Society for Academic Emergency Medicine Western Regional Abstracts

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The following abstracts, which are published here with author permission, were presented at the Western Regional Society for Academic Emergency Medicine Research Form in Portland, Oregon on March 16, 17, 2007. Additional abstracts from this forum will appear in the next issue.
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1 Clinical Presentation of Patients Diagnosed Post-Operatively with Appendicitis at Private Hospitals in Southern Puerto Rico

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Objective: The goal of our study is to aid in early identification of appendicitis in Hispanics by retrospectively reviewing the initial presentation, physical examination, and laboratory values of patients diagnosed post-operatively with appendicitis.
Method: Data collected from medical records at private hospital emergency departments (EDs) in southern Puerto Rico between 1/1/2000 and 12/31/2005 in post-operative diagnoses of appendicitis included: 1) sex, 2) age, 3) chief complaint, 4) presence/absence of abdominal pain, fever, anorexia, nausea, vomiting, diarrhea, constipation and dysuria, 5) clinical findings of pain location, the presence/absence of guarding, rebound tenderness, psoas sign, 6) laboratory and radiological data, and 7) pathology findings. This data was compared with major reference textbooks using the chi squared test and $\alpha=0.05$.
Results: Of 899 subjects this population was found to have significantly less anorexia (26.6%, $p<.001$), nausea (61.7%, $p<.001$), vomiting (50.9%, $p<.001$), and dysuria (4.6%, $p<.001$) than reported in major reference texts. There was a significantly greater frequency of fever (30.5%, $p<.001$), positive psoas sign (29.6%, $p<.001$) and leukocytosis (86%, $p<.001$).
Conclusion: The studied population varied greatly from commonly accepted literature frequencies for signs and symptoms of appendicitis. An important finding was a decreased frequency of anorexia. Anorexia, frequently considered a major symptom in appendicitis--classically indispensable in its clinical diagnosis--was found in only 26.6% of our sample. Most textbooks describe a frequency of anorexia from 70-100%. The differences found are of great significance for the future evaluation of Hispanic patients with suspected appendicitis. The presence of certain signs and symptoms should raise the suspicion of appendicitis in a patient with abdominal pain; however, their absence, especially anorexia, should not rule out appendicitis. This is especially true in the evaluation of the Hispanic population.

2 Teleradiology Over-read Retrospective Observational Study (TOROS)

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Background: Teleradiology is a system whereby attending-level, fully licensed radiologists interpret radiographic images over the internet, usually from a distant location and at night.
Objectives: To determine the frequency of disagreement on CT interpretations between teleradiologists and hospital-based radiologists; to determine which subtypes of CT studies most frequently have discordant interpretations; to determine if the difference in interpretation is clinically significant to Emergency Department management.
Methods: We performed a retrospective observational study

at a Northern California private hospital from January 1 to January 16, 2006. All consecutive CT scans performed between 5 pm and 8 am were reviewed; scans were eligible if they were interpreted primarily by a teleradiologist and subsequently by a staff radiologist.

Results: A total of 240 CT scans were reviewed, of which 207 were eligible. Overall discordance rate was 4.4% (95% Confidence Interval [CI], 2.3-12.4%); the overall clinically significant discordance rate was 3.9% (95% CI, 2.2-11.3%). Both the total and clinically significant discordance rates for CT abdomen/pelvis were 3.6% (95% CI, 2.6-12.6%); for CT chest were 5.3% (95% CI, 5.1-3.1%). The total discordance rate for CT head was 5.9% (95% CI, 4.3-20.3%), with a clinically significant discordance rate of 4.4% (95% CI, 3.5-16.8%).

Conclusion: The overall clinically significant discordance rate between teleradiologists and hospital-based radiologists on CT scan interpretation was higher than expected. The highest significant discordance rate was for CT chest, although the total numbers of scans and misses were small. The second highest significant discordance rate was for CT head, followed by CT abdomen/pelvis.

3 Experience and Training Are not Associated with the Ordering Propensity of Advanced Radiographic Imaging in the Emergency Department

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Objectives: The use of computed tomography (CT) and magnetic resonance (MR) imaging in the emergency department (ED) has increased over time. The purpose of this retrospective observational study was to explore the CT and MR ordering habits of a group of faculty emergency medicine (EM) physicians over a 15-month period of time at the University of California San Francisco.

Methods: Spreadsheets from Radiology containing information on every CT and MR scan ordered by EM physicians from June 2005 to August 2006 were obtained. This dataset included patient demographics, visit number, and study type. A second dataset was extracted from the electronic charting system used in the ED. The ordering physician for each scan was identified by matching visit numbers. Physicians that rarely worked and hand-offs between physicians were accounted for. The "ordering propensity" for each physician (number of imaging studies ordered per 100 patients seen) was thus calculated. Reliability of results was examined by looking at variability in six-month blocks. Acuity was determined by review of billing reports and admission rates. Physician characteristics were obtained from ED administrative records. Analysis of variance and regression were utilized to determine associations between variables.

