2019 ICEP

Spring SYMPOSIUM

& ANNUAL BUSINESS MEETING

STATEWIDE RESEARCH SHOWCASE EBOOK

Thursday, April 25, 2019

Northwestern Memorial Hospital | Chicago, Illinois

spotlight on:

SOCIAL EMERGENCY MEDICINE AND POPULATION HEALTH

#ICEPspring19

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Endoscopic Findings on Emergency Department Patients with Esophageal Obstruction

Brian Donahue, MD, Ashray Ohri, MD, Shu B. Chan, MD, MS; AMITA Health Resurrection Medical Center, Chicago IL

Background:
Acute esophageal obstruction is a true emergency, which requires urgent evaluation and treatment, and could result in death if not properly treated. A majority of obstructions are caused by ingested foreign bodies. Emergency Department (ED) interventions include medications or endoscopic intervention or both. One advantage of endoscopic intervention is the ability to diagnose esophageal pathology.

Study Objective:
The study objective is to determine the incidence of serious esophageal endoscopic findings in patients presenting to the ED with acute esophageal obstruction.

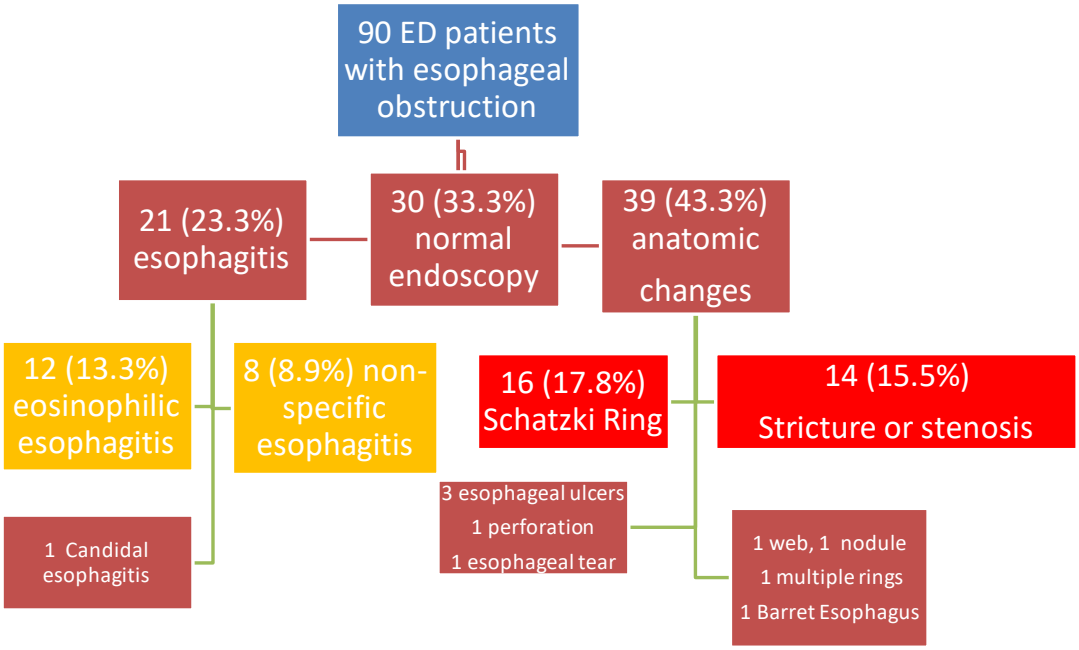
Method:
This is a retrospective electronic chart review study from two community-based Emergency Departments (ED) 2012 to 2018. Included are adult patients presenting with esophageal obstruction and had an emergent endoscopic procedure in the ED. Excluded were patients who had incomplete or aborted procedures. Differences between patients with normal and abnormal endoscopic findings were tested using ANOVA and Chi-squared as appropriate. Significance was set at a p-value of 0.05.

Results:
90 patients met inclusion exclusion criteria. The mean age was 54.0 years (SD: 18.8) with 31.1% female. Food impaction occurred in 71.1% of the patients followed by non-specific foreign bodies at 15.6%. On endoscopy, 33.3% of the patients had normal findings, 43.3% had an anatomic abnormality including 17.8% Schatzki Ring, 15.5% esophageal stricture or stenosis, and 7.7% esophageal ulcers. 23.3% had esophagitis, including 13.3% eosinophilic esophagitis. Patients with anatomic endoscopic findings were more than 10 years older (p=.002). Overall, 35.6% of the patients had a past medical history of GERD or other esophageal disease but this was not associated with anatomic endoscopic abnormalities (p=.727). Only 3 of the 14 patients with stricture or stenosis had a prior history of the same. Overall, 51 patients (56.7%) received attempted pharmacologic intervention prior to endoscopy. 41 patients (45.6%) received glucagon. There was one esophageal perforation and one esophageal tear found and both were in the glucagon group.

Conclusion:
This retrospective study from two community-based Emergency Departments found 43.3% anatomical esophageal pathology in patients with acute esophageal obstruction, including one perforation and one esophageal tear.

Impact:
Emergency Physicians should be aware of the high incidence of underlying esophageal pathology in patients with acute obstruction and arrange emergent endoscopy expeditiously.

Figure 1: Endoscopic Findings



Resident Barriers to Didactic Conference Attendance

Joshua E. Kim, DO, Neeraj Chhabra, MD; Cook County Health, Chicago, IL

Background:
The ACGME requires 70% attendance at didactic conferences for resident physicians to graduate.

Objective:
The purpose of this study is to identify positive and negative motivators for didactic conference attendance.

Design/Methods:
In an anonymous survey of Emergency Medicine residents at an urban PGY1-4 ACGME-accredited public hospital program, respondents were asked to identify which internal (e.g. content, lecturers) and external (shift schedule, life obligations) factors positively or negatively affected their conference attendance.

Results:
Forty-five of 67 residents responded (67%; 23 male, 22 female; 11 PGY-1, 12 PGY-2, 9 PGY-3 and 13 PGY-4). The highest negative external motivators were “stayed later for charting or patient care the night before” (79%); “was working the overnight into conference” (76%); “was on a floor service - missed time due to rounding” (55%); “felt burnt out” (53%); and “was working the 3-11 before conference” (53%). More female (68%) than male (35%) residents cited burn out as a negative influence (difference 33%; 95%CI 4%-56%) and more male (83%) than female (64%) residents cited working the overnight into conference as a negative influence (difference 19%; 95% CI -7%-42%). 83% of those with children or pets (COP) chose “was working the overnight into conference,” compared to 64% of those without COP (difference 19%; 95%CI -7%-42%). Furthermore, 57% of individuals with COP chose “had personal/life obligations” compared to 41% of individuals without COP (difference 16%; 95%CI -13%-41%). Positive external motivators for conference attendance included “I get to see my co-residents” (83%) and “It is a requirement” (81%). Positive internal motivators included “special guest lecturer” (71%) and “the topics were interesting” (71%).

Conclusion:
Across demographics, charting and patient care after shift hindered conference attendance. Twice as many females as males placed feeling burnt out as a reason preventing conference attendance. Though respondents with COP cited working overnight into conference and personal obligations at a higher rate than those without, both groups’ attendance was affected. Positive motivators for attendance included social benefits as well as interesting topics and guest speakers.

Impact:
With more attention paid to addressing these factors, it may be possible to increase resident attendance at conference, creating a better educational experience.

Resident Supervision and Patient Care: A Comparative Time Study in a Community-Academic versus a Community Emergency Department

Ernest E. Wang, MD, Yue Yin, PhD, Itai Gurvich, PhD, Morris S. Kharasch, MD, Clifford Rice, MD, Jared Novack, MD, Christine Babcock MD, Msc, James Ahn, MD, MHPE, Steven H. Bowman, MD, Jan A. Van Mieghem, PhD; NorthShore University HealthSystem, Evanston, IL

Background:
"[e]ducating and supervising residents and students while simultaneously providing patient care requires quantifiable faculty time and effort. Academic EDs must identify this time and effort accurately since providing this joint product line has the potential to make our emergency care system inefficient."

DeBehnke, 2001

Objective:
To compare attending emergency physician (EP) time spent on direct and indirect patient care activities in emergency departments (ED) with, and without, emergency medicine (EM) residents.

