2003 CAEP/ACMU Scientific Abstracts

Disclaimer: The large number of abstracts submitted and the short time interval between submission and publication did not permit communication with authors, abstract revision of *CJEM* editorial review. The following abstracts are presented, unedited, as they were submitted to the CAEP Research Committee. Abstract authors are from the department or division of emergency medicine of their respective universities unless otherwise specified.

001 Multicenter Prospective Validation of the New Orleans Criteria for CT in Minor Head Injury.
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INTRODUCTION: The New Orleans Criteria (NOC) for CT in minor head injury were previously derived and validated in a single site cohort of 1,429 patients. This study prospectively and explicitly evaluated the accuracy, reliability, and acceptability of the NOC in multiple sites. METHODS: This prospective cohort study was conducted in 9 tertiary care EDs and enrolled adult minor head injury patients with witnessed loss of consciousness, amnesia, or confusion and a GCS score of 15. More than 350 physicians completed data forms and interpreted the NOC status for patients prior to diagnostic imaging. In some cases 2nd physicians performed interobserver assessments. The outcome standards were 'need for neurological intervention' and 'clinically important brain injury'. Analyses included kappa coefficient, sensitivity, and specificity with 95% CIs. RESULTS: The 1,733 patients enrolled over 30 months had these characteristics: mean age 37.7 (range 16-99), male 68.2%, ambulance arrival 72.1%, clinically important brain injury on CT 5.0%, unimportant injury 2.7%, neurological intervention 0.5%, death 0%. The NOC classified patients for neurological intervention (N = 8) with sensitivity 100% (95% CI 63-100), specificity 12.3% (11-14), and would have required CT for 87.8%. The NOC also classified patients for 87 important brain injuries with sensitivity 100% (95% CI 96-100) and for 48 unimportant brain injuries with sensitivity 95.8% (95% CI 85-98). The kappa value for MD interpretation of the NOC was 0.47 (-0.13 - 1.0). MDs under-estimated the risk in 5.4% and were uncomfortable applying the rule in 11.5%. CONCLUSIONS: The NOC have proven to be very sensitive for identifying important brain injury. Interobserver agreement is fair but specificity is very low. The NOC may be appropriate for minor head injury patients in the U.S. where current CT rates are high but widespread implementation elsewhere would dramatically increase use of CT outside of the U.S. Key words: clinical prediction rule, diagnostic imaging, Computed tomography

002 Multicenter Comparison of GCS and RTS Scores at Scene versus at Trauma Hospital.
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OBJECTIVE: Prehospital triage of trauma patients is challenging. This study evaluated the predictive validity and reliability of the Revised Trauma Score (RTS) and Glasgow Coma Scale (GCS) by comparing scores at scene by paramedics to those made at the ED by physicians. METHODS: This multicenter prospective cohort study was conducted in 20 communities as part of the Ontario Prehospital Advanced Life Support (OPALS) Study, which evaluates the impact of ALS programs. EMS care was provided at both the BLS-D and ALS level. Included were adult trauma patients with ISS >12 and who were treated at 12 regional Level 1 trauma hospitals. We linked ambulance call report data to that from the Ontario Trauma Registry to compare scene and ED evaluations. Analysis included Cronbach's Alpha; Intraclass Correlation Coefficients (ICC); area under the Receiver Operating Characteristic (ROC) curves and Kendal's Tau C Correlation Coefficient (Tc) for predicting survival. Mann-Whitney U-test was performed to test association with ICU admission for survivors. RESULTS: For the 922 patients, scene and ED RTS scores had similar internal consistency with similar patterns of inter-item correlation (Alpha = 0.82, 0.85). Scene and ED GCS scores also had identical inter-item correlations (Alpha = 0.93, 0.93). Interobserver agreement between scene and ED scores was very good both for cases requiring 20-minute transfers (ICC for RTS 0.92, ICC for GCS 0.85) and for those with 15-minute transfers (ICC for RTS 0.96, ICC for GCS 0.88).

ROC	Tc	ICU Adm.	P-value
RTS Scene	0.79	0.34	0.67
RTS ED	0.81	0.29	0.13
GCS Scene	0.78	0.36	0.94
GCS ED	0.81	0.34	0.03

CONCLUSIONS: Paramedic scoring at scene showed good internal consistency and interobserver reliability and are as valid as ED physician scores in predicting survival. Although paramedic scores did not predict ICU admission, timing of the score seemed to be the main factor, rather than the performance of paramedics. Key words: emergency medical services, trauma

003 The Value of History in the Diagnosis of Subarachnoid Hemorrhage for Emergency Department Patients with Acute Headache.
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INTRODUCTION: It is unclear which ED patients with an acute headache require investigation for SAH. This study determined the value of history and resolution of headache for predicting SAH. METHODS: This 2-year prospective cohort study was conducted at 3 university tertiary care EDs. Adults with an acute headache peaking within 1 hour and without neurological deficit were enrolled. Excluded were recurrent headaches of similar type, trauma, or previous SAH/brain neoplasm. Emergency physicians completed data forms

prior to investigation. The outcome, SAH, was defined as SAH on CT, xanthochromia in the CSF, or the presence of red blood cells in the last tube of CSF with positive cerebral angiography. Patients were asked historical questions and to rate their pain on a scale of 0-10; 0 represented no pain and 10 the worst. Analysis included univariate and multivariate logistic regression. RESULTS: The 589 enrolled patients had a mean age of 42.9 years, were mostly women (60.6%), and had mean peak pain of 8.5 (SD=2.1). Anti-migraine treatment was given to most patients (83.9%); total pain relief was associated with benign headaches versus SAH (p=0.031); however 6.1% of patients with total pain relief had SAH. We compared patients with and without SAH and determined their unadjusted and adjusted odds ratios (** P<0.05):

FEATURE	% SAH	% NO-SAH	UNADJ-OR	ADJ-OR
Age over 50	67.5	26.8	5.7	7.8**
Female	62.5	60.5	1.1	0.6
Worst headache	92.5	77.1	3.7	1.9
Exertion	17.5	9.3	2.1	1.3
Transient LOC	15.0	4.1	4.2	2.3
Neck pain	75.0	32.3	6.3	5.4**
Vomiting	60.0	28.9	2.7	2.7**
Awoke with pain	5.1	19.8	0.2	0.3
Occipital	25.0	13.1	2.2	1.1

CONCLUSIONS: Age >50, neck pain and vomiting were related to the outcome of SAH and should be sought in all patients presenting with an acute headache. Although relief of headache was statistically more common in the benign headaches, it does not rule out SAH. Key words: Subarachnoid hemorrhage

004 The Epidemiology of Acute Myocardial Infarction Emergency Department Presentations in Alberta.
Holroyd BR, Bullard M, Welsh R, Yiannakoulias N, Spooner CH, Rosychuk R, Svenson L, Schopflocher D, and Rowe BH. Division of Emergency Medicine, University of Alberta, Edmonton, AB.

OBJECTIVES: Many patients with acute myocardial infarction (AMI) present to the emergency department (ED) and despite potentially serious consequences, limited information exists about this diagnosis in a defined population. This study examines the epidemiology of AMI presentations to the ED using a unique provincial data set. METHODS: All cases of AMI from all ages presenting to Alberta EDs were eligible for inclusion. Data were derived from the cohort of patients treated in Alberta EDs in all 17 health regions over 1 year (fiscal 00/01). Data were extracted from the Ambulatory Care Classification System (ACCS) database, which contains computerized MD-diagnosed abstracts coded using ICD-9 coding, by medical record nosologists in each hospital. Descriptive statistics and crude presentation rates are presented. RESULTS: AMI (ICD-9 410.x) accounted for 3543 (0.21%) of the 1.7 million annual visits to EDs in Alberta during 1 year; the overall population of the province is 2.8 million. Males presented more commonly (2,471; 70%) than females. Patients > 49 years old comprised 3,028 (85%) of the cases while patients > 69 years old comprised 1505 (42%) of the cases. Presentation rates demonstrated little variation based on weekday presentation or month of the year. The ED presentation rate for AMI was 1.12 / 1,000 persons in rural settings and 0.97 / 1,000 persons in urban settings. In the patients with AMI there were a total of 421 ED visits in the preceding 14 days prior to their AMI presentation. The most common ICD-9 diagnosis for these visits was "Chest Pain" 786.5 (40 visits). CONCLUSION: Myocardial infarction is a serious ED presentation which demonstrates marked gender differences, but fails to demonstrate significant variation across weekday, month or region. However, ED visits immediately preceding an AMI presentation are not infrequent and need further evaluation. Key words: myocardial infarction

005 Characteristics of Patients with Chest Pain Arriving by Ambulance vs Private Transport.
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OBJECTIVES: Approximately 50% of patients with a final diagnosis of AMI arrive to emergency departments by ambulance. Regional policies for the care of ACS often focus on patients transported by ambulance. We hypothesized that patients with chest pain arriving by ambulance are demographically distinct and more likely to have acute coronary syndrome (ACS). METHODS: We compared patients enrolled in a prospective cohort study of 1819 patients presenting with chest pain who arrived by ambulance (AMB) or not (nonAMB). Subjects were consecutive consenting patients > 25 years old, living in British Columbia with complete follow-up at 30-days. Explicitly defined diagnoses were applied for categories of ACS: AMI, definite unstable angina (UA), possible UA, no ACS with an adverse event (AE) and no ACS/AE. We compared presenting demographics, risk factors, diagnostic outcomes and mortality. Differences with 95% confidence intervals were calculated. RESULTS: 564 (31%) of patients arrived by ambulance. The AMB and nonAMB groups were 64.6 vs 55.4 years old (95% CI of difference; 7.7,10.8), were 52% vs 61% male (95% CI of difference; -14,-4%), took a median time of 100 min vs 135 min from symptom onset to ED arrival (95% CI of difference; 42,-6), had an incidence of 54% vs 35% of past AMI or angina (95% CI of difference; 14,23),had a 19% (106/564) vs 11% (135/1255) final outcome of AMI (95% CI of difference; 4,12) and a 8% (43/564) vs 9% (114/1255) incidence of no unstable angina (95% CI of difference;-4,1). CONCLUSIONS: Patients with chest pain who arrive by ambulance are different from those not using ambulance services. They are older, less likely to be male, have shorter duration of symptoms, more likely to have previous coronary disease and more likely to have ACS. However, as many patients with ACS arrive by private means, highlighting the need for regional carepaths to include strategies for patients who do not arrive by ambulance. Key words: acute coronary syndromes, myocardial infarction

006 Understanding and Improving Low Bystander CPR Rates: A Systematic Review of the Literature.
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INTRODUCTION: Bystander CPR rates remain low in North America. CPR is a crucial yet weak link of the chain of survival for cardiac arrest. We sought to understand the determinants of bystander CPR and factors associated with successful training. METHODS: For this systematic review, we searched 11 electronic databases, 1 trial registry, and 9 scientific websites. We performed hand searches and contacted 6 international content experts. We reviewed without restriction all communications pertaining to WHO should learn CPR, WHAT should be taught, WHEN to repeat training, WHERE to give CPR instructions, and WHY people lack the motivation to learn and perform CPR. We used standardized forms to review papers for inclusion, quality and data extraction. We grouped publications by category and classified recommendations (A, enough evidence to support to E, enough evidence not to support)

using a standardized classification system based on the level of evidence (I-1, meta-analysis to III, expert opinion). RESULTS: We reviewed 2254 articles and selected 370/2254 for complete evaluation. We included 221/370 papers in the systematic review. Differences in study design precluded a meta-analysis of those publications. We classified 22 recommendations. Recommendations with the highest scores (A,I-2) were: 1)Dispatch-assisted CPR instructions; 2)Teaching CPR to family members of cardiac patients; 3) Braslow's self-training video; 4)Maximizing time spent using manikins; and 5)Teaching concepts of ambiguity and diffusion of responsibility. Other examples include: Mass training events (C, II-3), pulse taking by laymen (D,I-2), and CPR using chest compressions alone (E,I-2). CONCLUSIONS: We performed the most extensive systematic review of bystander CPR determinants to date. We evaluated and classified the potential impact of interventions currently believed to improve bystander CPR rates. Our results may help international communities to design the best intervention to improve their bystander CPR rates. Key words: cardiac arrest, resuscitation

007 Do Point-of-Care Troponin-I Assays Reduce ED Length of Stay for Patients with Chest Pain?
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INTRODUCTION: Cardiac markers are used to rule-out myocardial infarction (MI) in the ED. Lab-based testing takes 1-3 hours and may tie up ED stretchers. Point-of-care (POC) tests can be performed rapidly at the bedside, potentially reducing time-to-disposition, enhancing throughput and improving access for waiting patients. Our objective was to determine whether POC troponin testing reduces length of stay (LOS) in ED patients undergoing serial assays. METHODS: This randomized clinical trial was based at Edmonton Royal Alexandra Hospital, Nanaimo Regional General Hospital and Victoria General Hospital. Consenting patients having serial troponin assays were randomized to quantitative LAB testing or qualitative POC testing using the Cardiac Status troponin I test kit (Spectral Diagnostics). Primary outcome was mean ED LOS. Patients were followed for 30-days to document final diagnosis and key outcomes. Test parameters were determined for both modalities. RESULTS: The study sample included 88 POC patients and 71 LAB patients (n=159), with similar baseline characteristics. In the POC group, there were 3 index MIs, 2 late MIs and 1 revascularization (4 of 6 were admitted). In the LAB group there were 4 index MIs and 3 revascularizations (all admitted). The table shows that ED LOS was shorter in the POC group (p=.02). At 30-days there were no significant differences in test utilization or ED re-visit and readmission rates but LAB patients had more revascularization procedures (p=.08).