Results: Twenty-two faculty physicians were evaluated. CT or MR imaging was ordered for approximately 20% of all patients seen during the study period by these physicians. The ordering propensity ranged from approximately 12% to 24% and was not explained by differences in patient acuity. Years since MD completion, residency training in EM, ABEM certification, gender, and work status were not associated with the ordering propensity of the individual physicians.

Conclusions: The CT and MR ordering propensity of a group of faculty EM physicians is variable and is not associated with experience and training in EM. There may be other variables not studied that are associated with ordering propensity.

4 Describing Cerebrospinal Fluid Red Blood Cell Counts in Patients with Subarachnoid Hemorrhage

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Objectives: It has been postulated that a decreasing red blood cell (RBC) count between the first and last tubes collected during lumbar puncture can be used to differentiate a traumatic tap from a true spontaneous subarachnoid hemorrhage (SAH). We sought to describe cerebrospinal fluid (CSF) RBC variation between tubes one and four in patients with known SAH.

Methods: We retrospectively identified all ED patients with a discharge diagnosis of SAH from June 1993 to November 2005. A structured chart review was performed on all patients with the additional billed procedure of "lumbar puncture," "lumbar drain," or "spinal tap." Data collected included: CSF RBC count in the first tube, CSF RBC count in the fourth tube, and an imaging study confirming the diagnosis. Patients were excluded if any of these three data points was absent.

Results: 1,323 patients seen in the ED were diagnosed with SAH, and 102 (7.7%) of these patients also had CSF collected. Of this group, 81 charts were located and reviewed. Thirty-five were then excluded for lack of documented RBC count in both tubes one and tube four, and 26 were excluded because of lack of documentation of an advanced imaging study. Of the remaining 20, seven (35%) were found to have an increase in RBC count between tubes one and four and 13 (65%) were found to have a decrease. Of the 13 patients who had an observed decrease in RBC counts between tubes, eight had a drop of >25%. The most dramatic case was a patient with xanthochromic CSF in whom the RBC count dropped from 453 in tube one to 0 in tube four.

Conclusion: In our sample of confirmed SAH cases, a drop in CSF RBC count was observed in 65% of cases, with a range spanning from 1% clearing to 100% clearing. These findings suggest that CSF RBC clearing between tube one and tube four is common in patients with SAH and thus cannot be used to rule out the diagnosis.

5 Emergency Department Series of Acute Conditions of the Scrotum

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Introduction: Acute scrotal pain comprises 0.5% of annual emergency department (ED) visits. Determining the etiology of acute scrotal pathology by history, exam and laboratory studies alone can be challenging. Radiology department-performed sonography (RDPS) is the imaging test of choice for scrotal pathology but may be time consuming and result in treatment delays and poorer outcomes. If accurate, ED-performed sonography (EDPS) may shorten time to diagnosis and treatment and result in quicker disposition and improved outcomes for scrotal pathology.

Methods: This retrospective cohort study evaluated the accuracy of EDPS for predicting the presence of scrotal pathology as established by RDPS. A composite endpoint consisting of testicular or testicular appendix torsion, epididymoorchitis, scrotal abscess or mass, varicocoele, spermatocoele, and epididymal cyst was used to define scrotal pathology. Subjects included a convenience sample of all patients presenting to our ED with acute atraumatic scrotal pain who received both EDPS and RDPS during a five-year period.

Results: During the study period 146 patients underwent EDPS, 49 of whom went on to receive RDPS. The sensitivity and specificity of EDPS for recognizing radiographic pathology as determined by RDPS were 0.93 (95% CI 0.81-0.98) and 0.33 (95% CI 0.02-0.87).

Conclusions: This study demonstrated relatively high sensitivity and low specificity for EDPS in predicting scrotal pathology. The low specificity in this study may have resulted from a selection bias affecting which patients underwent RDPS. These results indicate that all patients with abnormal EDPS should undergo RDPS. However, the low specificity of this study prevents conclusions regarding treatment of patients with negative EDPS. We conclude that EDPS is not currently accurate enough to recommend its use as a final diagnostic modality for patients presenting with a painful scrotum.

6 Availability of Standardized Chest Pain Order Sheet Improves Compliance with American College of Cardiology and American Heart Association Guidelines for the Treatment of Acute Coronary Syndromes

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Objective: The American College of Cardiology (ACC) and the American Heart Association (AHA) publish guidelines for the treatment of specific conditions within the spectrum of acute coronary syndromes (ACS). We hypothesized that, when available, implementation of a standardized chest pain order sheet for treatment of patients with ACS in our emergency department would improve adherence to the ACC/AHA guidelines.