Design/Methods:
We performed an observational, time-motion study on 25 EPs who worked in a community-academic ED and a non-academic community ED. Two observations of each EP were performed at each site. Average time spent per 240-minute observation on main-category activities are illustrated in percentages. We report descriptive statistics (median and interquartile ranges) for the number of minutes EPs spent per sub-category activity, in total and per patient. We performed a Wilcoxon two-sample test to assess differences between time spent across two EDs.

Results:
The 25 observed EPs executed 34,358 tasks in the two EDs. At the community-academic ED, EPs spent 14.2% of their time supervising EM residents. Supervision activities included data presentation, medical decision making, and treatment. The time spent on supervision is offset by a decrease in time spent by EPs on indirect patient care at the community-academic ED compared to the non-academic community ED, specifically from communication and EHR work. There was no statistical difference with respect to direct patient-care time expenditure across two EDs. There was a non-statistically significant difference in attending patient load between sites.

Conclusion:
EPs in our study spent 14.2% of their time (8.5 minutes/hour) supervising residents. The time spent supervising residents was largely offset by time savings related to indirect patient care activities rather than compromising direct patient care.

Impact:
To the best of our knowledge, this is the first study to comprehensively quantify and compare the time EPs spend on resident supervision and care-related activities in CAEDs versus community EDs. Our findings also help identify the "currency of resident apprenticeship".

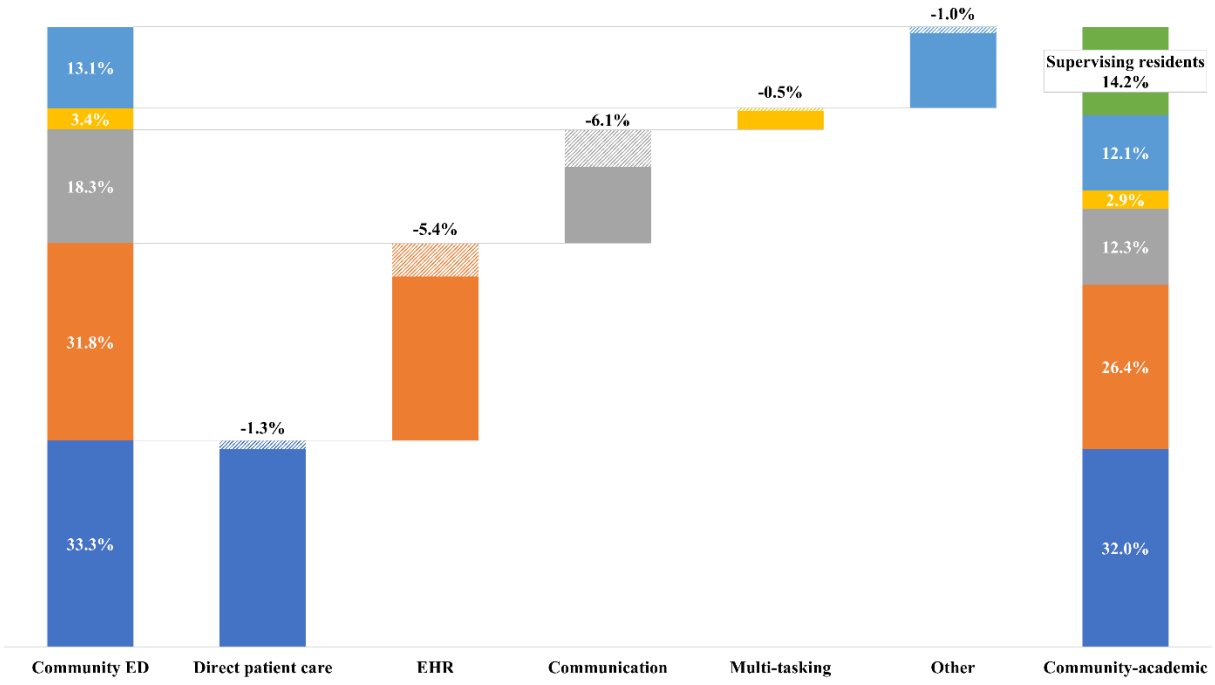


Fig. 1. Mean Task Percentages for the 240-minute observations

Battle of the Probes: Comparison of Linear versus Curvilinear Probes for Sonographic Detection of Endotracheal Tube Placement

Collin A Wulff, DO; John Bailitz, MD; Dallas Holladay, DO; Katharine Burns, MD; Stephen R. Gore, MD; Shital Shah, PhD; Michael Gottlieb, MD, RDMS; Rush University Medical Center, Chicago, IL

Background:
Ultrasound is a growing adjunct in the identification of endotracheal tube (ETT) location after intubation. Prior studies have varied with respect to the type of probe that was used. However, no study has performed a direct comparison of transducer types for this modality.

Objective:
Our objective was to compare the accuracy of the linear versus curvilinear probe for the detection of ETT location following intubation.

Design/Methods:
This study was performed in a cadaver lab on three human cadavers with varying neck circumference. Cadavers were randomized to tracheal or esophageal intubation in equal proportions. Intubations were performed by an experienced provider using video laryngoscopy. Four blinded ultrasound fellowship-trained emergency medicine physician operators sequentially assessed ETT placement using either a linear or curvilinear transducer, in an alternating fashion. Correct identification of ETT location was assessed as the primary outcome with time to identification and operator confidence level serving as secondary outcomes.

Results:
405 intubations were performed in total: 198 tracheal and 207 esophageal. The curvilinear technique was 95% (95% confidence interval [CI] 91.1% to 97.3%) accurate. The linear technique was 98% (95% CI 95.1 to 99.2%) accurate. Mean time to identification was 11.63 seconds (95% CI 9.05 to 14.2 seconds) with the curvilinear transducer and 7.46 seconds (95% CI 6.23 to 8.7 seconds) with the linear probe. Operator confidence was 4.44/5.0 (95% CI 4.30 to 4.57) and 4.84/5.0 (95% CI 4.76 to 4.91) for the curvilinear and linear techniques, respectively.

Conclusion:
This study found that ETT placement confirmation with a linear transducer provided increased confidence and shorter time to identification of location. However, there was no statistically significant difference in detection accuracy between the two transducer types. Further studies with more novice sonographers would be helpful in further comparison of the two techniques.

Impact:
While our data suggests that a linear transducer may result in a faster and more confident confirmation, we did not identify a statistically significant difference in accuracy. Therefore, providers may use whichever probe they prefer, but should be aware of the potential limitations with the curvilinear probe.

Impact of Ceftriaxone as Intravenous Push on Patient Safety in the Emergency Department

Abdulkareem A. Agunbiade, MD; Joanne Routsolias, PharmD; Lum Rizvanoli, BS; Sharadram Sundaresan; William Bleifuss; Jordan Moskoff, MD; Cook County Health, Chicago, IL

Background:
In September 2017, Hurricane Maria hit Puerto Rico damaging a main supplier of intravenous saline bags, leading to a national shortage. At our busy urban public hospital this shortage led to changing ceftriaxone from intravenous infusion (IVI) to intravenous push (IVP).

Objective:
We examined if this change led to an increase in adverse reactions.

Design/Methods:
We conducted a retrospective chart analysis study. Patients 18 years of age and older that were administered ceftriaxone in the emergency department (ED) between January to March 2018 were included. Trained research associates recorded information about demographics and possible adverse reactions. Adverse reactions were defined as any noxious or unintended response to a drug given at therapeutic doses and identified through review of ED nursing notes. Identified potential adverse reactions were independently reviewed by a team of two EM physicians and a EM clinical pharmacist using an adverse drug reaction (ADR) probability scale. The primary outcome was the rate of adverse events for IVP administration of ceftriaxone.

Results:
831 patients were identified, 77 were excluded due to erroneous or missing data, and a total of 754 were included. Study subject demographics include an average age of 52.8, female sex predominance (54.2%) and primarily Black race (41.5%). A total of 24 cases were highlighted as potential adverse reactions. After independent review using the ADR probability scale, only one of the 24 cases was determined to be an agreed upon adverse reaction to ceftriaxone as IVP. The total adverse event rate observed was 1/754 or 0.13%.

Conclusion:
Our study demonstrates that the rate of adverse events for IVP is lower than previously reported (1%-17.5%).

Impact:
Given the demonstrated safety of IVP administration future study is warranted to determine potential ED cost and time savings from this change in administration.