Outcomes	POC	Lab	Test parameter	POC	Lab
ED LOS (hrs)	6.9	10.4	Sens (95% CI)	60% (17-100)	100% (90-100)
% admitted	15.9	16.9	Spec (95% CI)	100% (98-100)	88% (80-96)
MI within 30d:	5.7%	5.6%	Accuracy (CI)	98% (95-100)	89% (82-96)
MI or revascular:	6.8%	10%			

CONCLUSIONS: POC testing was associated with shorter LOS. POC tests may be less sensitive and more specific for ACS events occurring within 30 days. Key words: myocardial infarction, troponin, diagnosis

008 The Epidemiology of Angina and Acute Coronary Syndrome Emergency Department Presentations in Alberta.
Holroyd BR, Bullard M, Welsh R, Yiannakoulias N, Spooner CH, Rosychuk R, Svenson L, Schopflocher D, and Rowe BH. Division of Emergency Medicine, University of Alberta, Edmonton, AB.

OBJECTIVES: Patients with angina or acute coronary syndromes (AACS) present to the emergency department (ED) and despite potentially serious consequences and the need for aggressive management, limited information exists about this diagnosis in a defined population. This study examines the epidemiology of AACS presentations to the ED using a unique provincial data set. METHODS: All cases of AACS from all ages presenting to Alberta EDs were eligible for inclusion. Data were derived from the cohort of ED patients in all 17 provincial health regions over 1 year (fiscal 00/01). Data were extracted from the Ambulatory Care Classification System (ACCS) database, which contains computerized MD-diagnosed abstracts coded using ICD-9 coding, by medical record nosologists in each hospital. Descriptive statistics and crude presentation rates are presented. RESULTS: AACS (ICD-9 411.1, 411.8, 413.x, 410.7) accounted for 11,023 (0.65%) of the 1.7 million annual visits to EDs in Alberta during 1 year; the overall population of the province is 2.8 million. Males presented more commonly (6455; 59%) than females. Patients > 49 years old comprised 9,545 (87%) of the cases while patients > 69 years old comprised 4,956 (45%) of the cases. Presentation rates demonstrated some variation by day of the week but not by month. The ED presentation rate for AACS was 4.20 / 1,000 persons in rural settings and 3.39 / 1,000 persons in urban settings. In the patients with AACS there were a total of 1171 ED visits in the preceding 14 days prior to their AACS presentation. The most common ICD-9 diagnosis for these visits was "Chest Pain" 786.5 (146 visits). CONCLUSION: Angina and acute coronary syndromes are potentially serious and common ED presentations. They demonstrate limited monthly variation but considerable variation by day of the week and region. ED presentations immediately preceding an ED visit for AACS are commonly undifferentiated, not infrequent and warrant further evaluation. Key words: acute coronary syndromes

009 Diagnostic Value of C-Reactive Protein for ACS in ED Patients with Chest Pain.
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OBJECTIVES: Inflammatory markers are predictive of future events in patients with established acute coronary syndromes (ACS) but it is unclear how they can be used as diagnostic tests in patients presenting with chest pain. We postulated that C-reactive protein on arrival to the ED in patients with chest pain would predict the diagnosis of ACS. METHODS: A convenience sample of patients prospectively enrolled to develop an early discharge decision rule were followed for 30-days to determine outcomes of AMI or definite unstable angina. High-sensitivity CRP was determined on the first blood specimen. Sensitivity and specificity were determined for different CRP diagnostic thresholds. RESULTS: Of 214 patients, 58 had a 30-day outcome of AMI or definite unstable angina. The area under the ROC curve was 0.55 indicating poor overall diagnostic accuracy. For a diagnostic threshold of 1 IU/L, the sensitivity was 41/58 = 71% (95% CI: 59%, 82%) with a specificity of 41/156 = 26% (95% CI: 19%,33%). For a diagnostic threshold of 5 IU/L, the sensitivity was 15/58 = 26% (95% CI: 15%, 37%) with a specificity of 104/156 = 67% (95% CI: 59%,74%). For a diagnostic threshold of 10 IU/L, the

sensitivity was 5/58 = 9% (95% CI: 1%, 16%) with a specificity was 124/156 = 79% (95% CI: 73%, 86%). CONCLUSION: CRP does not appear to provide diagnostic value for ACS in an undifferentiated population of patients with chest pain presenting to the ED. A larger cohort is needed to confirm the diagnostic accuracy with confidence. Further work may help to clarify whether CRP provides added value to ECG and other markers in specific subsets. Key words: myocardial infarction, C reactive protein, diagnosis

010 Determination of Sample Size Parameters for Community Intervention Cluster Trials in Cardiac Arrest.

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INTRODUCTION: Community interventions to improve survival from cardiac arrest are becoming more common. Individuals belonging to a community share characteristics that make them non-independent. We sought to determine the intra-class correlation and inflation factor for sample size calculation of community intervention cluster trials in cardiac arrest. METHODS: We analyzed data prospectively collected within the Ontario Prehospital Advanced Life Support Study. This study has the largest population-based cohort of adult out-of-hospital cardiac arrests from 20 communities and 11 base hospitals with BLS-D and ALS paramedics. We used one-way analysis of variance to obtain the mean square error among (MSC) and between (MSW) base hospitals for cardiac arrest survival. We calculated the intra-class correlation (p) using p=(MSC-MSW)/(MSC+(m-1) MSW) where m is the cluster size, the inflation factor (IF) using IF=(1+(m-1)p), and the required sample size (n) to find a 2% absolute difference in cardiac arrest survival (80% power, two-sided 5% alpha error). The number of clusters required (k) is given by k=2n/m. RESULTS: From 1995 to 2000, there were 7,707 consecutive cardiac arrest cases: mean age 68.9, 67% male, 37% VF/VT, 16% bystander CPR, and 4.0% survival to discharge. Intra-class correlation for cardiac arrest survival=0.0019 and IF=2.3. In other words, the sample size calculation for a community intervention needs to be multiplied by 2.3 to account for the lack of independence of individuals within communities. For example, we would need 8,000 cardiac arrests in 12 communities to find a 2% difference in survival from cardiac arrest. CONCLUSION: It is essential to know the intra-class correlation factor to calculate the required sample size for community intervention cluster trials. This factor is often estimated and had not been published for cardiac arrest research before. Our results can have major impact on the design and analysis of community intervention cardiac arrest research. Key words: cardiac arrest, resuscitation

011 OPALS Study Phase III: What is the Impact of Advanced Life Support on Out-of-Hospital Cardiac Arrest?

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INTRODUCTION: The Ontario Prehospital Advanced Life Support (OPALS) Study is designed to systematically evaluate the effectiveness of EMS interventions for critically ill and Injured patients. OPALS Phase III tested the incremental impact on out-of-hospital cardiac arrest survival of adding an ALS program to a multicenter BLS-D EMS system that had previously optimized defibrillation (Phase II JAMA 1999). METHODS: This multicenter before-after controlled clinical trial was conducted in 17 communities (population 20,000 to 750,000) and enrolled all adult out-of-hospital cardiac arrest patients during the 12-month BLS-D rapid defibrillation phase and the subsequent 36-month ALS phase. Paramedics were fully trained to ALS standards including endotracheal intubation and administration of IV drugs. The primary outcome was survival to hospital discharge. Chi-square and logistic regression analyses were performed. RESULTS: The 5,637 patients enrolled during the BLS-D (N=1,391) and ALS (N=4,246) phases were well matched and had these characteristics: mean age 69.2 (range 16-102), male 66.7%, witnessed 51.7%, bystander CPR 14.7%, initial rhythm VF/VT 32.3%, defibrillator at scene <8 minutes 93.3%. During the ALS phase, success rates were intubation 93.7% and IV insertion 89.0%. From the BLS-D to the ALS phase, the admission rate increased (10.9% vs 14.6%; P<.001) but survival did not change (5.0% vs 5.1%; P=.82) for all rhythms combined. Logistic regression also found the odds ratio for ALS to be non-significant (0.91; 95% CI 0.6-1.3). There was no survival improvement for any subgroup including cases witnessed by bystander (7.1% vs 6.8%; P=.80) or by EMS (13.5% vs 16.6%; P=.41); with rhythm VF/VT (12.9% vs 13.2%; P=.87) or PEA (1.4% vs 2.4%; P=.27). CONCLUSIONS: The OPALS Study is the largest multicenter controlled trial of out-of-hospital cardiac arrest. The addition of prehospital ALS interventions did not improve patient survival in a previously optimized rapid defibrillation EMS system. Key words: emergency medical services, cardiac arrest, resuscitation

012 Emergency Waiting Room Care: Are Some of Our Emergency Patients Being Poorly Cared for?

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BACKGROUND: ED overcrowding creates a situation where some ED patients are triaged to and cared for in the waiting room/hallway (WR). OBJECTIVE: To compare baseline characteristics, ED utilization and adverse outcomes in patients with WR care versus those triaged to an acute care (AC) bed. Our hypothesis was that patients managed in the WR would have more adverse events. METHODS: A retrospective cohort study at St. Paul's Hospital, a Canadian, tertiary center with 45,000 annual visits. By linking physician order entry and emergency department administrative databases, we reviewed all patients who required an AC bed from November 2000 to November 2002. We used Chi-square analysis and t-tests to compare patients cared for exclusively in WR versus those whose entire care was in an AC bed. RESULTS: 34,226 patients required an AC bed. Of these, 5,355 (15.6%) had their entire care in WR, 5,341 (15.6%) were triaged to WR and later transferred to an AC bed, and 23,530 (68.7%) were triaged directly to an AC bed on arrival. WR patients were younger, lower acuity, and seen less quickly than patients in a bed. WR patients had shorter ED length of stay (LOS) and left without being seen (WBS) or against medical advice (AMA) more often. WR patients were more likely to return requiring hospitalization within 7 days (revisit-admit) than AC bed patients.