Methods: This was an IRB-approved prospective observational study in an urban emergency department with 46,000 visits per year and an affiliated emergency medicine residency training program. The study involved three phases. During the first phase (3/04-9/04), charts of patients with the complaint of chest pain were reviewed for compliance with ACC/AHA guidelines. Two persons reviewed charts during a brief training session. To improve agreement between reviewers, five charts were reviewed in a trial run and again weekly. A third reviewer acted in cases of disagreement. In the second phase (9/04-12/04), a chest pain order sheet based on ACC/AHA guidelines was made available for physicians to use in evaluation and treatment of patients presenting with chest pain. The third phase (5/06-12/06) the chest pain order sheet was not available for physician use due to technical and logistical misadventures. In a similar fashion, charts were reviewed for compliance with guidelines. A kappa score for inter-observer agreement, Fisher's exact and Chi-Square tests were used to compare groups. In a retrospective review, charts were evaluated for continued compliance with guidelines in an analogous fashion.

Results: The kappa for inter-observer agreement was 0.91 (95% CI:0.883 to 0.990) Patients Administered Medication / Patients Eligible to Receive Medication ASA Beta-Blocker Heparin 2B, 3A GP-inhibitor Phase 1 213/221 (96%) 166/221 (75%) 55/221 (70%) 4/10 (40%) (no order sheet available) Phase 2 117/117 (100%)112/117 (96%)* 110/117 (94%)*4/6 (67%) (with use of order sheet) Phase 2 205/214 (96%) 163/214 (76%) 135/214 (63%) 3/7 (43%) (without use of order sheet) Phase 3 194/204 (95%)147/199 (74%) 138/201 (68%) 3/9 (33%) (without use of order sheet) (* P,0.001 compared to Phase 1)

Conclusions: The use of a standardized chest pain order sheet was associated with improved adherence to the ACC/AHA guidelines for administration of beta-blockers and heparin in ACS but returned to baseline when the guideline was no longer available. Limitations of this study include, but are not limited to, non-randomization and selection bias.

7 A Look at Pre-Hospital Practice Patterns Following the Introduction of Drug-Facilitated Intubation

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Objective: We conducted this study to evaluate the patterns and frequency of use of drug-facilitated intubation (DFI) by pre-hospital personnel following its introduction and availability.
Methods: This was a retrospective study of reported pre-hospital data on number of patients in which drug-facilitated intubations were performed between January 1, 2003 and July 31, 2006. For inclusion into the DFI data, the patient had to receive succinylcholine before an attempt at intubation by pre-hospital personnel and meet the indications set forth by standing orders for DFI, specifically presence of incomplete relaxation or high likelihood of losing an airway during transport. Patients in cardiac arrest were excluded from this study. The number of patients receiving DFI was compared to the total number of patients who were not in cardiac arrest that were intubated. The percentage of total non-arrest intubations that were drug facilitated was then calculated for each year between 2003 and 2006 with data through July 2006. Statistical analysis was performed using the Chi-square test. Trend analysis was performed using ANOVA and the Tukey test.
Results: The percentage of drug-facilitated intubations compared to total non-arrest intubations was 57.8%, 45.0%, 34.1%, and 71.1% for 2003, 2004, 2005, and the first 7 months of 2006 respectively. The percentage of DFI in 2003 (57.8%) compared to the percentage in 2004-2005 (38.8%) was statistically significant ($p<0.001$). The percentage of DFI in the first 7 months of 2006 (71.1%) compared to the percentage in 2004-2005 (38.8%) was also statistically significant ($p<0.0001$). ANOVA showed a significant quadratic trend in the use of DFI over time.
Conclusions: These data support the hypothesis that there was an initial peak in usage of DFI after the availability to pre-hospital personnel in 2003, and that after a decline the rates were increasing as users became more familiar and comfortable with its use.

8 Pre-Hospital Time Measures for Acute Stroke Patients

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Introduction: Poor rates of thrombolysis for acute stroke partially result from lack of recognition and delayed hospital arrival by patients. Even though EMS transports reduce time to hospital arrival, acute strokes missed by both emergency medical dispatchers (EMD) and paramedics may result in prolonged transport times.
Objectives: We sought to determine pre-hospital time delays for acute strokes in a large urban EMS system.
Methods: Retrospective study of patients >18 years identified as having acute stroke by EMD, city paramedics or stroke neurologists transported to hospitals by EMS personnel from 1/1/2005 to 12/31/2005. Data were acquired from a computer-assisted dispatch, a computerized paramedic, stroke team databases and ICD-9 codes. The final diagnosis of stroke/not stroke was identified from stroke team diagnosis or ICD-9 codes. Paramedic time to scene (TS), scene time (ST) and total run time (RT) were compared between missed and true strokes. Time intervals were calculated when EMS personnel had diagnostic agreement/disagreement using a Mann-Whitney U test for nonparametric data; medians and Inter Quartile Ranges are reported.
Results: A total of 1067 patients were eligible for the study, of which 22 were excluded for missing data. The stroke team identified 440 (41%) of which EMD missed 73 (16.6%) and paramedics missed 247 (56.1%). For true strokes, EMS personnel were in agreement 27.3% of the time. ST and RT were significantly different when EMS personnel were in agreement on stroke (ST=19 min.; IQR=16,24 and RT=39 min.; IQR=33,45) compared to not inagreement (ST=18 min.; IQR=14,22 and RT=36.5 min.; IQR=30,43 p's<0.001). Time measures did not differ between true and missed strokes (p's>0.05).
Conclusions: Pre-hospital scene time and run times for acute strokes are less when there is diagnostic concordance between dispatchers and paramedics. Future efforts should focus on improving the stroke recognition by all levels of pre-hospital providers.