Emotional Intelligence As It Relates to Burnout in Emergency Physicians

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Background:
Physician burnout rates have been reported to be higher in EM compared to other specialties. However, individual burnout rates seem to vary within the specialty as emergency physicians deal with stress differently among other variables. The importance of emotional intelligence (EI), the ability to identify and manage one's own emotions, has been well established in medicine, but there is little literature showing correlation between burnout and EI in physicians who are under chronic high-stress environments.

Objective:
The purpose of this study is to evaluate the relationship between burnout and emotional intelligence in emergency physicians compared to other variables including years in practice, and distribution of clinical hours.

Design/Methods:
A voluntary questionnaire survey was conducted for attending and resident physicians practicing in regional tertiary care, Level 1 Trauma Center that cares for over 80,000 annual patients. Burnout was measured using the Tedium Index, which is a 21 item survey on a 7 point Likert scale while EI was measured using the Trait EI Questionnaire (TEIQue), which is a 30 item survey based on a 7 point Likert scale. Other demographics were also collected including years in practice and distribution of nonclinical and clinical hours worked. Statistical analysis was performed to against a 2-sided alternative hypothesis with a significance level of 5%. Pearson correlations were used to determine the relationships between emotional intelligence, burnout, years in practice, and distribution of clinical hours worked.

Results:
There were a total of 43 physician participants (5 residents, 38 attendings). A significant negative correlation was found between mean emotion intelligence score and mean burnout score, $r = -0.44$, $p = 0.003$. No other variables examined (years in practice and clinical hours worked) were found to be significantly associated with burnout or EI.

Conclusion:
These results indicate that emergency physicians with higher EI are associated with lower rates of burnout. Meanwhile, burnout rates were not correlated with other variables including years in practice and distribution of clinical hours worked.

Impact:
Rates of physician burnout in EM is directly correlated with individual physician characteristics rather than other occupational variables. EI should be addressed when discussing physician burnout.

Haloperidol and QTc in the Emergency Department: Is There a Clinical Issue?

Darien Cohen, MD, Corbin Barwegen, MD, Ryan Ambroz, Shu B. Chan MD, MS; AMITA Health Resurrection Medical Center, Chicago IL

Background:
Haloperidol is used in the Emergency Department (ED) to treat agitation. There are reports of high dose haloperidol causing arrhythmias in critically ill patients but the association is not known in ED patients. Ketamine is also used to treat agitation, and while occasionally associated with prolonged QT, there have been no reports of ventricular arrhythmia.

Objective:
We analyzed ED patients over the course of a year receiving haloperidol and/or ketamine to determine any correlation with QT prolongation or ventricular arrhythmias.

Methods:
12 month chart review of all adult patients receiving IV haloperidol or ketamine in 2 community ED. Excluded were patients missing EKG. Data was re-abstracted on 10% with kappa= 100%. QTc intervals were considered prolonged if ≥440 msec in males or ≥460 msec in females while QTc > 500 msec were flagged as concerning. Patient were stratified into 3 groups; IV haloperidol, IV ketamine, and patients given both parenterally. Comparison between groups was tested using Chi-squared with significance set at 0.05.

Results:
168 charts met inclusion and exclusion criteria. There was no EKG or clinical evidence of ventricular arrhythmia. Mean age was 43.1 years with 37.5% females. IV haloperidol was given in 69.1%, IV ketamine in 19.6%, and both were given in 11.3%. Indication for sedation include 53.0% psychiatric agitation, 31.5% alcohol/drug agitation, and 15.5% pain/procedures. 44.0% had prior EKG, 20.2% had prior prolonged QTc, and 16.7% of patients were on QT prolonging drugs at home. Overall, 51.2% (86/168) patients had QTc prolongation. 36.8% (62/168) patients had new prolongation of QTc. Only 5.4% (9/168) had new QTc >500msec. There were no significant differences between patients given just haloperidol vs. just ketamine versus both (Chi-sq p-values 0.590 for new prolongation and 0.560 for new QTc > 500msec).

Conclusion:
In this review of patients given parenteral sedatives in the ED, 51.2% of the patients had prolonged QTc on their ED EKG. There were no EKG or clinical evidence of ventricular arrhythmia. There was no significant difference in new QTc prolongation between patients given parenteral haloperidol versus parenteral ketamine.

Impact:
Although there are concerns regarding haloperidol and QTc prolongation compared to ketamine, this study did not find a significant increase in the ED and there were no clinical evidence of ventricular arrhythmias.

Pediatric Croup Treatments and 72 Hour Returns to the ED

Nicole Colucci, DO, Ami Gohil, MD, Shu B. Chan, MD, MS; AMITA Health Resurrection Medical Center, Chicago IL

BACKGROUND
Croup is a common childhood self-limiting upper respiratory illness. A common problem that Emergency Department (ED) physicians encounter with the management of croup is determining which treatment(s) may best avoid a future revisit to the ED.

OBJECTIVE
To investigate different croup interventions and determine the effect of those interventions on likelihood to return to ED.

DESIGN/METHODS
12-month retrospective study of electronic medical records from two community ED. Included are all patients ≥ 18 years old with a diagnosis of "croup". Excluded were patients with concurrent diagnosis of asthma, patients with history of recurrent upper airway reaction, or acute allergic reactions. Data abstracted include treatments, outcomes, disposition, and ED return for croup within 72 hours of the index visit. Differences between patients with 72 hours returns were tested using Student-t or Fisher exact tests as appropriate. Significance was set at a two-tailed p-value of 0.05.

RESULTS
186 patients met the inclusion/exclusion criteria. The median age was 2.0 years (IQR: 1.0, 4.0) with 68.8% male. While in the ED, 51.1% were treated with steroids only while 46.2% received both steroid and nebulized adrenergic agents. Dexamethasone was used in 181 of the 186 patients (97.3%). . The mean dexamethasone dose given was 0.47mg/kg (SD: 0.20) with 82.2% given orally. In the 88 patients given nebulized treatments, 50.0% were given racemic epinephrine, 30.7% received albuterol, and 19.3% received both. The median length of ED stay was 142 minutes (IQR: 108, 208). On disposition, 169 (90.9%) were discharged home. Of the discharged patients, there were 7 patients (4.1%) found returning to the ED within 72 hours of the index visit. Those patients who returned were significantly younger (1.5 versus 2.8 years; p=.007) and more likely female (71.3% versus 30.9%; p= .038). Treatments with racemic epinephrine or albuterol or discharged with steroid during the prior ED visit was not significantly correlated with ED return.

CONCLUSIONS
In this community ED study of pediatric croup, 97.3% were treated with dexamethasone. There were 4.1% 72-hours ED returns. Returning patients were significantly younger and more female. Type of prior ED treatments were not correlated with returns.

IMPACT
Regardless of racemic epinephrine or outpatient steroids, there is still 4.1% return rate for pediatric croup patients.

Knowledge and Practice of Emergency Medicine Health-Care Providers (HCPs) Regarding the ASK Campaign and Firearm Safety

Daniel J. Cotton, Lera Driver, Todd A. Zimmerman, Mark E. Cichon, DO; Loyola University of Chicago, Chicago, IL

Background:
According to the Asking Saves Kids (ASK) campaign, 80 percent of unintentional firearm deaths involving children under 15 y.o. occur at home. ASK was promoted with the intent that parents/caregivers should ask if there is an unlocked firearm where their children play. Through educating HCPs about the "ASK Campaign" it is hoped this intervention would improve comfort in conveying this knowledge to patients and parents of patients in the ED.

Objective:
This study was designed to assess the current knowledge and behaviors of Emergency HCPs as it relates to the ASK campaign and firearm safety. The goals were to show improvement in knowledge about firearm prevalence, safe storage, and increased comfort presenting the information to caregivers of children. Additionally, this study wanted to assess if there was a difference in comfort discussing firearm safety/storage between demographics.

Design/Methods:
Surveys measured provider knowledge and attitudes before and after an educational intervention about the Asking Saves Kids (ASK) campaign. Descriptive statistics were reported for pre and post-survey responses.

Results:
91 HCPs participated in the pre-survey and 49 in the post-survey. Correct responses to knowledge-based questions improved from pre to post survey (% parents with loaded guns - 44.9% vs 69.4%; % unintentional firearm deaths of kids at home - 22.7% vs 85.7%). Confidence in knowing proper firearm storage increased from 41.8% vs 81.6%. Post-intervention, 87.8% of HCPs felt comfortable discussing firearm safety with caregivers of pediatric patients. Frequency of and comfort with discussing firearm safety did not differ by respondent age, gender, role, or parenthood ($p>0.05$).