Characteristic	Bed (n=23530)	WR (n=5355)	p
AGE (years)	50.4	42.6	<.0001
% LEVEL 1/2	27.3	11.8	<.0001
TIME TO MD (hrs)	0.75	0.85	<.0001
ED LOS (hrs)	4.30	2.82	<.0001
% LEFT WBS	0.26%	9.6%	<.0001
% LEFT AMA	1.3%	7.6%	<.0001
% REVISIT-ADMIT	1.35%	1.79	=0.018
ADMISSION RATE	37.5%	6.8%	<.0001

CONCLUSIONS: Triage nurses accurately identified patients who could safely be managed in the WR. High left WBS/AMA rates suggest lower patient satisfaction but we failed to show clinically important differences in revisit-admit rates. Key words: Overcrowding, quality

013 Multicenter Controlled Clinical Trial to Evaluate the Impact of Advanced Life Support on Out-of-Hospital Chest Pain Patients.

Stiell IG, Nesbitt L, Wells GA, Beaudoin T, Spaite DW, Brisson D, Nichol G, Field BJ, Lyver MB, Munkley DP, Luinstra LG, Cousineau D, for the OPALS Study Group. Department of Emergency Medicine, University of Ottawa, Ottawa, ON.

INTRODUCTION: There is little published evidence regarding the optimal EMS management of chest pain. Our study tested the impact of advanced life support (ALS) EMS programs on chest pain patient outcomes. METHODS: This multicenter before-after controlled clinical trial was conducted in 17 communities (population 20,000 to 750,000) as part of the Ontario Prehospital Advanced Life Support (OPALS) Study, which evaluates the impact of EMS programs for multiple conditions. During the before phase, care was provided at the BLS-D level. During the after phase, ALS providers performed endotracheal intubation and administered IV drugs. Data were collected from ambulance reports, centralized dispatch data, ED records, and in-hospital records. Chi-square and Student's t-test analyses were performed. RESULTS: The 4,601 patients enrolled during the two 9-month BLS and ALS phases were well matched for clinical and demographic features and had these characteristics: mean age 66.6 (17-102), female 50.4%, EMS status 'severe/life threatening' 48.7%, ICD-9 final diagnoses: chest pain NYD 17.7%, MI 17.0%, other non-cardiac 15.1%, unstable angina 14.6%, stable angina 9.4%, G.I. 8.6%, respiratory 5.9%, dysrhythmias 5.8%. During the ALS phase, patients received these EMS interventions: intubation 0.1%, IV fluid bolus 5.1%, SL NTG 64.4%, SL ASA 49.8%, IV morphine 6.1%, IV furosemide 4.5%, IV adenosine 0.8%, IV lidocaine 0.3%, IV atropine 0.3%. There was a 64.7% relative reduction in the primary outcome, overall mortality, from the BLS to the ALS phase (5.1% vs 2.8%; P<.001). Other outcomes also showed improvement from BLS to ALS phase: EMS-judged improved (20.1% vs 50.9%; P<.0001); admitted (76.7% vs 48.9%; P<.001); discharged to home (65.8% vs 68.7%; P<.01). A large mortality reduction was seen in the MI subgroup (19% vs 10%; P<.001). CONCLUSIONS: This is the largest controlled trial of out-of-hospital chest pain patients and clearly shows important benefit from ALS programs for mortality and other outcomes. Key words: emergency medical services, chest pain

014 Reasons Why Patients Leave Without Being Seen from the ED.

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INTRODUCTION: Recently, patients leaving without being seen (LWBS) by a physician have become an important emergency department (ED) concern; however, research into this problem has been limited. The purpose of the present study was to determine the acuity level, reasons, and outcomes of patients who LWBS at two EDs. METHODS: This prospective study, contacted all patients who LWBS at two Canadian EDs during six 7-day sampling periods in the summer of 2002. Following medical record review, a telephone questionnaire with the patient or guardian was completed up to 14 days after the original visit or 6 attempts. RESULTS: 8531 patients registered and 395(4.6%) LWBS during the sampling periods. Of these, 361 were confirmed LWBS cases; 46% were female and the mean age was 37. An urgent triage score was assigned to 26% of these LWBS. Median patient arrival in the hours before and during arrival was 11 (IQR: 9, 13) and median delay to seeing an MD for a triage-matched control was 79 minutes (IQR: 44, 135). Follow-up contact was made with 261(72%) and 245(94%) agreed to participate. The most common reason for LWBS in adults was "fed up with waiting" (49%) and in children was "feeling better"(44%). Overall, 60% of LWBS cases sought alternative medical attention for their symptoms; of the patients who did not seek any medical attention, 28 (29%) were triaged as urgent. Six patients were hospitalized and two of those required urgent surgery after seeking subsequent medical attention. One patient who did not follow up with a physician died our days after ED registration. CONCLUSIONS: The majority of LWBS results from impatience during periods of peak ED volumes. Many patients seek alternative medical care within one week of their presentation and, while rare, complications do occur. While most ED LWBS cases are minor and low-risk ailments, further research is required to determine methods of reducing LWBS, especially "high risk" patients. Key words: quality, outcomes

015 Inter-Rater Reliabilities of the Emergency Severity Index (ESI) vs. the Canadian Triage Acuity Scale (CTAS): a Randomized Controlled Trial

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INTRODUCTION: The Emergency Severity Index (ESI v. 2) has been developed as a triage acuity scale for use in the emergency department (ED). This five-level tool rates patients from level 1 (most serious) to level 5 (least serious). Unlike other triage acuity scales such as the Canadian Acuity Triage Scale (CTAS), the ESI combines both the level of acuity and the patients clinical resource needs into a single measure. It has been proven to be reliable and valid in several U.S. ED settings but has yet to be evaluated in a Canadian ED setting or compared with CTAS. The objective of this study was to compare the inter-rater reliability of CTAS and ESI v. 2. METHODS: Ten triage nurses from four urban EDs were randomly assigned to one of two groups for three hours of CTAS refresher or ESI introductory triage training. Following their training, the nurses in each group independently and in a blinded fashion assigned triage scores to 200 prospectively collected, local ED cases. RESULTS: There were no significant differences found between the two groups with respect to: age (p=0.053); years in the ED (p=0.13); hours of prior CTAS training (p=0.57); or years experience in triage (p=0.61). An intraclass correlation to measure the inter-rater reliability of the CTAS group was 0.9079 (0.897, 0.987) and not significantly different from that of the ESI 0.8926 (0.882, 0.985). An inter-test G-study performed on the variance components derived from an ANOVA revealed G (5) = 0.896 (0.817, 0.992). CONCLUSIONS: After just three hours of introductory training, experienced triage nurses were able to perform triage assessments using ESI v. 2 with the same inter-rater reliability as those with experience and refresher training in CTAS. This comparison study also shows that the triage scores assigned using CTAS generalize to those assigned using ESI v. 2. Key words: triage

016 Evaluation of Triage Nurse Satisfaction with Training and Use of an Electronic Triage Tool.

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OBJECTIVES: The Canadian Triage and Acuity Scale (CTAS) is a nationally recognized triage standard; however, application of CTAS in busy EDs by multiple users reduces reliability and limits validity. This study was designed to determine if an electronic, complaint-

based triage tool (eTRIAGE) could be easily learned and rated satisfactory by nurses in a busy urban ED. METHODS: 9 volunteer triage nurses each received 2 hours of didactic teaching, 2 hours of mentoring during their first eTRIAGE shift, and access to a free time training module. A satisfaction questionnaire was completed at the end of each shift (using a 7-point Likert scale). All eTRIAGE shift data were captured in a database for analysis with traditional paper triage interactions randomly captured for time comparison with eTRIAGE encounters. Users were categorized based on self-reported PC experience into novice (NOV) or experienced (EXP) computer users. RESULTS: The study nurses were experienced (median age 45) with 24 (IQR: 21,25) years of nursing. Overall, 2122 eTRIAGE encounters were recorded over 67 shifts; only 112 (5.2%) encounters had a nurse override the eTRIAGE score. EXP users rated eTRIAGE more favorably than NOV users with respect their: comfort using (5.88 vs 4.76), ease (3.96 vs 3.05), helpfulness (3.76 vs 3.18), interference with patient interaction (2.60 vs 4.08), and increased triage time (4.44 vs 5.21). Measured triage times (minutes/patient) were similar for paper-based (2.45m) and eTRIAGE (EXP = 2.42m vs. NOV = 2.85m). CONCLUSIONS: eTRIAGE was easily learned even by novice users and speed was at least comparable to paper-based triaging. The tool also satisfied nursing perceptions of patient acuity, as 5% of encounters resulted in an override of the eTRIAGE score. The database provides search and reporting capabilities. If ongoing studies confirm both reliability and validity, templated electronic triage should be adopted in place of paper-based triage relying on nurse memory and experience. Key words: triage

017 The Predictive Validity of the Canadian Triage and Acuity Scale (CTAS).

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INTRODUCTION: The Canadian Triage and Acuity Scale (CTAS) has been shown, in various emergency department (ED) studies, to possess good reliability. No studies to date have assessed the association between CTAS level and outcomes such as utilization and patient disposition. METHODS: Objective: To establish the predictive validity of the CTAS in relation to patient disposition, ED length of stay (LOS), hospital LOS (for admitted patients) and utilization (lab tests and imaging) based on a large administrative dataset. This retrospective cohort study was conducted at St. Paul's Hospital, a Canadian tertiary care institution with over 45,000 visits yearly. On arrival to the ED, all patients are assigned a CTAS level (from 1 to 5) by the triage nurse. ED LOS, hospital LOS, and patient disposition, were assessed for over 70,000 patient visits between October 2000 and October 2002. As a proxy for utilization, the proportion of patients having any imaging (CT, ultrasound, X-ray) or a CBC was established for each CTAS level. RESULTS: Multivariate ANOVA for mean ED LOS and hospital LOS by CTAS level rendered statistically significant results for ED LOS. Chi-square and trend analyses were conducted for proportion of patients admitted, having a CBC, or any imaging were significant (Bonferonni correction for multiple comparisons used).

CTAS Level	1	2	3	4	5	P-Value
Mean ED LOS (hrs)	5.7	4.0	3.5	2.1	1.7	<.0001
Admitted, %	54.9	35.2	23.9	11.6	2.8	<.0001
Any imaging, %	38	35	36.3	24.9	14.4	<.0001
CBC , %	46.1	47.9	39.8	11.6	6.1	<.0001

CONCLUSIONS: Based on this sample of over 70,000 patient visits the CTAS has excellent predictive validity for clinical and utilization outcomes. Key words: triage

018 Does HIV Co-Morbidity Increase the Utilization of the Emergency Department?

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BACKGROUND: The prevalence of human immunodeficiency virus (HIV) in the Downtown Eastside of Vancouver is one of the highest in Canada. We hypothesize that HIV positive patients are sicker and utilize significantly greater resources within the ED. OBJECTIVE: To compare the ED length of stay (LOS), admit rate and frequency of procedures in HIV patients versus non-HIV patients. METHODS: A retrospective cohort study between June–September 2001. HIV positive and HIV negative patients were identified in a previous study using a self-reporting questionnaire. Baseline data including age, sex, and mode of arrival to the emergency department were obtained for each patient through linkage with the ED administrative database (NERD). Self-reported HIV negative patients from the same period were used as controls. Surrogate markers for emergency department utilization - ED LOS, admission rate and procedures performed were measured. Comparisons were made using Student's t-tests for continuous and Chi-square analysis for discrete variables. RESULTS: There were 501 distinct HIV patients with 821 visits and 752 controls with 1144 visits during the study period. 354/1144 of the controls had Canadian Triage and Acuity Scale (CTAS) levels 1–3 versus 359/821 of the HIV patients. 157 of the HIV patients were admitted versus 76 of the controls. The number of procedures performed was not different between the two groups. ED LOS for discharged patients was significantly shorter in the control group.