9 Utilization of Computed Tomography Angiography in the Evaluation of Acute Pulmonary Embolus

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Objectives: To assess the appropriate use of computed tomography angiography (CTA) in the diagnostic evaluation of acute pulmonary embolism (PE).
Methods: Review of 580 inpatient (45%), emergency department (ED) (41%) and outpatient (14%) CTAs to evaluate for acute PE performed at a large teaching hospital from January 2004 through March 2005. Based on chart review blinded to final diagnoses, PE pretest probability using Wells criteria was retrospectively assigned. D-dimer values (if obtained) were also reviewed.
Results: Of the 580 patients scanned, only three were high probability; two of these had PE (67%). Of the remaining 577, 48% were intermediate and 51% were low probability. The overall positivity rate for PE was 10%; inpatient 12%, ED 8%, and outpatient 1%. Of the high, intermediate and low probability groups, 67%, 14% and 5% had PE, respectively.

D-dimer was only ordered on 39% of all patients; 17% were negative (<0.5), 47% intermediate (0.6-2.0) and 36% positive (>2.0). Only one patient with a negative D-dimer and three patients with an intermediate D-dimer had PE. CTAs obtained in low and intermediate D-dimer groups comprised 25% of the total. Of the ED patients, 21 had PE (9%); 50% in the high group, 15% in the intermediate group and 2% in the low group. In the ED, 59% had a D-dimer drawn; 21% were negative, 54% intermediate and 25% positive.

Conclusion: CTA is fast, diagnostic and widely available for evaluation of acute PE. Wells criteria stratify patients and guide the PE workup. Our data show suboptimal use of Wells criteria and subjective overestimation of PE probability prior to CTA. Negative D-dimer also does not deter unnecessary CTA. This represents a paradigm shift in which clinical tools are supplanted by imaging that, while noninvasive, is not without cost or risk. While no definitive acceptable positivity rate for CTA has been established, we feel 10% represents use of CTA as a screening rather than diagnostic test, equating to ineffective resource utilization and unnecessary radiation exposure.

10 Distribution of Emergency Department Diagnoses Presenting to Oregon Emergency Departments

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Objective: To examine the distribution of diagnoses that present to Oregon emergency departments (EDs).

Methods: Claims data on 2,299,151 visits to a representative sample of 21 Oregon EDs from August 2001 through February 2005 were analyzed using a cross-sectional approach. The AHRQ multi-level CCS data tool was used to define diagnostic categories. Frequencies were examined for the most common diagnostic categories at each CCS level and at the level of ICD9 classification.

Results: The top five most common CCS Level 1 diagnostic categories were injury and poisoning (28%), diseases of the respiratory system (12%), signs/symptoms (11%), neurological diseases (8%), and diseases of the circulatory system (8%). In looking at injury and poisoning, the most common diagnoses in this category included sprains and strains (7% of all visits), open wounds (6%), superficial injuries and contusions (5%), and fractures (4%). The majority of respiratory diagnoses consisted of asthma (1%) and respiratory infections (7%) - including upper respiratory infections (4%), pneumonia (2%), and acute bronchitis (1%). Other common diagnoses included abdominal pain (4%), headaches (3%), spondylosis/disc disorder (3%), nonspecific chest pain (3%), otitis media (2%), teeth and jaw complaints (2%), urinary tract infections (2%), cellulitis/abscess (2%) and dysrhythmias (1%).

Conclusion: From a public health perspective in the state of Oregon, injury prevention programs may have a significant impact on ED use. The high volume of visits for upper respiratory infections, teeth complaints, and disc disorders highlights the role of the ED as a safety net for patients who cannot get care elsewhere. In addition, lack of access to primary care may be a contributing factor for the 28,818 visits for asthma, illustrating how lack of access can promote acute exacerbations of chronic conditions that are seen in the ED.

11 Length of Stay Following Trauma Is not Affected by Ethnicity When Controlled for Ethanol Intoxication

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Introduction: Studies have demonstrated that, from pre-hospital mortality rates to emergency department (ED) evaluation to post-injury recovery, trauma care is fraught with examples of the health care race gap. Many of these studies have not properly controlled for ethanol and drug intoxication. We completed a study to address race differences on length of stay and mortality in traumatized patients, controlling for ethanol intoxication.

Methods: Data were entered prospectively in the Trauma One by Lancet database by research assistants (RNs, etc.) following any level one trauma patient seen in the ED from January 1, 2001 to October 31, 2005. Data were analyzed using SPSS 15.0 (SPSS, Inc, Chicago, Il.). Descriptive statistics as well as logistic regression predicting odds of > two days length of stay (LOS) were conducted. Ethanol use was defined as blood alcohol level greater than 10 mg/DL. Race was self-described by patients or families.