Conclusion:
This intervention was sufficient to improve HCP knowledge in firearm safety and comfort in discussing firearm storage with their patients. No significant difference in knowledge and comfort with discussion of firearm safety was noted between HCPs regardless of their demographics.

Impact:
Knowledge of the ASK campaign may reduce unintentional firearm deaths. This study demonstrated that after a brief intervention most ED HCPs were comfortable discussing firearm safety. By utilizing this intervention, this study hopes that more ED HCPs will incorporate the ASK campaign into patient education.

Attitudes, Behavior & Knowledge of Emergency Medicine Healthcare Providers Regarding LGBT+ Patient Care

Lera Driver, William Adams, PhD, Jacqueline M. Dziedzic, DO; Loyola University of Chicago, Chicago, IL

Background:
Although awareness of LGBT+ patient health concerns has increased, there is evidence that healthcare providers are lacking in knowledge when it comes to treating LGBT+ patients.

Objective:
The purpose is healthcare providers' LGBT+ health-care knowledge, willingness to treat LGBT+ patients, and communication behaviors.

Design/Methods:
We asked physicians and nurses in the emergency department of an urban level I trauma center to participate in a survey regarding LGBT+ health. The survey was modified from published work and included questions about transgender patients. We examined the effects of age, gender, and type of provider on their willingness to treat and their knowledge of LGBT+ healthcare.

Results:
Compared to nurses, physicians were about 9.0 (95% CI: 2.09 – 38.79) times more likely to agree with the statement "LGBT+ patients avoid accessing healthcare due to difficulty communicating with providers" (p = .003). Physicians also reported higher levels of agreement for the statement "The LGBT+ population is often more difficult to treat" (p = .03). Regarding the five-question knowledge assessment, the number of correctly answered items was comparable across age, gender, and provider types.

Further, compared to older providers, those under the age 45 had a higher level of agreement with the statement "There should be more education in health professional schools on LGBT+ health needs" (p = .03). These respondents also reported higher agreement with "being listed as an LGBT-friendly provider" (p = .001) as did nurses (p = .04) and those who identify as LGBT+ or know someone who identifies as LGBT+ (p = .005).

Finally, respondents reported higher agreement to the statement "There should be educational events at my hospital about LGBT+ health needs" (Mdn = 4, IQR = 3 – 5) than to "I am well informed on the health needs of the LGBT patients" (Mdn = 2, IQR = 2 – 3).

Conclusion:
Based on the data, we found a need and desire for educational events at the professional school and provider level in the ED. We recommend a follow-up study in the primary care setting and an educational intervention.

Impact:
We hope to encourage physicians within EDs to ask and address LGBT+ issues to improve patient satisfaction and care.

Assessment of Emergency Physician Knowledge About Sexual and Reproductive Health

Courtney Hutchins, MD, MPH; Kimberly A. Stanford, MD; University of Chicago Medical Center, Chicago, IL

Background:
Rates of sexually transmitted infections (STIs) are rising throughout the country, most notably in urban areas such as the south side of Chicago. Urban women may be more likely to contract STIs, lack access to reproductive health care, and have higher-risk pregnancies. These patients disproportionately utilize the emergency department (ED) for their medical care. ED patient interactions represent a unique opportunity to provide screening, education, and referral for patients with sexual health complaints.

Objective:
This study aims to assess ED physician knowledge about sexual health and early pregnancy care in the ED, with a goal of identifying specific areas where education and clinical support pathways can be improved.

Design/Methods:
An anonymous electronic survey of resident and attending physicians at the University of Chicago was performed in January 2019. This survey assessed core content knowledge (25 questions) and subjective comfort level (5 questions) with sexual and reproductive health complaints.

Results:
Survey participants included 25 resident physicians (51% response rate) and 16 attending physicians (52% response rate). 25 (61%) of the survey participants identified as male. Greater than 80% of respondents felt comfortable or very comfortable with discussing and treating sexual health complaints, but notably 51.2% of respondents did not feel comfortable referring patients for pregnancy or STI follow-up care. Fewer than half of respondents reported asking patients with genitourinary complaints about their sexual orientation (32.6%) or their sexual history (48.8%). 9.8% were not familiar with CDC guidelines for HIV screening, and 53.7% were unaware that HIV screening tests are positive during acute infection. Fewer than half correctly answered questions about STI testing, treatment, and follow up.

Conclusion:
Our data suggest that while ED physicians may feel comfortable with evaluating and treating sexual and reproductive health complaints, knowledge gaps exist, particularly around HIV and STI testing and counseling, that represent an area of significant potential for improvement in clinical care.

Impact:
There is a need to improve education around referral and follow up care for pregnant patients and those with suspected STIs. We will use our findings to provide ongoing education to physicians as well as to design robust clinical pathways for decision support in the ED.

Creating an Emergency Medicine Resident Cultural Competency Curriculum: Results of a Validated Needs Assessment Survey

Adesuwa I. Akhetuamhen, MD, Abiye L. Ibiebele, MD, John M. Bailitz, MD, Northwestern University, Chicago, IL

Background:
A significant proportion of healthcare today is provided within the ED, particularly for society's most vulnerable minority patients. Governing agencies in Graduate Medical Education (GME) and EM have called for Residency programs to improve Cultural Competency (CC) education.

Objective:
To help meet this critical need, the Northwestern Emergency Medicine residency (NWEM) is developing a novel EM CC Curriculum utilizing Kern's six steps of medical education curriculum design. For step one, we completed a Needs Assessment utilizing the validated Tool for Assessing Cultural Competence Training (TACCT) Survey from the Association of American Medical Colleges (AAMC). We are the first investigators to utilize TACCT in EM GME. We hypothesize that the TAACT survey will identify areas of improvement to inform the development of educational objectives for our CC education.

Design/Methods:
TACCT contains 42 items within 6 domains, specifically Health Disparities, Community Strategies, Bias/Stereotyping, Communication Skills, Use of Interpreters, and Self Reflection/Culture of Medicine. Each item reflects a separate facet of students' knowledge (K), skill (S), or attitude (A). Participants check off which items are addressed in the current curriculum. We anonymously administered the TACCT survey online at NWEM to 60 residents and 33 faculty physicians at our four-year residency, an urban, tertiary care, level-one trauma center.

Results:
Response rate was 72% for overall (N=67), 75% for residents (N=45), and 66% for faculty (N=22). The mean percentage of checked responses ranged from 4-70%. The majority of the items in the bottom quartile were in the Health Disparities domain. No items in the bottom quartile come from the domains Use of Interpreters and Self Reflection/Culture of Medicine.

Conclusion:
To create a rigorous EM CC Curriculum, we administered the validated TACCT survey designed by the AAMC to identify need in our current training. The majority of inadequately addressed items are related to health disparities.

Impact:
We have utilized these results to develop meaningful educational objectives for our EM CC Curriculum now being implemented. This may provide a valuable framework for meeting this critical need in our increasingly diverse EDs.

Needs Identified from the Bottom Quartile of the TACCT Survey	Domain	Knowledge, Skill, Attitude
Show strategies to reduce bias in others	Bias/stereotyping	S
Value historical impact of racism	Bias/stereotyping	A
Discuss race and culture in the medical interview	Communication Skills	S
Describe methods to identify community leaders	Community Strategies	S
Propose a community-based health intervention	Community Strategies	S
Collaborate with communities	Community Strategies	S
Gather and use data from the SAEM, AAEM and ACEP policies on diversity*	Health Disparities	S
Concretize epidemiology of disparities (apply research to practice)	Health Disparities	S
Critically appraise literature on disparities	Health Disparities	S
Define race, ethnicity and culture	Health Disparities	K
Recognize disparities amenable to intervention	Health Disparities	A

*The original item, “Gather and use data from Healthy People 2010,” was edited to reflect EM training.

Optimizing the Patient Experience for Behavioral Health Patients Boarding in the Emergency Department

Joanne C. Routsolias, PharmD, RN, BCPS, Trevor J. Lewis, MD, Mark B. Mycyk, MD; Cook County Health, Chicago, IL

Background:
Prolonged ED boarding times for behavioral health patients have increased nationally. Previous study suggests incomplete medication reconciliation and other medication errors contribute to prolonged ED boarding times.