Characteristic	HIV	CONTROL	P Value
Age (Years)	37.0	37.6	NS
CTAS 1–3 (%)	44%	31%	<.0001
Ambulance Visits	209	122	<.0001
Procedures (N)	61	87	NS
ED LOS (hours)	3.2	2.6	<.0001
Admit Rate (%)	19%	7%	<.0001

CONCLUSIONS: HIV patients tend to be sicker and spend more time in the department. The number of procedures performed does not account for this. Co-morbid illnesses such as HIV have an impact on the utilization of emergency departments. Key words: HIV, utilization

019 Emergency Department Presentations of Atrial Fibrillation (AF) In Alberta, Canada.

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OBJECTIVES: Atrial fibrillation (AF) is the most common sustained arrhythmia and the most common arrhythmia seen in the emergency department (ED); however, the burden of acute AF on EDs is virtually unknown. This study examines the epidemiology of AF presentations to the ED using a provincial database. METHODS: All patients presenting to Alberta EDs were eligible for inclusion. Data were derived from a population of patients treated at Alberta EDs in 17 health regions over 1 year (fiscal 00/01). Data were extracted from computerized abstracts coded similarly across all regional EDs contained within the Ambulatory Care Classification

System (ACCS) database. Diagnostic categories are recorded using ICD-9coding by medical record nosologists in each hospital and represented the primary physician discharge diagnostic code. Descriptive statistics, crude and adjusted presentation rates are reported. RESULTS: Over 1 year, 1.7 million ED visits were recorded; 3276 (0.2%) patients aged > 17 made 5023 presentations to the ED during this period with a diagnosis of AF. Males (1691; 52%) and females were similarly represented. The elderly (>60 years) accounted for 76% of all cases of AF. Daily variation was high with peak presentations occurring at 5 PM. The provincial presentation rate was 1.0/1000persons with a prevalence of 1.5/1000. Patients experienced frequent relapses of AF in the first 30 days and one year (16.4% and 32.8%, respectively). The proportion experiencing TIA or AMI within the 365 days after an AF presentation was 1.5% and 1.4% respectively; the proportion of patients experiencing CHF was 9.6%. Approximately 60% of all patients were discharged and 9.7% were admitted to ICU. CONCLUSIONS: Discharge for acute AF is common, reflecting the outpatient treatment of this disease in Canada. Recurrence and complications are also frequently observed; however, TIAs are less common than reported elsewhere. Further research is needed to understand the role of outpatient treatment of AF on these outcomes. Key words: atrial fibrillation, dysrhythmia

020 Determination of Accurate Out-of-Hospital Cardiac Arrest Location in 20 Communities.

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INTRODUCTION: Many communities are implementing CPR training and public access defibrillation programs with little information on cardiac arrest location. We sought to determine accurate out-of-hospital cardiac arrest location in 20 communities. METHODS: Prospective cohort. The OPALS study is the largest population-based cohort of adult out-of-hospital cardiac arrest cases in 20 communities with BLS-D and ALS paramedics. We merged the OPALS and provincial dispatch databases using a unique identifier to obtain addresses where cardiac arrest occurred. Addresses were then retrieved from the municipal property assessment corporation database to obtain accurate description of cardiac arrest location. Cardiac arrest location was classified within 26 predetermined categories. Missing information was submitted to base hospitals for review. Data was analyzed using descriptive statistics. RESULTS: From 1995 to 2000, there were 7,707 consecutive cardiac arrest cases. Mean age 68.9, 67% male, 37% VF/VT, 49% witnessed, 16% bystander CPR, and 4.0% survival to discharge. CONCLUSION: This is the largest review of cardiac arrest location ever conducted. Most cardiac arrests occur in private locations (84.7%) compared to public places (15.3%). Communities should review locations of their cardiac arrest when designing CPR training and public access defibrillation programs. Key words: Cardiac arrest

LOCATION	%
Single-residential	56.1
Multi-residential	22.7
Nursing home	5.9
Single store/Strip mall	3.0
Street/HighwayRoad	2.7
Recreation facility	2.1
Office building	1.2
Indoor shopping mall	1.0
Hotel	0.8
Factory/Industrial site	0.7
Restaurant/Bar	0.6
Hospital (non-acute)	0.5
Medical office/Clinic	0.5
School/College/University	0.5
Missing	0.4
Casino	0.4
Sports field/Park	0.2
Other	0.2
Golf course	0.1
All other locations	<0.1

021 Family Physicians' Perceptions of a Standardized Communication System (SCS) that Delivers Computer-Based Emergency Department (ED) Patient Information to their Offices.

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INTRODUCTION: The lack of communication between EDs and family physicians (FPs) is often cited as a problem in the health care system. The SCS is an Internet and e-mail-based application that enables FPs to access detailed reports regarding their patients who have received ED care. This study measures the perceptions of family physicians with regards to the utility of the SCS in comparison with snail-mailed copies of the ED physician's hand-written note. METHODS: Prior to and subsequent to the completion of a randomized triple-crossover trial of 23 FP practices examining the impact of the SCS on measures of health care delivery, these same physicians were asked to complete surveys focused on issues of communication between the ED and their offices. The non-parametric McNemar test was applied to compare responses prior to and following exposure to the SCS. RESULTS: Completion rates for both the pre and post surveys were 91% (22/23). Of responding FPs, the majority were males (85%) with an average of 24 years in practice (range 6 to 33 years). The FP practice profile was reported to consist of 32% of patients older than 70 years of age and 36% of patients suffering from at least one chronic disease. While exposed to the SCS intervention 90% of FPs reported that the information received was useful compared with 15% who felt the same way regarding the mailed copy of the ED chart ($p< 0.0001$). SCS information was deemed to be more complete (95% vs. 10%, $p<0.001$) and more precise (86% vs. 40%, $p=0.04$). SCS was also perceived by the FPs to reduce the time required to obtain lab and imaging results (72% vs. 14%, $p< 0.01$). Furthermore, while having access to SCS, more FPs were satisfied with their ability to care for their patients than during control periods (90% vs. 43% $p< 0.01$). CONCLUSIONS: Rapid electronic transmission of detailed information from the ED to FPs regarding their patients who sought ED care was perceived by FPs to be highly useful to the provision of patient care. Key words: Information systems, quality

022 The Use of Electronic Clinical Practice Guideline Resources in Two Canadian Emergency Departments.

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INTRODUCTION: Access to valid clinical practice guideline (CPG) information in the emergency department (ED) has the potential to improve practice efficiency and patient care. This study examined the use of electronic CPG applications by emergency physicians. METHODS: Desktop computers containing an ED tracking system were widely available to all staff in two linked EDs. In addition, EM-specific desktop CPG materials including decision tools,

order sets, full care maps, and discharge instructions were accessible using an intranet website (eCPG). Access was provided to 38 full-time EM staff over a 20 month study. Staff use was documented using a web counter, database (n = 2267) and end of session questionnaires (n =840) using a 7-point Likert scale. Descriptive and comparative analyses are reported ($p < 0.05$). RESULTS: All physicians accessed the tools at least once over the study, with over 5500 "hits" recorded to the site. Most (88%) physicians used 1 application per site visit of which many (64%) preferred the defaulted templates. Overall, the most common resource accessed was the outpatient information in 1138 cases (50%), followed by decision tools in 603 cases (27%), and order sets in 526 (23%) cases; over seven 3-month periods, use of all applications increased ($p<0.0001$). The respondents reported that they found the resources easy to find (6/7; IQR = 5,7) and helpful (6/7; IQR = 5,7). Physicians felt more confident with the care they delivered (6/7; IQR: 4,6) and felt that the application improved the quality of care they provided (6/7; IQR: 4, 6). Finally, most physicians felt satisfied both with the information contained in the document (6/7; IQR: 5, 7). CONCLUSIONS: An intranet based EM-specific eCPG site was used widely by pediatric and adult physicians in busy EDs. Overall, physicians felt the eCPG information was valid and helped them practice better medicine in the ED. Further research is required to determine if access to eCPGs improves patient outcomes. Key words: clinical practice guideline

023 Does Physician Order Entry Reduce ED Length of Stay (LOS) in an Overcrowded ED?

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INTRODUCTION: The practice of holding admitted patients in the ED reduces stretcher availability and limits access to emergency care. When ED stretcher occupancy is above 100% and sick patients are treated in waiting rooms (WR), reducing ED LOS improves throughput and care access for waiting patients. In November 2000, we instituted ED physician order entry (POE), which reduces process times and expedites testing for WR patients. Our hypothesis was that the change to POE would reduce ED LOS, especially for patients treated in the WR. METHODS: A controlled before-after study conducted at St. Paul's Hospital (SPH), an inner city Vancouver teaching centre. The before cohort included all patients discharged from the SPH ED from June 10-Nov 10, 2000. The POE (after) cohort included all patients discharged from June 10-Nov 10, 2001. Concurrent control data was gathered from a nearby teaching hospital with similar volume and triage mix that did not implement POE. The primary outcome was ED LOS for discharged patients. RESULTS: The POE and before cohorts included 19,225 and 22,191 patients respectively. Age (42.8 vs. 41.9), gender (62.5% vs. 61.3% male) and disease spectrum were similar in the two groups. During the study period, ED overcrowding and gridlock increased: The mean daily n of admitted patients held in the (22-bed) ED rose from 17.6 to 20.7 and ED LOS (wait time) for admitted patients rose from 11.6 to 31.5 hrs. ED LOS for discharged patients rose by 36 minutes (17%) at the control hospital and 12 minutes (8%) at the POE hospital ($p<.001$). ED LOS fell by 18 minutes for WR patients treated at the POE site. We are unaware of confounding variables to explain these findings.

Table	Before	After
SPH ED LOS (hrs)	2.4	2.6
SPH LOS for WR pts	3.4	3.1
Control hospital LOS	3.6	4.2

CONCLUSIONS: We believe POE expedites patient care, particularly in non-traditional locations, and mitigates the negative impact of overcrowding on ED LOS. Key words: physician order entry, quality, outcomes

024 Do Electronic Linkages Between the ED and Primary Care Physicians Reduce Resource Utilization in the ED? Results of a Randomized Controlled Trial.

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INTRODUCTION: The lack of communication between emergency departments (EDs) and primary care physicians (PCPs) is often cited as a cause of inefficiency in ED-based care. Despite this, few EDs consistently transmit clinical information about the patients they care for to PCPs. We hypothesized that an electronic communication tool would reduce resource utilization in the ED. METHODS: The Standardized Communication System (SCS) is a secure, e-mail and internet -based application that enables PCPs to receive detailed reports including laboratory and imaging data as well as consultation reports and disposition and follow-up information regarding their patients who have received ED care. We conducted a non-blinded, prospective, triple-crossover, randomized controlled trial of PCPs' practices, stratified by age and load of ED-using patients. While allocated to intervention, PCPs received reports via the SCS and while in control, mailed copies of the hand-written ED note. Outcomes of interest were 14-day revisit rates, admission rates upon revisit and ED length of stay (LOS) as well as consult requests and test ordering in the ED. The study was designed with 0.80 power to detect a 25% reduction (alpha = .05) in revisit rates. Mixed models analysis was employed for all comparisons. RESULTS: 2022 ED visits (974 SCS vs. 1048 control) were entered into the trial. The clinical and demographic characteristics of the patients in each arm were comparable. The SCS intervention did not reduce 14-day revisit rates (adjusted OR 1.10, 95% CI 0.80–1.51). There was also no difference in admission rates upon revisit (23% with SCS vs. 26% in controls; p=ns) nor ED LOS (10.3 hrs. with SCS vs. 10.4 with controls; p=ns). Consult requests (16% SCS vs. 15% controls; p=ns) and test ordering (84% SCS vs. 85% control; p=ns) were also unaffected by the intervention. CONCLUSIONS: In comparison with mailed copies of the ED chart, electronic communication between EDs and PCPs does not reduce resource utilization in the ED. Key words: information systems, utilization