Results: A total of 6,102 patients were analyzed. Mean age was 29.8 [SD 17.5] years, and 3,364 (55.1%) of patients were male. Univariate odds ratios with regard to length of stay (95% Confidence Interval) were: Native American 1.08 (.903, 1.30), Asian .681 (.390, 1.19), Black .786 (.594, 1.04), Hispanic .731 (.640, .836) and White was used as the reference. In multivariate analysis adjusting for age, sex, alcohol and drug status, and injury severity, however, race was no longer a significant predictor of LOS. A total of 156 (2.6%) died. Age, alcohol and drug use, and injury severity were associated with risk of mortality. No statistically significant differences were noted among different ethnicities with regard to risk of death.

Conclusions: There is not a significant difference between Native American and White patients following trauma. Although a slight trend was noted in increased LOS in Native Americans in comparison to Whites, this trend was eliminated when ethanol use was controlled.

12 Emergency Department Length of Stay and Predictive Demographic Characteristics

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Objectives: Emergency department (ED) crowding continues to be a significant national concern. However, there is a paucity of data on the disparities in length of stay (LOS) by ethnicity and insurance coverage. We sought to identify associations between LOS and patient demographic characteristics, using three years of a nationally representative database.

Methods: Retrospective cohort study. We used data from the 2002 to 2004 National Hospital Ambulatory Medical Care Survey (NHAMCS), a nationally representative database containing information on ED patients, their diagnosis, and length of stay. Our empirical approach accounted for hospital-specific differences, adjusted for the number of procedures and diagnoses for each patient (as a proxy for patient complexity), and included data on day-of-week (as a proxy for typical ED flow).

Results: From 2002 to 2004, NHAMCS collected data on 114,179 ED visits, representing a weighted estimate of 334.3 million national visits over three years. Mean LOS for discharged patients was 167.4 minutes (95% CI 162.1-172.8); patients admitted to the hospital had a mean LOS of 363.4 minutes (95% CI 338.4-388.3). After adjusting for patient severity and individual hospital effects, longer LOS was associated with nonwhite patients (an additional 10.6 minutes, 95% CI 4.0-17.1) and patients who were uninsured (an additional 8.7 minutes, 95% CI 1.4-15.9). Moreover, differences in LOS are primarily attributable to the portion of time spent in the ED waiting to see the emergency physician. For example, compared to white patients, nonwhite patients waited 5.4 minutes longer (95% CI 3.4-7.4) to see a physician.

Conclusions: Disparities exist in ED LOS, with nonwhite and uninsured patients experiencing longer lengths of stay. Interventions to reduce ED crowding should consider efforts that aim to reduce wait times for underserved populations.

13 Hand Surgeons' Perceived Barriers and Solutions to Emergency Call

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Objectives: Sub-specialty shortages are a growing threat to public healthcare. Surveyed emergency physicians and administrators cite the difficulties of liability, costs, and lack of reimbursement. Our study explores hand surgeons' perceived barriers and potential solutions to taking call.

Methods: An IRB-approved, anonymous electronic survey was sent to the American Society of Surgery of the Hand list serve. Respondents ranked perceived obstacles (payment, liability, lifestyle, and inconvenience) and potential solutions (fixed payment per call, reimbursement rate per patient, and liability assistance). Respondents listed specific requirements to do more call. Comments were solicited qualitatively.

Results: 614/2054 (30%) of surveys were returned. Respondents varied by location, practice type, and call coverage. Barriers cited were lifestyle (42%), dumping (11%), uninsured patients, and liability concerns (10% each). The preferred incentive was pay-per-call (58%), followed by a guaranteed reimbursement per patient (27%). Results did not significantly vary by geographic location. Respondents gave 632 qualitative comments, calling for improved management and referrals (48%), prevention of dumping (12%), availability of rooms and staff (11%), and earlier triage/consultation (3%). Eighty-three percent would increase call for money. Fifty percent would take more call for $1500/night, 150% of Medicare reimbursement guaranteed-per-patient, or $45,000/year in liability assistance.

Conclusions: Hand surgeons' barriers to call were lifestyle, dumping, and financial concerns. Professional and personal frustrations were evident in the qualitative analysis. Respondents called for defining appropriate referrals. Fixed pay-per-call was the preferred incentive. $1,500/night, 150% of Medicare reimbursement guaranteed, or $45,000/year of liability assistance would increase coverage 50%. Our survey is a novel step focused on hand surgeons. Further research should explore incentives, mandates, and standardized protocols in other specialties.

14 Severe Traumatic Brain Injury: Stabilization or Definitive Care

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Objectives: We conducted this study to determine whether there is a mortality reduction conferred by direct transport to the trauma center from the scene when compared with inter-facility transfer (IFT).