Objective:
We performed a systematic needs assessment to identify areas for improving staff education, medication safety, and future study in patients boarding with behavioral health problems.

Design/Methods:
A closed-format electronic survey instrument was developed by experts in ED operations, behavioral health, and medication safety. The instrument was piloted, revised, then administered over a two week period until targeted participation reached N=100. Eligible subjects were all ED staff members at an urban academic hospital with >130,000 visits annually and a PGY1-4 EM residency; participation was voluntary, anonymous, confidential, and approved by our IRB. Data collected included basic demographics and staff perceptions about ED boarding of behavioral health patients.

Results:
Of 100 subjects who completed the survey, 26 were attending physicians, 17 resident physicians, 39 nurses, 4 physician assistants, 10 ED technicians, and 4 others. Most (99%) felt behavioral health patients often board in the ED for >24 hours. When asked if boarding would ever improve, 54% were unsure, 21% answered yes, and 25% answered no. The majority (88%) reported the physician is not always aware of the medication needs of the patients: 90% reported patients did not receive their usual non-psychiatric medications (e.g., diabetes, hypertension) while boarding, and 88% felt patients did not receive appropriate psychiatric medications. Most (96%) reported daily clinical pharmacist rounds would improve medication safety; 86% reported a daily “safety huddle” involving pharmacy, ED and psychiatry physicians, nurses, techs, and social work would improve the needs of patients; 70% thought starting psychiatric medications during boarding would result in sooner discharge to home.

Conclusion:
Our needs assessment suggests a multidisciplinary approach is needed to enhance staff education and revise operational procedures to improve medication safety in behavioral health patients with prolonged ED boarding times. The impact of pharmacy-led comprehensive medication management on safety and length of stay needs to be examined.

Impact:
These findings have already informed our operations leaders: changes implemented in our ED since this needs assessment have already resulted in measurable improvements in safety and LOS that will be reported in our subsequent study. Our findings can be applied to other hospital systems that share the same challenges.

HEART Score Compared with Physician Clinical Judgment in Predicting Outcomes in Chest Pain Patients in the Emergency Department

Mary B. Naughton, MD, Wesley P. Eilbert, MD, Pei-Shan Yen, MS, Thomas J. Brennan; University of Illinois Hospital and Health Sciences System, Chicago, IL

Background:
The HEART score has been proven to be a useful tool to predict major adverse cardiac events (MACE) in patients presenting to the emergency department (ED) with chest pain.

Objective:
To compare the HEART score to ED physician gestalt (clinical judgment) in the ability to predict MACE in ED patients with chest pain.

Design/Methods:
All ED patients admitted with chest pain concerning for ischemic cardiac disease were enrolled. A HEART score and physician gestalt were recorded for each patient prior to admission by an ED attending physician or senior-level resident. The occurrence of MACE within six weeks of admission was determined by chart review and telephone contact with patients. MACE was defined as acute myocardial infarction, confirmed coronary artery disease on angiography, and death.

Results:
100 patients were enrolled in the study, with information regarding MACE available for 75 patients. Of these 75 patients, miscalculation of their heart score was discovered in 19 (25.3%), requiring recalculation of their HEART score before use in the study. Of the 75 study patients, seven (9.3%) were felt to be high risk and 29 (38.7%) were felt to be intermediate risk by physician gestalt. Using the HEART score, four (5.3%) of the patients were determined to be high risk and 42 (56.0%) were determined to be low risk.

Four of the 75 study patients had a MACE. Of these four patients, one was in the high risk group by both physician gestalt and HEART score. Three of these four patients were in the intermediate risk group by both physician gestalt and HEART score. Analysis by the Fisher exact test found no significant difference in the predictive value of physician gestalt and the HEART score in those patients deemed to be at high risk (P=1.0) and in those at intermediate risk (P=0.67).

Conclusion:
The HEART score and ED physician gestalt are equivalent in predicting MACE within six weeks of admission for chest pain.

Impact:
When properly calculated, the HEART score is of equivalent value to physician gestalt in predicting outcomes in ED patients with chest pain.

Figure 1
SAMPLE HEART SCORE FORM

Patient Medical Record Number: _____

Please assess the following components and assign a score.

History:
- ___ Highly suspicious (2 points)
- ___ Moderately suspicious (1 point)
- ___ Slightly or non-suspicious (0 points)

ECG:
- ___ Significant ST depression (2 points)
- ___ Nonspecific repolarization (1 point)
- ___ Normal (0 points)

Age:
- ___ 65 years or older (2 points)
- ___ 45 to 65 years (1 points)
- ___ 45 years or younger (0 points)

Risk Factors: diabetes mellitus, current or recent (within the past month) smoker, HTN, HL, family history of CAD, obesity
- ___ 3 or more risk factors or history of CAD (2 points)
- ___ 1 or 2 risk factors (1 point)
- ___ No risk factors (0 points)

Troponin
- ___ 0.12 or higher (2 points)
- ___ between 0.04 and 0.12 (1 point)
- ___ less than 0.04 (0 points)

___ TOTAL SCORE

Reference HEART Score Criteria
0-3 points = low risk
4-6 points = intermediate risk
>/= 7 points = high risk

What is your suspicion that this patient has chest pain from ischemic coronary artery disease?
- ___ Low
- ___ Intermediate
- ___ High

Medical Tent Usage from Bank of America Chicago Marathon 2015-2017

Brendan T. Parker, MD, Poonam P. Thaker, MD, Shu B. Chan, MD, MS, George Chiampas, DO; AMITA Health Resurrection Medical Center, Northwestern Memorial Hospital, Chicago, IL

Background:
As mass participation endurance events continue to increase in popularity throughout the world, the need for medical care in the acute setting continues to increase as well. Many endurance events, including the Bank of America Chicago Marathon, have implemented systems to help decrease morbidity and mortality by using medical tents along the course.

Objective:
Our objective was to evaluate medical tent usage throughout the Bank of America Chicago Marathon course.

Design/Methods:
This study was a retrospective analysis of data collected by the Bank of America Chicago Marathon medical staff and Superior Ambulance from 2015 to 2017. Documented patient encounters were analyzed from each course medical tent. 20 medical tents were roughly spaced 1.2 miles apart depending on location and ease of EMS access to the medical tent. Medical tent staff included a variety of health care professionals, from physicians and nurses to physical and massage therapists.

Results:
From 2015-2017, the course medical tents saw 2973 patients with a 96.3% discharge rate (97.1%, 98.8% and 91.3% respectively). The data showed a linear increase of 5.69 patients seen per mile until mile 20 (linear regression p-value <0.01). After mile 20, the number of patients seen per mile were about the same.

Conclusion:
Course medical tents saw a statistically significant linear increase in patients per mile until mile 20. After 20 miles, the number of patients was consistent with no statistical difference.

Impact:
This study has the potential to impact medical tent placement for endurance events with increasing patient encounters as the mileage of the endurance event increases.