025 Supporting Clinical Practice at the Bedside Using Wireless Technology.

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OBJECTIVES: Despite studies that show improvements in both standards of care and outcomes with the judicious application of clinical practice guidelines (CPG), clinical utilization remains low. This randomized trial examines the use of a wirelessly networked mobile computer (MC) by physicians at the bedside with access to an ED information system, decision support tolls and other software options. METHODS: Each of 10 volunteer Emergency Physicians were randomized using a matched pair design to work 5 shifts in their standard fashion and 5 shifts with a wireless networked laptop computer. Work pattern issues and electronic template use were compared using end-of-shift satisfaction questionnaires and reviewing the database for electronic template usage. Repeated measures ANOVA was used to examine between shift differences. RESULTS: 99% compliance with post-shift questionnaires was achieved. Using a 7 point Likert scale (MC values first) MC shifts were rated as be-

ing as fast (5.04 vs 4.54; p = 0.128) and convenient (5.08 vs 4.14; p = 0.071) as desk top computers. Overall, physicians rated MC to be less efficient (3.18 vs 4.30; p= 0.015) but resulted in more frequent use of CPG forms (4.10 vs 3.47; p = 0.034) without impacting on doctor-patient communication (2.78 vs 2.96; p = 0.512). During the study period, physicians demonstrated more frequent use of CPGs during shifts assigned to the mobile computer compared to the desktop (3.6 vs 2.0; p=0.033). The major concerns of the study physicians were the size of the computer and cart and the limited number of CPGs available on-line. CONCLUSIONS: The MC technology permitted physicians to rapidly access information at the bedside and use the CPG tools more frequently. Patients appeared to accept physician's use of information technology to assist in decision making. The major limitations remain MC size and portability, requiring ongoing development of new computer technology. Key words: information systems

026 The Prevalence and Effect of Information Gaps in the Emergency Department.

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INTRODUCTION: Information gaps (IG) occur when previously collected information is unavailable to a physician who is currently treating a patient. This study measured the prevalence and impact of IG for patients presenting to the ED. METHODS: This prospective cross-sectional survey was conducted in a teaching hospital ED on a stratified sample of adult patients. A trained research assistant interviewed ED attending and housestaff physicians immediately after patient assessment to determine if there was previously collected information that was not available in the ED. The physicians identified what data was missing, why it was required, and its importance to the patient's care on a 5-point Likert scale. We reviewed patient charts to measure severity of illness and determine if the patient was referred to the ED by a community physician. Multiple linear regression was used to determine if IG were associated with ED length of stay. RESULTS: Information was collected for 1002 visits (983 patients) over an 8-week period. At least one information gap was identified in 323 (32.2%, 95% CI 29.4%-35.2%) of ED visits. IG most commonly comprised hospital record (36.9%), laboratory (23.3%), medication (13.4%), and physician record (9.2%) data were felt to be essential to patient care 47.8% of the time. Patients with IG were more likely to: be older (60 vs 48 yrs), have arrived by ambulance (34.1% vs 20.9%), have triage level 'emergent' (15.5% vs 7.5%), be in a monitored bed (26.6% vs 12.4%), have a cardiovascular diagnosis (23.8% vs 9.7%), and be admitted (24.8% vs 11.3%); all p-values <.0001. After adjusting for important confounders, ED length of stay was 1.2 hours longer for patients with IG (p <.0001). CONCLUSIONS: IG were present in one-third of ED patients, most common in the sickest patients, and independently associated with prolonged stay in the ED. IG could have huge implications to the patient and the health care system and future research should identify strategies to decrease IG. Key words: quality

027 Impact of Medical Trainees on Clinician Efficiency and Diagnostic Utilization.

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INTRODUCTION: Trainees may enhance emergency physician (EP) efficiency by reducing the time they spend with each patient, but trainees may also increase diagnostic utilization. Our hypothesis was that trainee care would reduce EP time with patients, increase hospital admission rates and prolong ED length of stay (LOS) for discharged patients. METHODS: During a representative sample of ED shifts, research assistants shadowed attending EPs and tracked patients seen by trainees, patient characteristics and EP time spent on patient care and teaching. Patient disposition, LOS and test utilization were captured from hospital databases. The number of shifts covered was based on project funding and the size of the study groups was based on the number of patients seen by trainees. RESULTS: During 32 shifts, 22 EPs treated 446 patients alone and 139 in conjunction with trainees. Patients treated by EPs alone were more likely to have comorbid conditions (34.8% vs. 28.8%), to arrive by ambulance (30.1% vs. 25.7%), to require procedures (23.1% vs. 19.4%) and to have GCS <15 (6.4% vs. 4.8%). For each patient seen by a trainee, EPs provided more teaching and less clinical care (table). Patients seen by trainees had higher admission rates, longer LOS and more diagnostic tests.

Table	EP only	EP plus trainee	p
EP clinical time/pt	19.4 min	12.4 min	.0001
EP teaching time/pt	0.3 min	5.0 min	.0001
EP total time/pt	19.7 min	17.4 min	.10
Admission rate	13.9%	17.3%	.39
Median LOS (disch pts)	1.8 hrs	2.3 hrs	.01
Pts having lab tests	35.9%	41.7%	.26
Pts having imaging study	34.3%	43.9%	.05

CONCLUSION: Bedside teaching is "time-neutral" but trainees may increase admission rates, ED LOS and test utilization. Close supervision of trainee care is required. Key words: medical education, utilization

028 A Standardized Communication System (SCS) Linking the Emergency Department with Primary Care Physicians: Impact on Continuity of Care.

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INTRODUCTION: The seamless integration i.e. continuity of care (CC) between the emergency department (ED) and primary care physicians (PCPs) depends on accurate and timely sharing of information. However, for various reasons, EDs inconsistently transmit information about the patients they care for to PCPs. The objective of this study was to determine the impact of an electronic communication tool on measures of CC. METHODS: The SCS is an internet and e-mail-based application that enables PCPs to receive detailed reports regarding their patients who have received ED care. We conducted a non-blinded prospective, triple-crossover, randomized controlled trial of PCP practices, stratified by age and load of ED-using patients. While allocated to intervention, PCPs received reports via the SCS and while in control, mailed copies of the hand-written ED note. Outcomes were measured with a patient-specific questionnaire that was completed by PCPs 3 weeks following the ED visit of interest. Mixed model analysis was employed for all comparisons. RESULTS: From June 2001 to May 2002, 2022 ED visits (974 SCS vs. 1048 control) were entered into the trial. The clinical and demographic characteristics of the patients in each arm were comparable. The questionnaire response rate was 77% overall and differed little between intervention and control periods. SCS resulted in an increase in PCP follow-up directly related to the ED visit (adjusted OR 0.56, 95% CI 0.38–0.82). PCPs in the intervention arm also reported having better knowledge of their patients' ED visits than controls

(adjusted OR 0.16, 95% CI 0.12–0.22). SCS did not reduce duplication of test ordering at the time of PCP follow-up (hematological exams 22% vs. 16%, microbiologic exams 12.6% vs. 7%, EKGs 10% vs. 5% p=ns for all). CONCLUSIONS: Enhanced transfer of clinical information between the ED and PCPs improves CC primarily through improved PCP follow-up of ED visits and better knowledge of the care provided to their patients in the ED. Key words: information systems

029 The Inter-Rater Reliability of Triage in an Acute Care ED Setting.

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Background: Triage reliability studies typically use hypothetical scenarios and weighted kappa scores where agreement within 1 level is considered satisfactory. If triage category is used to define comparative ED case-mix groups, agreement on exact triage level and major system involved is important. We have previously developed a computerized presenting complaint list linked to the 5-level Canadian Triage and Acuity Scale (CTAS). Our hypothesis was that a computerized menu that links presenting complaints to preferred triage levels (PC-linked triage) would provide high triage reliability. Objectives: To assess inter-rater reliability of PC-linked triage using the CTAS in a real-time clinical setting, considering agreement on exact triage level and the presenting complaint system involved. Methods: This prospective study was conducted at St. Paul's Hospital, a Canadian inner-city academic centre. The on duty triage nurses assessed a convenience sample of ED patients and entered a presenting complaint and a PC-linked triage level. A second nurse, blinded to the triage assignment, concurrently observed the patient interview and independently entered the same information on a dummy terminal. Each nurse also assigned a subjective triage level without PC-linking. Results: Between August and November 2002, 15 pairs of nurses triaged 265 patients. Study patients matched actual ED case mix closely, with 1%, 13%, 36%, 33% and 18% in levels 1-5 respectively. Kappa statistics were 0.66 (95% CI 0.59 – 0.73) for PC-linked triage (exact level) agreement and 0.80 (95% CI 0.69 – 0.91) for agreement on major system involved. Raw agreement between the subjectively assigned acuity levels and PC-linked triage levels was 0.55 (95% CI 0.51 – 0.59). Using subjective triage, nurses assigned fewer patients to levels 1, 2 and 5. Conclusion: PC-linked triage reliability is high in a real-time clinical setting. Nurses triaging subjectively are more likely to cluster patients in triage levels 3 and 4. Key words: triage

030 A Randomized Controlled Trial of a Novel Anti-Arrhythmic Agent RSD1235 in the Treatment of Acute Atrial Fibrillation.

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INTRODUCTION: Acute atrial fibrillation (AF) is a common arrhythmia, and cardioversion agents are often ineffective. This study determined the efficacy and safety of a novel anti-arrhythmic (RSD1235) for the termination of AF. METHODS: This phase II, multi-centered, randomized, double-blind, placebo-controlled, parallel group study enrolled patients with uncomplicated AF (3hr < AF < 72hr). Patients were randomized LOW (0.5 and 1 mg/kg) or HIGH (2 and 3 mg/kg) dose RSD1235 compared to placebo (PLAC) given by infusion over 10 min. Safety was assessed by: incidence of adverse events (AEs); vital signs; ECG monitoring, and laboratory data. The primary endpoint was termination of AF during infusion or the following 30-min. Secondary endpoints included number of patients in normal sinus rhythm (NSR) post-infusion and time to NSR conversion. RESULTS: 20 US and Canadian sites enrolled 56 patients during 2002; demographics were similar between groups (61% males; age = 61 years). HIGH dose showed significant improvements over PLAC in: termination of AF within 30-min (61% vs. 5%; p =0.0003), patients in NSR 30 min post-dose (56% vs. 5%; p = 0.0008), patients in NSR 1 hour post-dose (53% vs. 5%; p = 0.0014), and median time to achieve NSR (14 vs. 162 minutes; p = 0.016). Five patients had SAEs: 4 PLAC patients and one LOW patient. All SAEs resolved and none were deemed related to drug. Clinically significant abnormal ECG results were seen in PLAC (7), LOW (4) and HIGH (3) dose patients. CONCLUSION: RSD1235, a new atrial-specific, mixed Na/K channel blocking agent, appears to be efficacious and safe for patients with acute AF. Further Phase III studies using wider inclusion criteria and larger populations are required before this promising drug can be approved in this setting. Key words: atrial fibrillation

031 Multicenter Prospective Validation of the Canadian CT Head Rule.

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INTRODUCTION: The Canadian CT Head Rule (CCHR) for use of CT was previously derived in a cohort of 3,121 patients and stratifies minor head injury patients into High-, Medium-, and Low-Risk categories, based upon 7 clinical criteria. This study prospectively and explicitly evaluated the accuracy, reliability, and acceptability of the CCHR. METHODS: This prospective cohort study was conducted in 9 tertiary care EDs and enrolled adult minor head injury patients with witnessed loss of consciousness, amnesia, or confusion and a GCS score of 13-15. More than 350 physicians completed 15-item data forms and interpreted the CCHR status for patients prior to diagnostic imaging. In some cases 2nd physicians performed interobserver assessments. The outcome standards were 'need for neurological intervention' and 'clinically important brain injury'. Analyses included kappa coefficient, sensitivity, and specificity with 95% CIs. RESULTS: The 2,588 patients enrolled over 30 months had these characteristics: mean age 38.4 (range 18-99), male 69.3%, ambulance arrival 76.9%, clinically important brain injury on CT 8.2%, unimportant injury 3.6%, neurological intervention 1.6%, death 0.2%. The five CCHR High-Risk Criteria classified patients for neurological intervention (N = 41) with sensitivity 100% (95% CI 91-100), specificity 65.4% (63-67), and would have required CT for 35.7%. The seven CCHR High- and Medium-Risk Criteria classified patients for 212 important brain injuries with sensitivity 100% (95% CI 98-100), specificity 41.0% (39-43), and would have required CT for 62.4%. The kappa value for MD interpretation of the CCHR was 0.80 (0.76-0.92). MDs under-estimated the risk in 7.1% and were uncomfortable applying the rule in 7.7%. CONCLUSIONS: The CCHR has proven to be an accurate, reliable, and acceptable decision rule for the use of CT in minor head injury. Widespread implementation would stabilize or decrease use of CT, decrease health care costs and ensure optimal patient outcomes. Key words: clinical prediction rule, computed tomography

032 Oral Prednisone for the Prevention of Relapse in Outpatients Discharged from the Emergency Department with Exacerbations of Chronic Obstructive Pulmonary Disease.