Methods: This is a retrospective cohort study of all patients over the age of two who suffered a traumatic head injury and were transported across county lines to a regional Level I trauma center for neurosurgical care between January 2002 and November 2006. Patients with suspected TBI resulting in a GCS less than 9 were included. Patients were stratified according to whether they were directly transported (DT) from the field or via IFT after initial stabilization and resuscitation at a Level III trauma center. Data obtained from the trauma registry included patient demographics including age, sex, and race, time of ambulance arrival, mechanism of injury, initial

vital signs, GCS, patient disposition from ED and final clinical outcome. Logistic regression and chi-square statistics were applied to compare mortality rates between the two groups.

Results: A total of 94 IFT and 379 DT cases were studied. Cases were matched according to GCS. The median time for direct transport was 26 minutes while the median time of IFT was 151 minutes. A total of 77.7% of all patients arriving by IFT survived to discharge compared with 71.2% of DT patients (p=0.21). The odds ratio for survival (IFT/DT) was 1.40. The logistical regression demonstrated a small but statistically insignificant contribution to survival for each additional stabilization minute for patients from an IFT.

Conclusions: Direct transport to a neurosurgical-capable trauma center from the scene for patients with GCS less than 8 does not confer a survival benefit when compared with patients taken to the nearest hospital before IFT. We recommend that pre-hospital triage guidelines include provisions for initial stabilization at a Level III center in lieu of mandatory transport to the regional Level I trauma center.

15 Prophylactic Antibiotics for Dog Bites: A RCT with Refined Cost Model

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Background: The use of prophylactic antibiotics remains controversial with conflicting results from a meta-analysis and Cochrane review.

Objectives: 1) Determine estimates of outcomes from dog-bite wounds comparing current treatment with and without antibiotics. 2) Use these estimates in a cost model to generate treatment recommendations.

Methods: A two-center randomized double blind placebo controlled trial comparing amoxicillin/clavulinic acid vs. placebo considered all dog bites, regardless of site. We excluded immunosuppressed patients, those with penicillin allergy and wounds > 12 hours old and those with suspected neurovascular, tendon, joint or bone injury. Patients were randomized to treatment, and structured follow-up was done after 14 days to determine the presence of a wound infection. Continuous data were compared with t-test and categorical data with chi square analysis. Data generated with 95%CI were then used in a cost model and a sensitivity analysis done to determine thresholds for treatment.

Results: We considered 230 consecutive dog bites, 146 were eligible, 6 were missed, 33 refused, and 97 consented to participate. Seventy-two percent were non facial, 62% were full thickness and 14% were sutured. There were no differences in demographic or clinical characteristics between the groups. Overall infection rate was 2% (95% CI 0-7%), none in the antibiotic group 0% (95% CI 0-6%) and 2 in the placebo 4.5% (95%CI 1-15%). Both infected wounds were sutured and on the face. The cost model determined antibiotics would always be cost effective when the infection rate was greater than 5% and never be cost effective if the rate was < 3%.

Conclusion: Our infection rate was much lower than older studies. Antibiotics consistently show a trend towards benefit and our model recommends treating any wounds at greater than 5% risk of infection. Further research should focus on the current infection rate of dog bites and identifying factors associated with high risk wounds, not on the benefits of antibiotics.

16 Ski Patrollers: Reluctant Role Models for Helmet Use

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Objectives: Ski helmets reduce the risk of brain injury, but helmet use is low. Ski patrollers (SPs) could serve as role models for helmet use, but little is known about their practices and beliefs. We studied: The frequency of helmet use by SPs; reasons for non-use; and beliefs predictive of helmet use.

Methods: A survey was completed by a convenience sample of SPs attending conferences. Questions addressed helmet use, head injury experience (self, family, friends) and knowledge of helmets and injury risk reduction. Helmet use was defined as "100% use during patrol skiing." To assess predictors of helmet use, odds ratios and 95% confidence intervals were calculated, after adjusting for seasons skied.

Results: Among 93 SPs, most were men (79%), < 45 years old (70%) and experienced (mean seasons skied = 26 ± 11). Helmet use was 21% (CI95 = 14-31). Common reasons for non-use were hearing (35%), comfort (28%) and vision (24%); only 16% cited "socially unacceptable." Most SPs believed helmets prevent injuries (90%) and that SPs are role models (93%). Head injury experience was common (23%). However, many SPs believed helmets encourage reckless skiing (39%) and increase injury risks (16%). Four factors predicted helmet use: head injury experience (9.8; 1.02-94); perceived exposure protection (OR = 9.7; CI95 = 3.1-29.8); belief that role modeling is an advantage of helmets (3.5; 1.1-10.6); and belief that helmets encourage reckless skiing (.17; .03-.83).

Conclusions: Although based on self-reports by a small convenience sample of SPs, these data suggest there is discordance: SPs are convinced that helmets reduce serious injury and that they are role models, but most do not wear helmets regularly. Manufacturers should address helmet design and comfort. Education programs should include head injury cases, address the belief that helmets encourage recklessness (risk homeostasis) and stress role modeling as a professional responsibility.