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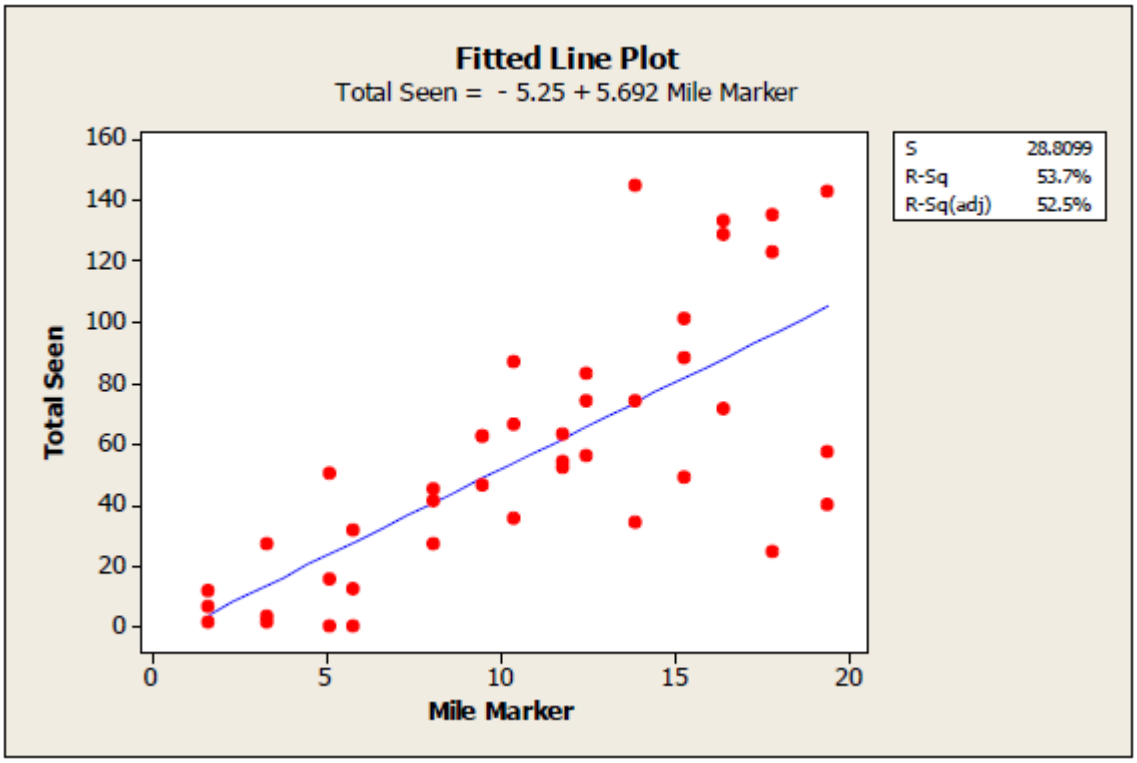

Development of a Novel Emergency Medicine Physician Training to Improve Care for Survivors of Sexual Assault: A Preliminary Survey

Melissa Prusky, Chloe J. E. Solomon, MS, Kaitlynn P. Tracy, Jaclyn Rodriguez, BSN, BS, RN, SANE-A, Maria Balata, Madeline Mangiaracina, Sloane York, MD, MPH, Vanessa Tirone, PhD, Dino P. Rumoro, DO, MPH; Rush University Medical Center, Chicago, IL

Background:
In the United States, one in three women and one in six men experience sexual violence in their lifetime. One in seven survivors are younger than six years old. While emergency medicine (EM) nurses and social workers undergo continuing education in caring for survivors of sexual assault, physicians typically do not. Training for EM physicians is imperative to achieve physician competence and confidence of care for survivors.

Objective:
Our objective in this work is to understand from the perspective of EM physicians what topics should be included in a training to improve competency and sensitivity of care for survivors of sexual assault. This will provide insight into points-of-care that are lacking for sexual assault survivors when presenting to the emergency room.

Design/Methods:
An online anonymous checkbox-style survey was administered to 40 Rush University Medical Center (RUMC) EM physicians, inquiring as to what topics they would like to learn more about in a training. Four categories, including communication, roles and responsibilities, medical care, and legal considerations, were included in the survey.

Results:
Twenty-seven EM attendings completed the survey. Of these respondents, 96% requested education on communication, 70% on roles and responsibilities of various healthcare providers and law enforcement, 93% on follow-up medical needs, and 96% on legal considerations specifically for survivors under 18-years old.

Conclusion:
Sexual assault is a significant public health problem that requires EM physicians receive specialized training in areas including trauma-informed care. Our research shows that RUMC EM physicians want to receive comprehensive training to improve skills and knowledge working with this patient population.

Impact:
Survey results were considered alongside expertise provided by Resilience (formerly, Rape Victim Advocates), SANE Coordinator of the Office of the Illinois Attorney General, and others to develop a four-hour CME-accredited multidisciplinary training for RUMC EM physicians to improve quality of care and health outcomes. Success of this training, administered December 2018-February 2019 at Rush, may advance training efforts at other health institutions to improve care across Illinois.

Medical Simulation Olympics: An Innovative Competition

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Background:
Medical simulation is a burgeoning field in resident education, and utilizing allotted time correctly is important. A successful combination of multiple task training and team building exercises into a timely and entertaining medical simulation activity is a difficult achievement. One method is a medical Simulation Olympics competition. By combining multiple task training and teamwork related exercises into one efficient simulation period, the Olympics can develop emergency medicine skill sets and benefit EM residents in cognitive skills, task proficiency, and overall wellness.

Objective:
The objectives of this exercise were: to support resident teamwork and clinical reasoning, to create a simulation application with multiple tasks blended into a singular efficient exercise, to eliminate the comfort of the classroom, and to improve the appreciation of simulation.

Design/Methods:
These goals were accomplished with a multifaceted procedure course. Nine procedure stations were arranged with two sets of each station, one per side. The procedure stations included thoracostomy, lumbar punctures, eFAST ultrasound, cardioversion, difficult intubation using a SALAD model, and central venous catheter placement. Two teams of residents , 4-7 per team, were arranged with one team per side. While being timed, each team completed the nine procedure stations with a judge determining if each procedure was adequately completed.

Results:
The Simulation Olympics model was time efficient and increased the number of procedural and diagnostic tasks in a traditional simulation session. The Olympics were run twice, once for the PGY1s and PGY2s, and a second time for the PGY3s and PGY4s. The winning times were 9:15 and 9:22 respectively. After the Olympics were completed, the remaining allotted time was utilized in teaching nuances of the procedures. The resident response was overwhelmingly positive for the competition.

Conclusion:
A total of nine different procedures were covered in the course in a time efficient manner with participants covering all stations within ten minutes. The competitive element fostered team building, encouraged resident wellness, and increased appreciation of simulation.

Impact:
By successfully incorporating a variety of procedures in a short time while also fostering wellness, the course maximized the resident benefit of the allotted time. This course model will influence the development of future educational courses.

Decreased Emergency Department Utilization for Mental Health Services Following the Opening of a Community-Based Behavioral Health Center

Julie A. Littwin, DO, Erin Rigert, DO, Shawn Robertson, DO, Keri Robertson, DO; Swedish Covenant Hospital, Chicago, IL

Background:
Crowded Emergency Departments have become the front line for treatment of psychiatric patients in crisis, however they are often poorly equipped to handle most psychiatric complaints beyond initial stabilization. The Welcoming Center was opened with the intent to provide a safe alternative to costly ED care for non-emergent mental health needs and to serve as a bridge to long-term maintenance care.

Objective:
This impact study sought to demonstrate the patient-centered and financial benefits of providing direct access to outpatient behavioral health services from an urban community Emergency Department (ED).

Design/Methods:
In this retrospective data analysis, ED utilization patterns before and after a patients' first visit to the outpatient behavioral health clinic known as the Welcoming Center were compared. The cohort was selected to include all patients who utilized the ED for mental health services prior to opening the Welcoming Center *and* those who utilized the Welcoming Center during its first sixteen months of inception. The final study time frame extended from 5/5/2014 to 9/5/2016. The cost savings were calculated using the total billed for services rendered during each ED visit, as well as the average charge for each outpatient visit to the Welcoming Center.

Results:
Findings demonstrated a 67% decrease in total ED usage following the opening of Welcoming Center. This equated to approximately $2,852,798.00 savings to the healthcare system.

Conclusion:
Patients provided with direct access to outpatient, community-based, behavioral health services demonstrated a pattern of decreased ED utilization by 66%. This model promoted both continuity as well as more appropriate, cost-effective care for patients with psychiatric disorders who would have normally utilized the Emergency Department. This equated to an approximate $2,852,798.00 savings to the healthcare system during the study time frame.

Impact:
The Welcoming Center model may be duplicated in hospitals around the country to provide long term, cost effective, community-based psychiatric care. Behavioral health patients that utilized this resource demonstrated a pattern of decreased Emergency Department visits and a substantial cost savings. This model emphasizes the benefits of early intervention and maintenance care for psychiatric illness, with advantages to both the patient and the healthcare system.

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ED Time for Uncomplicated Pediatric Procedural Sedation by Emergency Physicians

Darien Cohen, MD, Jenny Bao, MD, Shu B. Chan MD, MS; AMITA Health Resurrection Medical Center, Chicago IL

BACKGROUND
Conscious sedation is commonly performed in the ED, especially among pediatric patients. Among the sedation agents, some common ones used include ketamine, midazolam, etomidate, and fentanyl. Aside from safety and efficacy, another important thing to consider when sedating a patient is whether this would add to their length of stay, which would then affect overall ED flow, throughput, and productivity.