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INTRODUCTION: This multi-center randomized, double-blind, placebo-controlled clinical trial studied the effectiveness of prednisone in reducing relapse after the treatment of acute outpatient COPD exacerbation. METHODS: We enrolled 147 patients who were being discharged from the emergency department (ED) after treatment for acute exacerbations of COPD and randomly assigned them to outpatient treatment with oral prednisone 40 mg once daily, or identical placebo given for 10 days. All patients received oral antibiotics for 10 days, plus inhaled short-acting bronchodilators given four times daily throughout the 30-day follow-up period. The primary endpoint was relapse within 30 days of entry into the trial, defined as an unscheduled visit to a physician's office, or a return to the ED, because of worsening dyspnea. RESULTS: The overall rate of 30-day relapse was significantly lower in the prednisone-treated group compared to the placebo group (27% vs. 43%, P=0.05), and the time to relapse was significantly prolonged in those taking prednisone (P = 0.04). After 10 days of therapy, patients allocated to prednisone showed greater improvements in FEV1 (34 ± 42% from baseline versus a 15 ± 31% improvement in the placebo-treated patients; P = 0.006). Patients randomized to prednisone experienced greater improvements in dyspnea as measured by the transitional dyspnea index (3.95 ± 4.62 vs. 2.07 ± 5.53, P = 0.04) and by the change in the chronic respiratory questionnaire dyspnea index (1.69 ± 1.55 vs. 0.97 ± 1.83, P = 0.02). Improvements in health-related quality of life were not significantly greater for those treated with prednisone compared to placebo (P = 0.14), and patients treated with prednisone reported more adverse effects including insomnia (p=0.0009) and hyperphagia (p=0.003). CONCLUSION: Outpatient treatment with oral prednisone for 10 days reduces relapse within 30 days, improves lung function and decreases dyspnea following an acute COPD exacerbation. Key words: chronic obstructive lung disease, corticosteroids

033 Pediatric Wrist Buckle Fractures: Management and Outcomes.

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INTRODUCTION: Wrist buckle fractures are common in children yet there is little literature regarding their management and outcome. This study described the management and outcomes of wrist buckle fractures in children presenting to a children's hospital. METHODS: All charts at a tertiary care children's hospital over a 1 year period with a diagnosis of wrist, forearm, radial or ulnar fracture were reviewed. Charts with a diagnosis of distal radius or ulna buckle fracture, confirmed by pediatric radiologist report, were further reviewed. A standardized data form was used to extract demographic information, presentation, initial and subsequent management, refracture, and fracture displacement. RESULTS: 324 patients were eligible for inclusion. 51.4% were male and mean age was 8.6 years (SD 3.9). 78%, 1%, and 21% had radial, ulnar, and both radial and ulnar fractures. All but 1(0.3%) patient presented to the ED for initial management and 89% of these were managed by the ED physician. 86% were casted and 14% were splinted. 30(11%) of casted patients revisited the ED for a cast complication, while only 1(2%) splinted patient had a repeat ED visit. 93% had follow-up with an orthopedic clinic: 35% had 1 visit and 65% had 2 follow-up visits. 58% had only an initial x-ray, 28% had 2 and 14% had 3 x-rays. 4(1%) patients had a refracture of the same bone within 6 months. 2(0.6%) were reported to have displacement on follow-up x-ray. Both of these patients were initially casted. Neither patient required a reduction and final outcomes were acceptable. CONCLUSIONS: In our population, the majority of patients have 2 follow-up orthopedic visits and many have multiple x-rays, yet <1% had subsequent fracture displacement. Patients treated with casts appeared to have more complications than those patients treated with a splint. Given the low risk of displacement and complications of these fractures it appears that routine orthopedic follow-up and x-rays may be unnecessary health care expenses. Key words: buckle fracture

034 Diagnostic Accuracy of Ultrasound and Computed Tomography for Emergency Department Diagnosis of Appendicitis: A systematic review

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INTRODUCTION Appendicitis is common, representing 5% of Emergency Department (ED) visits for abdominal pain, and can be difficult to diagnose clinically. Many adjunctive studies are used to confirm the diagnosis in the ED setting, including diagnostic imaging studies such as ultrasound (US) and computed tomography (CT). However, the diagnostic accuracy of US and CT in the ED setting has not been systematically examined. This study systematically reviews studies that examine the diagnostic accuracy of US and CT in acute appendicitis presenting to the ED, and describes the outcomes associated with the use of these tools. METHODS A systematic review of diagnostic studies was conducted, examining the sensitivity and specificity of US and CT for appendicitis. Secondary outcomes included cost and time spent in imaging. A comprehensive search strategy was employed, and inclusion criteria were applied independantly by two reviewers. Study quality was assessed using empirically evaluated measures. Data were extracted independently by two reviewers, and contingency tables were recreated where possible. RESULTS Thirteen studies were included. Twelve were U.S. based and 1 was Australian. All were cohort studies. Nine were prospective and 4 were retrospective chart reviews. All studies used differential verification: surgery and clinical follow-up. Prevalence of appendicitis in cohorts ranged from 19 to 79%. Fixed effects pooled sensitivities for US and CT were 62% (95% CI 58,65) and 89% (86,92) respectively. US sensitivity was heterogeneous (IQ 40,83%); specificities and CT sensitivity were not. US random effect estimates of positive and negative likelihood ratios (LR) were 4.9 (2.6,9.1) and 0.35 (0.22,0.57). CT estimates are 9.1 (4.5,18.3) and 0.10 (0.05,0.21). LR chi-square tests for heterogeneity are significant. When outliers are removed from CT estimates, the results are homogeneous. Outcomes of cost and time associated with testing are described. CONCLUSIONS Prevalence of appendicitis varies widely between studies, implying that referral patterns to diagnostic imaging vary. Quality of studies was variable. CT is homogeneous and accurate for both sensitivity and specificity; US shows significant heterogeneity for sensitivity. Further research is required regarding variable apparent disease prevalence, and to identify reasons for heterogeneity of US measurements. Standardized methods for quality assessment of studies of diagnostic tests require further development. Key words: appendicitis, diagnostic imaging, computed tomography

035 Practice Variation Among Pediatric Emergency Physicians in the Treatment of Bronchiolitis.

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INTRODUCTION: Bronchiolitis is the most common disease of the lower respiratory tract in the 1st year of life. Treatment is controversial; RCTs give conflicting views on the benefits of bronchodilators and steroids. The objectives of this study were to describe: (1) management of bronchiolitis in pediatric emergency departments (EDs) in Canada, (2)patient outcomes, (3)bronchiolitis symptoms, medical his-

tory, previous treatment. METHOD: A prospective consecutive cohort of children with bronchiolitis presenting to 7 Canadian pediatric EDs was enrolled during a 1-3 week period in 2002. Standardized interviews of parents provided data regarding symptoms, previous treatment, and past history. Charts were reviewed for treatment, investigations, and disposition. Telephone follow-up at 2-3 weeks collected information regarding length of symptoms and return visits. RESULTS: 238/261 eligible patients were enrolled. 191 had interview and chart reviews; 48 only chart reviews. Follow-up completed for 167. Median age 5 months and 59% were male. On ED presentation, 11% had been prescribed bronchodilators, 2% steroids, and 24% antibiotics. 74% (ED range 59-100%) were treated in the ED with bronchodilators (usually salbutamol or epinephrine) and 5% (0-14%) with oral steroids. 25% were discharged on bronchodilators and 2% on oral steroids. Chi-square tests indicated significant practice variation in ED bronchodilator use ($p<0.001$) and bronchodilator use at discharge ($p=0.001$). Admission rate was 31% (23-43%). Viral studies were obtained in 52%; 76% were RSV+. 17% revisited the ED and 1% were admitted after 1st visit. Median length of cough was 7 days, wheeze 5 days, and difficulty breathing 3 days. CONCLUSIONS: Our findings are consistent with the literature for bronchodilator use but much lower for steroid use. Bronchodilator use in the ED and at discharge varied significantly by site. Our results capture variation in treatment practices in Canadian EDs which may be the result of discordant RCT evidence. Key words: bronchiolitis

036 Dexamethasone for the Treatment of Sore Throat in Children with Suspected Infectious Mononucleosis: A Double Blind, Randomized, Placebo Controlled Clinical Trial.

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INTRODUCTION: Steroids are used to treat upper airway obstruction (UAO) caused by infectious mononucleosis (IM). The efficacy of steroids to relieve pain associated with IM-induced sore throat in the absence of UAO is not known. METHODS: We conducted a randomized, double-blind, placebo-controlled, pediatric emergency department-based, outpatient clinical trial. Patients aged 8 to 18 years with sore throat from clinically suspected IM were eligible. Patients were randomized to receive either an oral dose of 0.3 mg/kg (max 15 mg) of dexamethasone (D) or placebo (P). Patients completed a diary of symptoms and rated their pain on a visual analog scale (0 to 100 mm) at time 0h, 12h, 24h, 48h, 72h and on day 7. An improvement of 20 mm from baseline in the VAS was used as the primary endpoint. RESULTS: Twenty patients were recruited in each group; mean age was 13.5 +/- 2.8 years. There were no differences between the study groups (D vs P) with respect to the duration of sore throat prior to presentation (median 4.5 vs 4.0 days, $p=0.74$), initial intensity of the sore throat (71.3 +/- 21.0 vs 69.0 +/- 16.0 mm, $p=0.70$), proportion of patients with a confirmed diagnosis of IM (16/20 vs 17/20, $p=1.0$) and proportion of patients with streptococcus co-infection (13% vs 6%, $p=0.60$). In comparison with P, a significantly greater proportion of patients given D achieved pain relief within the first 12 hours (60% vs 26%, $p=0.03$). On further follow-up, the proportions achieving pain relief were similar among the groups: 55% vs 30% at 24h ($p=0.10$), 55% vs 55% at 48h ($p=1.0$), 75% vs 79% at 72h ($p=0.93$) and 95% vs 95% at day 7 ($p = 1.0$). There was no difference in the use of acetaminophen between the D and P groups (median 12.4 vs 35.6 mg/kg/day, $p=0.24$). CONCLUSION: The short-lived relief in pain of the acute exudative pharyngitis in children with suspected IM may suggest that a single oral dose of dexamethasone may not be sufficient and that additional doses may be necessary for insuring lasting relief. Key words: mononucleosis, corticosteroids

037 Parenteral Metoclopramide For Acute Migraine: A Systematic Review Of The Literature

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INTRODUCTION: In addition to its anti-emetic properties when used to treat acute migraine headache, metoclopramide also appears to reduce headache pain. This systematic review was designed to determine the effectiveness of parenteral metoclopramide for episodes of acute migraine. METHODS: Randomized controlled trials were identified using MEDLINE, EMBASE, other computerized databases, hand searching, bibliographies, and contacts with industry and authors. Studies in which metoclopramide (alone or in combination with other agents) was compared to placebo or any other standard migraine therapy were considered. Relevance, inclusion, and study quality were assessed independently by two reviewers. RESULTS: From 479 potentially relevant abstracts, 14 trials met the inclusion criteria. Metoclopramide alone was compared to placebo in 5 studies; metoclopramide was more effective for significant pain reduction (odds ratio(OR) = 0.40, 95% confidence interval (95% CI): 0.22, 0.72). Metoclopramide alone was compared to other therapies in 5 studies; significant heterogeneity was present as metoclopramide was more effective than some therapies and less effective than others in reducing pain. In 7 combination treatment studies, metoclopramide administered in conjunction with other therapies was shown to be more effective than therapies without metoclopramide over several different outcomes, including complete resolution of migraine (OR=0.15, 95% CI: 0.04, 0.53), significant pain reduction (OR=0.31, 95% CI: 0.06, 1.51), and relapse of migraine (OR=0.25, 95% CI: 0.07, 0.94). CONCLUSIONS: Current evidence supports the use of metoclopramide as an effective treatment for migraine headache, particularly in combination with other therapies. Given its non-narcotic and anti-emetic properties, metoclopramide should be considered as a first-line agent in the treatment of acute migraines in the Emergency Department. Key words: migraine, metoclopramide

