past three months, the website has grown in readership and content. To date, there are six posts from both residents and faculty physicians. Louisville faculty increased notoriety among the Kentucky medical community through the Greater Louisville Medical society (GLMS) and Kentucky American College of Emergency Physicians (KACEP). National readership and involvement was promoted through CORD (Council of Emergency Medicine Residency Directors). Conclusion: Overall, the website has been received in a positive manner. It appears that its content is unique in comparison to the current literature available. Posts and/or cases will be added on a monthly basis. It is our goal that this website will fill the niche of ED-public health resources for both academic and community ED personnel.

(130) Optimizing Communication of Emergency Response Adaptive Randomization Clinical Trials to Potential Participants
Brendan McEvoy, Jason Tehranisa, William Meurer. University of Michigan, Ann Arbor, MI

Background: The use of response-adaptive randomization (RAR) within a clinical trial has the potential to increase patient participation when compared to standard fixed randomization. However, communication - and thus, patient understanding - of the RAR can be more difficult due to the increased complexity of the design itself, especially in an emergent, time-sensitive setting such as with acute stroke patients. Objectives: We hypothesized that introducing brief comprehension questions into a video explaining a hypothetical acute stroke trial would improve the understanding of the trial allocation procedure and increase patient participation. Methods: We conducted a cross-sectional survey of adult patients presenting to the emergency department. After obtaining verbal consent, patients were randomized to one of four groups: They watched a
video with either an RAR or a standard hypothetical acute stroke trial, with or without the addition of interactive comprehension questions. These questions addressed research procedures relevant to the consent process and operation of the trial. Subjects were asked whether they would consent to the trial and if they could identify the method of randomization and allocation used. **Results:** A total of 720 patients were enrolled. A significantly higher proportion of individuals in the RAR interactive video group (85.9%) correctly identified the trial allocation method assigned versus the RAR uninterrupted video group (60.4%), absolute increase: 25.5% (95% confidence interval, 17-33%). Additionally, there was significantly higher trial participation in the RAR interactive video group (table). **Conclusion:** Integrating structured comprehension questions into the consent process of a hypothetical acute stroke trial increased understanding of the RAR trial design and further attracted more research participation. Improving the communication of the trial procedures within a simulated situation that mimics the rapid discussion regarding an emergency research trial is beneficial and should be incorporated into future acute stroke trials.