OBJECTIVE
The study objective is to determine if there a significant difference in ED length of stay depending on the number of agents used in pediatric sedation.

DESIGN/METHODS
This is a 3-year retrospective study of procedural sedations performed by Emergency Physicians on pediatric patients (≤ 18) at two community-based ED. Excluded are patients admitted to the hospital or transferred to another hospital. Patients were stratified into groups based on the number of sedative(s) and or narcotic(s) used during the procedure. Statistical analysis was done using ANOVA with significance set at 0.05.

RESULTS
72 pediatric patients had recorded procedural sedation by EP. Three patients had complications during procedural sedation (one dizziness and two emesis) and were excluded. Of the 72 cases, 64 cases met all inclusion and exclusion criteria. The mean age was 9.9year (SD: 4.5) with 47% female. Closed fractures or dislocations of the upper extremities accounted for 94% of the case. The mean LOS was 232 minutes (SD: 62). There were 27 patients given one sedative/one narcotic, 21 given one sedative/no narcotics, 6 given one sedative/two narcotics, 6 given two sedative/one narcotic, and 4 given two sedative/no narcotics. The most common drugs used were IV ketamine (mean 1.3 mg/kg) in 77% of patients and IV morphine (mean 0.07 mg/kg) in 53%. There was a significant difference (p=.044) for patients given two sedatives to have a longer length of stay than patients given only one sedative.

CONCLUSIONS
In this limited study, there was a significant increase in length of ED stay for pediatric patients given two sedative agents for orthopedic injuries versus one sedative.

IMPACT
Consideration should be given for fewer sedative agents for pediatric ED procedural sedation.

Table 1: LOS by number of sedatives and narcotics given (ANOVA p=0.044)

Drugs	n	LOS (minutes)	Std Dev
Single sedative, no narcotics	21	238	58
Single sedative, one narcotic	27	216	58
Single sedative, two narcotics	6	208	60
Two sedatives, no narcotics	4	245	50
Two sedatives, one narcotic	6	296	75

Use of Rapid Cycle Deliberate Practice in Simulation to Improve Primary and Secondary Survey Completeness in Pediatric Traumas

Diana H. Yan, MD, Mark Slidell, MD, MPH, Lisa McQueen, MD; University of Chicago Medicine Comer Children's Hospital, Chicago, IL

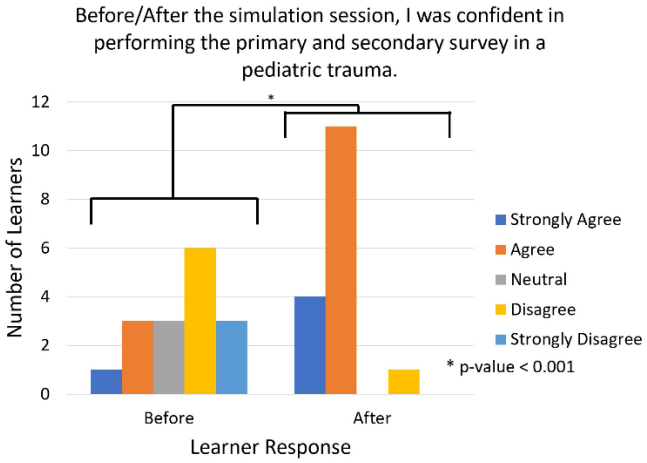
Background:
The primary and secondary survey is the basis of all trauma care as it is used to rapidly find injuries and guide care. Gala et al 2016 showed that only 22% of primary surveys at a level 1 pediatric trauma were completed according to guidelines. Additionally, Carter et al 2013 showed that only 13% of resuscitations completed all primary and secondary tasks.

Objective:
By completion of the curriculum:

1. Surgical residents will accurately list all of the steps to the complete primary and secondary survey in trauma resuscitations.
2. Surgical residents will demonstrate improved competence in performing a primary and secondary survey.
3. There will be a measurable improvement in the confidence of the learners to perform a primary and secondary survey.

Design/Methods:
Rapid cycle deliberate practice (RCDP) is an innovative simulation method which uses specific repetitive coaching to develop targeted skills. RCDP has been shown to improve performance of resuscitation skills. Our curriculum, completed during intern orientation, uses RCDP to coach 16 surgical residents in performing the primary and secondary exam. A post-education survey was collected from all 16 participants. A 5-point Likert scale was used to assess the impact of the curriculum on learner confidence and perception.

Results:
14/16 learners enjoyed the simulation session giving a strongly agree or agree response. No residents felt that the curriculum would negatively impact their abilities. The RCDP curriculum improved learner confidence in performing the primary and secondary survey ($p<0.001$).



Conclusion:
Our RCDP curriculum taught surgical residents how to perform a complete and timely primary and secondary survey during pediatric trauma resuscitations. Anecdotally, learners showed clinical improvement during the sessions. The majority of residents felt that the curriculum would positively impact their performance in the trauma bay. There was a statistically significant improvement in their confidence.

Impact:
This curriculum shows that RCDP can improve surgical residents' confidence to perform the primary and secondary survey in the pediatric trauma bay. This will hopefully translate into improvement in their clinical abilities in the trauma bay.

Pregnancy Testing Before Ibuprofen Administration in the Emergency Department

Dana E. Loke, MD; Andra M. Farcas, MD; Justine S. Ko, MD; Laurie M. Aluce, MD; Valerie R. McDonald, BA; Abra L. Fant, MD MS; Nahzinine Shakeri, MD; Northwestern University McGaw Medical Center, Chicago, IL

Background:
In the Emergency Department (ED), medications are often delayed or administered unsafely to women of childbearing age (WCBA) whose pregnancy status is unknown. One study reported that only 22% of women aged 14-40 who received teratogenic medications in the ED were pregnancy tested. Currently, the rate of pregnancy testing prior to teratogenic medication administration at our institution is unknown.

Objective:
We sought to investigate how often a pregnancy test was completed in WCBA prior to administration of ibuprofen, a commonly used but teratogenic medication.

Design/Methods:
A retrospective chart review was performed at a single center academic ED for visits from 3/3/2018 to 6/3/2018. Women age 12-50 were designated WCBA. WCBA who received ibuprofen were analyzed to see if a pregnancy test (serum or urine) was recorded during the visit, and specifically before ibuprofen administration. The average age of those who were tested versus not tested prior to receiving medication was compared with a Mann-Whitney U test.

Results:
Out of 6851 WCBA, 620 (aged 15-50) received ibuprofen during their visit. 454 (73.2%) received ibuprofen either before pregnancy testing (n=93) or without any pregnancy testing (n=361). 249 (41.8%) were tested for pregnancy at any point during the visit (compared to 55.9% of all WCBA). The average age of women who were tested prior to ibuprofen administration was 32.2 years (SD=8.6), while average age of women who weren't was 35.1 years (SD=9.2)($p<0.001$).

Conclusion:
This single center, retrospective chart review demonstrates that only one-fourth of WCBA are tested for pregnancy prior to administration of ibuprofen (comparable to national data), with those who are tested tending to be younger. This could have wide-reaching consequences in terms of potential teratogenic effects of this medication and other commonly used teratogenic medications in the ED. A streamlined process to more quickly determine pregnancy status in WCBA may reduce the incidence of this error.

Impact:
The results of this study demonstrate a need for change in clinical practice in order to provide safer care for this special population.