038 A Cellulitis Guideline at a Community Hospital ED: a 12 Month Prospective Study.

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INTRODUCTION: Cellulitis is a common emergency department (ED) presentation, yet treatment remains unstandardized. The Nova Scotia Cellulitis Guidelines were piloted at a teaching hospital previously. We wanted to assess the safety and cost-effectiveness of the guideline in a community hospital setting. METHODS: A prospective study covering the period from November 2001-2002 was undertaken at the Dartmouth General Hospital. Physicians were asked to follow the guideline in the management of their cellulitis patients. Patients were contacted by telephone 5 days after their ED visit. Patients who did not report an improved condition at that point, were re-contacted at 10 days after presentation, in order to ascertain their outcome. Physician 'compliance' with the guideline was defined as following > 3/5 recommendations for antibiotic choice, dose, mode of administration, duration, and follow-up. RESULTS: Of the 272 patients, 147 (54.1%) were classified according to the guideline as Grade 1, 53 (19.5%) as Grade II, 33(12.1%) as Grade 3, and 6 (2.2%) as Grade IV. In 12.1% there was insufficient information on the patient chart to assign a Grade. 43.5% were treated in a manner that was considered 'compliant'. Of these 'compliance' cases, 83.3% reported an improved condition at 5 day follow-up, while 87.7% of the patients treated in a non-compliant manner reported an improved condition. At10 days, 98.8% of the 'compliance' patients and 94.7% of 'non-compliance' reported an improvement. 41 patients (20 and

21 in each group respectively) were lost to follow-up. Regarding antibiotic costs for Grades I-III, in 'compliance' patients average costs/patient were: Grade 1 $8.48, Grade II $16.65, Grade II $96.53. For 'non-compliance' patients the costs were $35.68, $51.28, and $150.18 respectively. CONCLUSIONS: Patients treated in accordance with the cellulitis algorithm had similar outcomes to those treated otherwise, at significantly lower cost. Further efforts to improve compliance are warranted. Key words: cellulitis, clinical practice guideline

039 Glucose-Insulin-Potassium for the Treatment of Acute Myocardial Infarction? A Systematic Review.

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OBJECTIVE: The concept of metabolic protection in acute myocardial infarction (AMI) is not new and the use of glucose, insulin and potassium (GIK) for the treatment of AMI has been proposed. This systematic review evaluated the randomized controlled trial evidence for GIK in AMI. METHODS: A comprehensive search for trials was conducted using MEDLINE, EMBASE, bibliographies and author contacts. Studies were included if they involved treatment of AMI with intravenous (IV) GIK. Two reviewers performed selection, methodological quality, and data extraction independently. Sensitivity, sub-group and overall analyses were performed; for dichotomous variables, odds ratio (OR) with 95% confidence intervals (CI) were calculated and for continuous variables, weighted mean difference or standardized mean difference and 95% CI were calculated. RESULTS: The search yielded over 300 original publications from which 22 trials (4787 patients) were included. Overall, GIK does not appear to reduce mortality compared to placebo. GIK was not superior in preventing death compared to placebo when analyzed with random effects model but does show statistical significance when a fixed effects model is used (OR 0.78; 95% CI: 0.66, 0.93). High dose GIK appeared to decrease mortality (OR 0.57; 95% CI: 0.32, 0.99). The rate of arrhythmia or re-infarction was not reduced using GIK compared to placebo. Patients underwent re-vascularization procedures at similar rates in both groups. The NNT for GIK in AMI is 25 patients to prevent 1 death or 1 arrhythmia and 83 patients to prevent 1 re-infarction. CONCLUSION: GIK failed to demonstrate a clear statistical benefit in AMI; however, a favorable trend does exist. There is no difference in the rate of arrhythmia or re-infraction and at high doses; GIK in the treatment of AMI may decrease mortality. Large-scale studies are warranted to determine if GIK has value in addition to current therapy. Key words: myocardial infarction

040 Parenteral Dihydroergotamine (DHE) For Acute Migraine: A Systematic Review of the Literature

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INTRODUCTION: Many therapies are used in the treatment of acute migraine headache with little agreement on which are most effective. This systematic review was designed to determine the effectiveness of parenteral DHE for episodes of acute migraine. METHODS: Randomized controlled trials were identified using MEDLINE, EMBASE, other computerized databases, hand searching, bibliographies, and contacts with industry and authors. Studies in which DHE (alone or in combination with an anti-emetic) was compared to placebo or any other standard migraine therapy were considered. Relevance, inclusion, and study quality were assessed independently by two reviewers. Studies were pooled using odds ratios (OR) or standardized mean differences (SMD) with 95% confidence intervals (CI). RESULTS: From 281 potentially relevant abstracts, 11 studies met the inclusion criteria. Solitary DHE use was compared to standard therapies in 3 studies; results failed to demonstrate a significant benefit of DHE over other therapies. In 8 combination treatment studies, DHE administered with an anti-emetic was more effective than other therapies in complete resolution of migraine (OR = 0.15; 95% CI: 0.04, 0.53), significant pain reduction (OR = 0.22; 95% CI: 0.03, 1.62), pain reduction on 10cm VAS scale (SMD = -0.30; 95% CI: -0.85, 0.25), improvement in functional ability (OR = 0.27; 95% CI: 0.13, 0.56), and relapse of migraine (OR = 0.46; 95% CI: 0.22, 0.97). There was significant heterogeneity among studies, likely due to the variation in comparison therapies used in trials. Overall, DHE was well tolerated and safe. CONCLUSIONS: This evidence suggests that DHE is not as effective as standard care as a single agent for treatment of acute migraine headache; however, when administered with an anti-emetic, DHE is more effective than comparison treatments. Given its low cost and non-narcotic properties, parenteral DHE should be considered as first-line therapy in clinical practice. Key words: migraine, dihydroergotamine

041 Emergency Department Gridlock and Pre-Hospital Delays for Cardiac Patients.

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OBJECTIVE: To determine the effect of simultaneous ambulance diversion at multiple emergency departments (gridlock) on transport delays for patients with chest pain. METHODS: Retrospective data on consecutive ambulance patients with chest pain and the diversion status of emergency departments in Toronto were obtained from January 1998 to December 1999. Gridlock was calculated separately for the four city quadrants as the daily duration of episodes where all EDs in the quadrant were simultaneously diverting ambulances. The primary outcome was 90th percentile ambulance Transport Interval (scene departure to hospital arrival). RESULTS: 11400 patients were included (mean age 67 years; female 51%; severity of illness moderate to life-threatening 89%). Ambulance diversion resulting in gridlock was associated with prehospital delays. Gridlock occurred an average 1.1 hour/day, and 3060 patients were transported on days when it occurred. 90th percentile Transport Interval was 15.5 min (95% CI 15.3-15.9) for patients not exposed to gridlock vs. 17.4 min (95% CI 16.8-17.8) for patients who were exposed to gridlock. In multivariate analyses, both Transport and Total Prehospital Interval delays were associated with ambulance diversion, but only when it resulted in gridlock (0.2 min/hour, 95% CI 0.1-0.4 and 0.2 min/hour, 95% CI 0.04-0.4 respectively). Delays were similar regardless of patient severity of illness ($p = 0.5$). Age (0.8 min/10 years, 95% CI 0.5-1), female sex (1.9 min, 95% CI 1.3-2.6), and advanced care paramedics (5.3 min, 95% CI 4.4-6.3). CONCLUSIONS: Ambulance diversion was associated with delays in prehospital ambulance transport for chest pain patients, but only when it resulted in gridlock. The magnitude of the delay was the same regardless of patient severity of illness. Key words: overcrowding, emergency medical services

042 Clinical Scaphoid Fracture: Over-Treatment of a Common Injury?

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INTRODUCTION: Clinical scaphoid fracture [CSF] (tender scaphoid and negative x-rays [XR]) is commonly managed with thumb spica cast and repeat imaging, despite little evidence for this approach. METHODS: Objectives: 1. Estimate the proportion of CSFs that are true fractures 2. Identify risk factors for 'poor outcome' of scaphoid fracture (AVN, non-union, malunion). 3. Identify

side-effects of treatment of CSF. A separate study was conducted for each objective. 1. Cohort study. 186 consecutive patients, diagnosed with CSF in the ED over 2 years were followed to establish the proportion of true fractures. 2. Case-control study. 27 cases of 'poor outcome' of scaphoid fracture were identified from operative records from 3 hospitals. 2 matched controls per case were chosen randomly from 285 consecutive patients diagnosed with clinical and true scaphoid fracture. Blind assessment of records for the following variables was conducted: age, gender, initial treatment, initial x-rays + or -, location of fracture, and imaging modality 3. A telephone survey of 50 randomly selected patients with CSF assessed satisfaction with and side effects of treatment, and disability. RESULTS: 1. 176/186 (94.6%) of patients initially diagnosed with CSF had repeat imaging (XR, bone scan, MRI or CT) 10-42 days after initial injury. 7/176 patients (3.9%) had a true scaphoid fracture (95% CI 2.1-5.7%). Over 3 years of follow-up, no patient with CSF had a 'poor outcome' (95% CI 0-1.7%). 2. Conditional logistic regression identified these risk factors for poor outcome: initial XR positive (odds ratio [OR] infinite), age > 60 years (OR 4.1, 95% CI 1.5-12.9), and initial treatment (non-operative) (OR 3.6, 95% CI 1.7-8.8). 3. 41/50 of CSF patients telephoned were casted. 3/50 had returned to the ED for a tight cast. 1/50 patients had true fracture. 465 days of work were missed in casted patients. CONCLUSIONS: This common injury is over-treated and there is significant morbidity associated with treatment. Key words: scaphoid fracture

043 Measuring Trauma Care Performance in Ontario Emergency Departments.

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INTRODUCTION: The care of traumatic injuries accounts for the greatest proportion of the overall caseload in emergency departments (EDs), yet existing measures of ED quality of care may not capture important aspects of trauma care. The purpose of our study was to develop and test a set of specific clinical quality indicators for ED trauma care that could be applied across a range of settings. METHODS/RESULTS: Using a previously validated modified Delphi panel process, an advisory panel was convened to select appropriate injuries and indicators for measuring trauma care in EDs. Based on a literature review and formalized expert consultations, a set of 7 important outcomes were chosen and panelists were asked to identify which of these outcomes were linked to quality of care for each of 15 injuries that are either common or where ED care may have significant impact on outcome. For 9 injuries (minor head trauma, moderate head trauma, ankle injury, neck injury, open fractures of upper limb, hip fractures, thoracic injury, spinal cord injury, multisystem trauma), the panelists identified at least one outcome linked to quality of ED care (e.g., neck injury -diagnostic tests, open limb fracture - morbidity, thoracic injury - mortality) for a total of 31 injury-outcome pairs. Next, 45 specific clinical indicators for 31 injury-outcome pairs were identified (e.g., time to operating room for hip fracture, antibiotics for open fractures). The panel highly ranked 33/45 specific indicators for the 9 injuries (e.g., CT scan rates in minor head injury, trauma leader response time for multisystem trauma, length of time on back board for neck injury). These indicators were subjected to feasibility and validity studies using an administrative dataset containing over 1.1 million trauma cases treated in 166 EDs in the province of Ontario over one year. CONCLUSIONS: The study shows that it is possible to systematically develop and apply clinical quality of care indicators to ED trauma cases. Key words: trauma, quality