17 The Reliability of Triage Classification as a Predictor of Severity in Major Trauma

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Objective: To determine which clinical parameters can be used to reliably identify severely injured trauma patients in the Emergency Department.
Methods: A retrospective study of all adult patients (>14 years) identified on our prospectively maintained Level I Trauma Center Registry at this inner city hospital over a six-month period. Medical records were reviewed for mode of arrival and triage classification assigned. We calculated Revised Trauma Score (RTS) and Injury Severity Score (ISS) for each patient. Admission to the SICU or to the OR or an operation within 48 hours of arrival was used as identifiers of severe injury.
Results: Of the 208 patients included in the study, 100 (48.08%) met criteria for severe injury. Ninety five patients (45.67%) were brought in by EMS as resuscitations, 76 (36.54%) were brought in by EMS but not as resuscitations, and 37 (17.79%) were walk-ins. Forty-four (46.32%) of the resuscitation patients, 34 (44.74%) of the non-resuscitation patients, and 22 (59.46%) of the walk in patients met criteria for severe injury (P =0.275). Nurses assigned 112 patients to Triage Class A, 80 to Class B, 2 to Class C, and 14 were not assigned. Fifty-three (47.32%) of Triage A patients, 41 (51.25%) of B patients, and 1 (50%) of the C patients were severely injured (P=0.604). There was a 75.26% concordance between mode of arrival and triage classification (kappa =0.578). The calculated mean RTS of the severely injured patients was 7.59 and of those not severely injured, 7.82 (P=0.010, odds ratio 0.1645). The ISS for the severely injured patients was 33.5 and for those not severely injured, 27.2 (P=0.001, odds ratio 1.040). Age adjusted logistic regression did not alter the results.
Conclusions: Emergency physicians traditionally rely on mode of arrival and triage classification as predictors of the severity of injury in trauma patients. Both of these parameters are highly unreliable. Ambulatory trauma patients in our study had a greater than 50% incidence of severe injury. Triage classification is well correlated with mode of arrival and poorly correlated with injury severity. RTS, previously indicated for use as a medical triage instrument, proved to be unreliable in our study. The ISS proved to be the most reliable tool. Further study should be undertaken to validate its reliability and consideration should be given to using ISS to evaluate trauma patients on arrival to the Emergency Department.

18 Pediatric Trauma Video Review: An Underutilized Resource

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Background: Traumatic injuries continue to be the number one cause of mortality in patients ages 1-44 years in the U.S. Successful trauma care often requires a coordinated team effort. Trauma video review (TVR) has been identified as an effective method of quality improvement and education.
Objective: The objective of this study is to determine the TVR practices of pediatric trauma centers in the U. S. and their use of video review for quality improvement and education.
Methods: Pediatric trauma centers accredited by the American College of Surgeons (n=16) and the National Association of Children's Hospitals and Related Institutions (n=24) were identified and surveyed by telephone. Surveys included questions regarding program demographics, residency information and details about past and present TVR.
Results: Forty pediatric trauma centers were contacted over a two-month period; four reported not to be trauma centers. Ninety-four percent (34/36) of trauma centers completed the surveys. Twenty-seven percent (9/34 centers) are currently using TVR; 38% (13/34) previously used TVR, but stopped due to legal concerns or technical problems; and 35% (12/34) never used TVR. Nine reported that a TVR program was under development. Total planned or current use is 53% (18/34). All currently videotaping programs confirmed that TVR has improved their trauma process. Eighty-eight percent (30/34) have emergency medicine (EM) and/or pediatric emergency medicine (PEM) trainees. Two centers specifically use recorded traumas for resident education. Eight programs do not allow EM (7) or PEM (1) trainees to participate in trauma resuscitations; two of these programs allow trainees to attend TVR conferences.
Conclusions: Most pediatric trauma centers are using or planning to use TVR but few are using it for resident education. Emergency medicine trainees may have limited pediatric trauma experience. Future studies should focus on identifying potential uses of TVR for resident education and impediments to TVR program establishment.

19 Short Stay Admissions: Emergency Department (ED) Observation Unit (OBS) Compared to In- Hospital

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Background: Admission to an emergency department (ED) observation unit (OBS) provides an option to hospital (HOSP) admission for selected patients.

Methods: We retrospectively reviewed a cohort of patients >2 months old admitted either to OBS or HOSP who had stays < 24 hrs during a 26 month study period at a Level I trauma center, adult and children's university hospital with 40,000 ED census and a 10-bed ED OBS. Exclusions were: elective, day surgery, and pregnancy-related admits; patients with major procedures; and deaths and zero charges. Using a two-sample t-test for continuous variables and chi-square test for discrete variables, we compared total facility charges (CHARGES) in dollars and length of stay (LOS) in hours for the cohort and for selected diseases using ICD-9-CM categories. Significance was set at $p < 0.01$ or <0.05.
Results: Adjusting for age, gender, LOS, ICD-9 category and insurance class, linear analysis of covariance (ANCOVA) demonstrated significant difference in log of charges. A similar model without LOS found significant difference in log LOS. OBS admits had a larger percent of non-sponsored patients (17.4 vs 7.5, $p <0.05$) and fewer patients returning within 72 hours of discharge for readmission to the hospital (1.5% vs 2.2%, $p<0.05$).