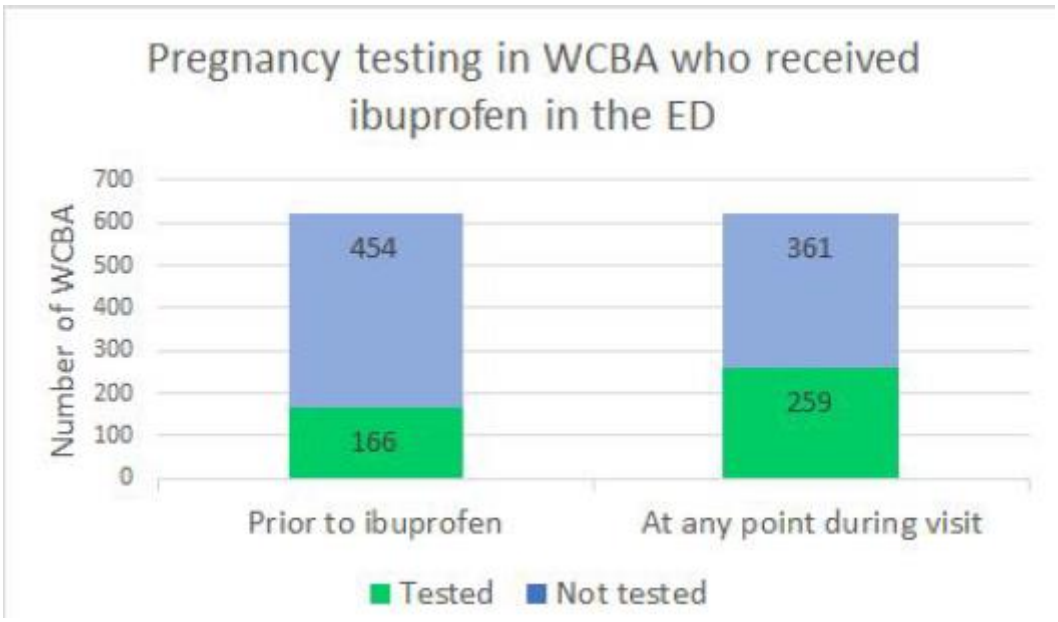


Figure 1: Pregnancy testing done in WCBA who received ibuprofen in the ED

Evening Presentation of Behavioral Emergencies Are Associated with Increased Emergency Department Length of Stay

Samantha Margaritis, DO; Ryan Misek, DO; Ashley DeBarba, DO; Midwestern University, Chicago, IL

Background:
Outpatient psychiatric care is limited in the United States and many patients utilize the emergency department during times of mental health crisis leading to increased psychiatric patient ED length of stay.

Objective:
To investigated temporal factors associated in emergency department length of stay in patients with psychiatric emergencies

Design/Methods:
We performed a retrospective multicenter cohort study of all patients assessed to require inpatient psychiatric hospitalization at two community emergency departments from July 1, 2010 through May 10, 2013. All patients requiring inpatient psychiatric hospitalization were included. Exclusion criteria consisted of patients under 18 or over 65 years of age, patients requiring medical stabilization prior to transfer, pregnant patients, and patients discharged from the Emergency Department prior to transfer to a psychiatric facility. The time of presentation was divided into four categories of six-hour blocks: Morning (0600-1159), Afternoon (1200-1759), Evening (1800-2359), and Night (0000-0559). A total of 1,108 patients qualified and time of arrival, day of week of presentation, time and date of disposition and time and date of transfer were collected. Using the Dunn Test and the P-value adjusted by the Holm method we analyzed the length of stay based on time of patient presentation to the emergency department

Results:
Psychiatric patients presenting between the evening hours had significantly longer emergency department length of stay compared to psychiatric patients presenting during other time periods. Psychiatric patients who presented in the evening (mean=809 min., range=165-5691) had a statistically significant longer length of stay than patients who presented in the night (median=747,range=114-5435) ($p<0.03$), morning (median=707, range=202-4938) ($p<0.03$) and afternoon (median=809, range=165-5691) ($p<0.01$). Variances in length of stay did not significantly differ between weekend and week day, national holiday and non-holiday and day of the week presentations

Conclusion:
We concluded that patients who presented in the evening hours had a significantly longer length of stay when compared to the other times of presentation with 62.5 min. longer than night presentations, 102 min. longer than morning presentations and 208.5 min. longer than those who presented in the evening.

Impact:
This study highlights a critical time period where psychiatric patients may benefit from additional mental health services to assist with placement. We hope to bring attention to the need for increased emergency department psychiatric services during evening hours.

Improving Emergency Department Efficiency Through Utilization of Flow Cell Methodology

Paul Casey, MD, FACEP, Shayna Adams, MD, MBA, Brian Yu, MD, T. Shamindra Fernando, MHSc, CHE; Rush University Medical Center, Chicago, IL

Background:
Emergency departments nationwide are applying lean management principles in an effort to improve operation efficiency with inconsistent results.

Objective:
To demonstrate that with a lean value stream transformation including flow cell methodology a large, urban, academic emergency department can significantly impact operational metrics (arrival to provider, arrival to discharge, left without being seen).

Design/Methods:
Three front end flow cells were created with principles of 1 by 1 pull flow, standard work, 5S and visual management. They were:

1) Arrival & Sort which enabled the quick assessment of a patient arriving to the ED and assignment to a downstream flow cell based on the predicted resources needed for their care,
2) Low Resource designed for patients requiring either no resources or one resource, and
3) Rapid Assessment which efficiently evaluated mid-acuity patients arriving to the ED and sorting them either to vertical (do not need a bed) or horizontal (need a bed) treatment cells. Daily improvement huddles and leadership rounds supported the operational changes throughout the year.

Results:
A year-over-year 15 minute decrease in arrival-to-discharge time, 110% reduction in both left-without-being-seen rates and arrival-to-provider time.

Conclusion:
A system of continuous improvement using flow cell methodology to overhaul the emergency department led to marked improvements in patient throughput.

Impact:
While there are often external challenges to efficient ED throughput (e.g. boarding), through the design and implementation of a value stream transformation focused on continuous daily improvement emergency departments can gain substantial operational efficiencies.

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Comparison of Routine Care Versus Transcutaneous Electrical Nerve Stimulation (TENS) for Treatment of Back Pain in the Emergency Department

Jean-Philippe Daniel, Nicholas Chien, MD, Kevin Dyer, Thomas Seagraves, MD, Shital Shah, Yanina Purim-Shem-Tov, MD, MS; Rush University Medical Center, Chicago, IL

Background:
Low back pain is a common chief complaint in Emergency Medicine. Standard care involves the use of NSAIDs, opioids, and/or muscle relaxants, which may have harmful effects on patients and have the potential to develop dependency and addiction. Transcutaneous electrical nerve stimulation (TENS) uses skin surface electrodes to stimulate peripheral nerves, resulting in decreased pain perception and analgesia. Variable efficacy has been shown for the use of TENS in acute pain, therefore, further research is needed to understand this technology's use in the treatment of back pain.

Objective:
To evaluate the role of an over-the-counter TENS unit in managing low back pain in the ED, and to compare the average patient length of stay in the ED compared to conventional treatment.

Design/Methods:
The study used a convenience sample of 70 patients presenting with a chief complaint of lower back pain. The study protocol and consent form were approved by the Rush IRB. Pain scores on a 0-10 scale were obtained before and after treatment with the TENS unit for 30 minutes. The control group included 70 historical cases with reported pain scales before and after conventional treatment. T-test analysis was used to evaluate for any statistical difference in pain reduction between the two groups, with 70 subjects per group in order to achieve appropriate power.

Results:
Based on preliminary data (Sample size = 37), the average pain reduction score for the TENS group was 2.55 (the percentage reduction was 0.31), and the average pain reduction score for the historical group was 2.64 (percentage reduction was 0.31). After removing two outliers (patients who got admitted), the length of stay was 16.3 minutes longer for the TENS group as compared to the historical group.

Conclusion:
According to preliminary data, there is no statistical difference between the TENS and historical groups for pain score reduction and length of stay.

Impact:
These results suggest that TENS is a viable treatment for lower back pain in the ED compared to conventional therapy. Given that TENS units are available over-the-counter, patient education can potentially contribute to reducing ED visits for low back pain.

Table 1: **Result table based on independent sample t-test (EXCLUDING OUTLIERS IN LOS).**

		N	Mean	Std. Deviation	Std. Error Mean	Sig. (2-tailed)
Pain scale before treatment	0	70	8.53	1.52	0.18	0.433
	1	35	8.29	1.43	0.24	
Pain scale after 30 min of treatment	0	70	5.89	2.00	0.24	0.822
	1	35	5.79	2.39	0.40	
Delta_Pain_score	0	70	2.64	1.64	0.20	0.695
	1	35	2.50	1.97	0.33	
Delta_Percentage_Pain_score	0	70	0.31	0.20	0.02	0.984
	1	35	0.31	0.24	0.04	
Ratio_Pain_score	0	70	0.69	0.20	0.02	0.984
	1	35	0.69	0.24	0.04	
LOS Minutes	0	70	208.41	117.72	14.07	0.506
	1	35	224.71	118.76	20.07	