20 Factors Important to Emergency Medicine Residency Applicants in Selecting a Residency Program

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Background: Little is known about the factors important to applicants when selecting an emergency medicine (EM) residency program. We sought to identify factors important to applicants when selecting a training program, and determine whether there were gender differences in the factors that applicants value.
Methods: This observational study surveyed interviewees at an EM residency program from November 2005 to February 2006. Applicants were asked to rate each of 18 factors from "not at all important" to "very important" in their selection of an emergency medicine residency program. Participation was voluntary and anonymous.
Results: 73 of 82 interviewees (89%) completed the survey. The factors with the top five mean scores were: how happy the residents seemed (3.9), program personality (3.8), faculty enthusiasm (3.7), geographic location (3.6), experience during interview day (3.5) and pediatrics training (3.5).
Conclusions: The top three factors deemed most important to emergency medicine applicants are primarily intangibles, while programs have no control over the fourth most important factor, location. Still, programs aware of these findings may choose to emphasize these intangibles as well as the geographic strengths of their city in order to maximally appeal to potential residents. Further research is needed to investigate in more detail what aspects of the interview-day experience are most meaningful, as this may be the factor over which program directors have the most control.

21 Attending and Resident Satisfaction with Feedback in the Emergency Department

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Objectives: Effective feedback is a core component of medical education. Little is known of emergency medicine (EM) attending and resident perceptions of the feedback they give and receive in the emergency department (ED). This study aims to characterize the overall satisfaction of EM attendings and residents with feedback in the ED. We hypothesized that attending and resident perceptions of the ED feedback would differ significantly.
Methods: This observational study was conducted in an EM residency program. Attendings and residents received unique but similarly worded web-based surveys. The primary outcome was overall satisfaction with feedback in the ED, measured on a 10-point scale. Additional items assessed satisfaction with specific aspects of feedback and whether attendings or residents were more likely to initiate feedback. The attending and resident responses were compared using a two-sample t-test for continuous variables and a c2 test for discrete variables.
Results: 24 of 32 attendings and 15 of 27 residents completed the survey. Attendings were significantly more satisfied overall with feedback in the ED (6.4 vs. 4.5, $p=0.01$). Attendings were more likely than residents to report good or excellent satisfaction with the timeliness of feedback (50% vs. 13%, $p=0.04$), quality of positive feedback (88% vs. 46%, $p=0.01$), quality of constructive feedback (58% vs. 13%, $p=0.01$), feedback on communication and professionalism (63% vs. 20%, $p=0.02$) and feedback on managing patient flow (54% vs. 20%, $p=0.05$). When asked who usually initiates feedback, attendings were more likely to report that the attending usually does (96% vs. 27%, $p<0.01$). The study achieved 80% power to detect the primary finding ($\alpha=0.05$).
Conclusions: Attending satisfaction with the timeliness and quality of feedback they give in the ED is significantly higher than resident satisfaction with feedback they receive. There is also significant difference in their perception of who initiates feedback.

22 Use of a Single Expert Reviewer Instead of End Users to Evaluate a Decision Support Tool

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Background: Development of a decision support tool (DST) requires end-user feedback during prototype testing. This process is logistically difficult and would be eased if the evaluation of a single expert evaluator accurately reflected that of the end users.
Objective: To determine the agreement between physician evaluation of the performance of a case-based reasoning (CBR) DST with that of a single expert reviewer.
Methods: Ten EPs and three midlevel providers were presented with the results of a CBR-based DST designed to predict disposition of children presenting to the ED with bronchiolitis. Each rated their agreement with the predicted disposition, the explanatory case and the explanatory dialogue generated by the software. The expert reviewer, a pediatric EP, initially reviewed case notes blinded to the original disposition. A second evaluation was performed after four months when the case notes were reviewed alongside the CBR output. Evaluators used a five-point descriptive scale, which was converted to a numeric scale for analysis.
Results: The case notes and DST output of 109 patients were evaluated. Where the end user and expert evaluator agreed on the need for admission, agreement on the CBR tool's prediction of disposition was 88.2%(expected 70.6%) κ 0.585 $p< 0.001$. Where the reviewer and end user disagreed on the disposition, agreement was 61.7% (expected 62.6%) κ -0.026 p=NS. When both subsets were combined, agreement was 84.9%(expected 70.9%) κ 0.483 $p<0.001$. There was only fair agreement on the value of explanation case provided by the software (observed agreement 69.5%(expected 56.7%) κ 0.296 $p <0.001$). There was poor observed agreement on the usefulness of the explanation provided of 61.6%(expected agreement 55.4%), κ 0.139 p=0.07.
Conclusions: A single expert reviewer had moderate agreement with end users when evaluating a CBR based DST predictions for disposition. This agreement waned progressively as the subjectivity of the components being evaluated increased.

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