044 The Bedside Investigation of Pulmonary Embolism Diagnosis (BIOPED) Study.

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INTRODUCTION: Bedside methods to exclude pulmonary embolism (PE) include the Wells Clinical Model, non-ELISA D-Dimers and alveolar dead space analysis. We sought to test whether using combinations of bedside tests was as safe as a standard strategy of diagnostic imaging. METHODS: This triple blind randomized controlled trial enrolled adults with suspected PE in a tertiary care hospital. Patients were randomized to initial bedside tests or initial V/Q scan without bedside tests. All patients had a Wells Clinical Model score, a non-ELISA D-Dimer and alveolar dead space analysis but these data were only used in management in the bedside test group. Patients assigned to the bedside test group had a sham V/Q performed if 2 of 3 of the bedside tests were negative; otherwise they had a real V/Q scan. Further diagnostic testing and management were dictated by a blinded physician. The primary outcome was recurrent Venous Thromboembolic (VTE) disease over 90 days in patients not anticoagulated. Chi-square and logistic regression analyses were performed. RESULTS: Of the 399 patients, 64.4% were ED cases, 65 were anticoagulated after the initial work-up, and the total VTE rate was 18%. Among the 334 patients not anticoagulated, the VTE rate was 2.4% (95% CI 0.6-6.1%) in the bedside test group vs. 3.0% (1.0-6.8%) in the V/Q scan group (P=0.76). 5.3% patients with 2/3 bedside tests negative had VTE vs. 24.1% with 2/3 bedside tests positive (p<0.0001). 9.9% patients with <4 points on Wells Model had VTE vs. 21.6% with >4 points (p=0.004). 6.2% patients with negative D-Dimer had VTE vs. 26.5% with positive D-dimer (p<0.0001). 12.4% patients with alveolar dead space fraction <0.15 had VTE vs. 32.1% with >0.15 (p<0.0001). LR analysis demonstrated all 3 bedside tests were independent predictors of VTE. CONCLUSIONS: Using a strategy that 2 out of 3 negative bedside tests excludes PE is as safe as an initial V/Q scan approach and eliminates the need for diagnostic imaging in 1/3 of suspected PE patients. Key words: pulmonary embolism

045 Streptococcal Pneumonia Culture and Resistance in Low Risk Patients with Pneumonia.

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INTRODUCTION: Limited information exists on the presence and resistance of Streptococcal pneumonia (SP) in patients with pneumonia discharged from the emergency department (ED). This ED study examined the utility of a standardized collection of sputum for patients with a physician-diagnosis of pneumonia. METHODS: Multicenter, prospective cohort study in Canadian and US EDs between 12/01-10/02. Using a standardized method for sputum sample collection, 22 EDs enrolled pts, age 18+, discharged with community acquired pneumonia (CAP). Patients with a pneumonia severity index (PSI) of >III were excluded. All patients were treated with clarithromycin for 7 days and followed for by telephone (2 wks) and in person (4 wks) to ascertain outcomes. Cultures were completed on "culturable sputum" and SP resistance to macrolides and penicillin was determined by local and central laboratories. RESULTS: A total of 270 patients have been enrolled in this interim analysis, 141 (52%) had sputum samples that qualified for culture and 59 (22%) grew an identifiable organism. Overall, 35 (13%) were positive for non-SP organisms, and 24 (9%) grew SP. No penicillin and 3 macrolide resistant organisms were identified in the SP+ cases; 4-wk cure rates were similar in all SP+ and SP- groups. CONCLUSIONS: Out-patient treatment of CAP is common in the ED, and empirical treatment is recommended with macrolides. SP resistance appeared

low and patients did well in this setting, although < 25% of sputum samples grew pathogens in PSI Class I-III patients. In these low risk PSI groups, sputum cultures should be reserved for surveillance purposes only. Key words: pneumonia, sputum culture

046 Prospective Assessment of the Accuracy and Reliability of the Eight Clinical Criteria in the Canadian C-Spine Rule.
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INTRODUCTION: We recently prospectively validated the accuracy, reliability, and acceptability of the Canadian C-Spine Rule (CCR) in a cohort of 8,283 patients. In this study, we sought to evaluate the accuracy and reliability, separately, of each of the 8 high-risk and low-risk clinical criteria within the CCR. METHODS: This prospective cohort study was conducted in 9 tertiary care EDs and involved alert (GCS 15) and stable adult trauma patients at risk for neck injury. Physicians performed standardized clinical assessments and completed data forms for patients who then underwent radiography to determine the outcome, clinically important c-spine injury. 130 patients were independently examined by a 2nd MD. Patients were followed by a 14-day telephone interview. We conducted chi-square, odds ratio, and kappa coefficient analyses. RESULTS: Among the 8,283 patients, the mean age was 37.6 (range 16-100), 52.3% were male, 67.2% were injured in a MVC, and 2.0% had clinically important cervical spine injury. This table shows % of injury and non-injury patients with findings, P-value, unadjusted odds ratio, and kappa coefficient:

Criteria	Injury, %	No injury, %	P value	O.R.	Kappa
High-Risk					
Dangerous mechanism	69.2	18.3	<.0001	10.0	–
Age 65 years	24.3	7.2	<.0001	4.2	–
Paresthesias	22.5	12.2	<.0001	2.1	0.81
Low-Risk					
Simple rear-end MVC	1.2	23.1	<.0001	0.03	0.97
Sitting position in ED	5.9	34.6	<.0001	0.12	0.70
Ambulatory at any time	40.8	62.2	<.0001	0.42	0.86
Delayed onset neck pain	18.6	38.2	<.0001	0.37	0.74
Absence midline tenderness	16.0	39.8	<.0001	0.29	0.52

CONCLUSIONS: The 3 high-risk and 5 low-risk CCR criteria showed very good interobserver agreement and very strong association with c-spine injury. The excellent accuracy and reliability of the CCR is based upon the strength of its clinical components. Key words: clinical prediction rule, diagnostic imaging, cervical spine injury

047 Establishing a Predictive Model for Physician Clinical Workload.
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INTRODUCTION: Emergency department (ED) physician staffing requirements should be based on clinical workload. Factors predicting physician time necessary to care for patients are poorly described. METHODS: Objectives: To develop and validate a multivariable linear regression (MLR) model to establish which clinical, demographic and setting variables have the strongest association with time needed to treat patients. A research assistant (RA) followed 20 emergency physicians (EP) for 31 day, evening and night shifts at a busy inner city ED. The RA recorded EP time spent performing clinical, teaching, departmental and communication functions for 585 consecutive patient visits. The RA also recorded candidate predictor variables: gender, age, mode of arrival, CTAS level (Canadian Triage and Acuity Scale), language, housing, vital signs, GCS, co-morbidity, prior visits, need for a procedure, and whether a resident or student was involved in care. Association between predictors and total EP time per patient (dependent variable) was assessed with MLR. The model was then validated on 234 subsequent patient visits. RESULTS: Assumptions underlying MLR were valid for these data. Colinearity between variables was minimal. The regression equation for total physician time per pt (TFT) was derived using a forward stepwise selection procedure (F-to-enter 0.05): TFT = 49.8 + 10.9(procedure required [Y/N]) – 4.0(CTAS level [1-5]) + 3.1(ambulance arrival) ‘ 2.3(GCS [3-15]) + 3.4(age > 70 years]) + 3.4 (female gender) + 2.5 (English not first language) + 1.5 (# of comorbid conditions) + .32(age x CTAS interaction). This model predicted 29.2% (R2 = .292) of the variance in physician time per patient (F [8, 331] = 17.4; P <.0001). The cross-validation R2 for the second sample (N = 241) was .239 (shrinkage R2 = .053).

PREDICTOR	SURV	NON-S	O.R.
Age in years	69	76	0.97
Male gender	46%	51%	0.77
Respiratory rate/min	28	31	0.97
Pulse rate/min	100	104	NS
Prehospital GCS <15	10%	28%	0.44
EMS life-threatening	13%	22%	0.77
CHF	28%	26%	1.7
COPD	22%	11%	2.5
Pneumonia	12%	21%	NS
Asthma	9%	0.1%	56.9
Bag ventilation	2%	5%	0.63
Intubation	0.4%	1%	NS
Nebulized Salbutamol	36%	28%	1.2
SL NTG	5%	4%	1.8
IV Furosemide	7%	8%	NS
IV Morphine	0.8%	0.9%	NS

CONCLUSIONS: This study describes a predictive MLR model for physician workload that has been validated in our institution. After validation in other settings, these data will help predict ED manpower needs. Key words: emergency workload

048 Predictors of Survival for Out-of-Hospital Respiratory Distress Patients in the OPALS Study.
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INTRODUCTION: We previously demonstrated that the addition of an ALS EMS program led to a large mortality reduction for respiratory distress patients. In this study, we sought to determine which specific factors are associated with better survival. METHODS: The Ontario Prehospital Advanced Life Support (OPALS) Study evaluates EMS programs for critically ill and injured patients. The respiratory component was a multicenter before-after controlled trial that enrolled adult patients with a primary complaint of shortness of breath. During the before phase, care was provided at the BLS-D level and during the after phase, ALS providers performed endotracheal intubation and administered IV drugs. We conducted stepwise logistic regression analyses to identify independent predictors of survival. RESULTS: The 7,478 patients enrolled during the two 6-month phases had these characteristics: mean age 70.6 (16-107), female 53.3%, survival rate 86.7%. This table compares survivors and non-survivors and gives the adjusted odds ratios for predictors associated with survival: CONCLUSIONS: We believe this to be the largest dataset of out-of-hospital respiratory distress patients. After adjustment for demographic, clinical, and EMS factors, the only interventions associated with better survival were salbutamol and NTG. Key words: emergency medical services, respiratory distress

049 Nonurgent Emergency Department (ED) visits: Patient Characteristics and Barriers to Primary Care

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OBJECTIVE: ED overcrowding is at the forefront of the medical and political agendas and diversion of nonurgent (NU) patients (pts) has been entertained as a management strategy. Prior to policy changes a clear understanding of the reasons why these pts are not seeking care at a primary care provider (PCP) before presenting to the ED is essential. This study compares NU pts to urgent and semi-urgent (USU) and describes the NU pt reasons for not seeking care at a PCP before presenting to the ED. Methods: Cross- sectional study with sequential sampling in 5 tertiary care hospitals EDs (Oct. 19 1999 to May 26 2000). Data on past medical history, social support, awareness and utilization of healthcare, ED visit, referral, Activities of Daily Living (ADL),socio-demographics, were obtained. The NU group were pts triaged as code 5 while USU were pts coded 2,3,4 using the Canadian Triage & Acuity Scale. Pts reasons for visiting the ED were structured into the Andersen Behavioral Model (ABM) for health care utilization. Only comparison producing P-value <0.05 are shown. RESULTS: Of 2348 pts approached 1804(76%) accepted to participate. NU (n=454) were younger than USU (n=1329) (mean age 43 vs. 49 years). NU pts had better health (number of prior conditions;(3.1 vs 2.87) and functioning (ADLs; 1.92 vs 1.87), were less likely to arrive by ambulance (4% vs 22 %), reported less specialist care (38% vs 48%)and were less often admitted from the ED (4% vs 24%). While 70%of NU pts compared to 75%USU pts were followed by a PCP, only 22% of NU pts and 27%USU pts sought PCP care before presenting to the ED. The reasons given by NU pts for not seeking PCP care were: accessibility (34%), referral/follow-up to the ED (19%), familiarity with (19%), perception of need (16%), and trust of the ED (10%). CONCLUSION: The reasons NU pts seek ED care before presenting to their PCP include practicality, perceptions of need, professional advice, and accessibility. Planning strategies for diversion of this group should consider and address such matters. Key words: overcrowding

050 Prospective Evaluation of the Classification Performance Accuracy of Neck Rotation and Flexion in Potential C-Spine Injury Patients

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INTRODUCTION: We recently validated The Canadian C-Spine Rule (CCR) for radiography in alert and stable trauma patients. The CCR calls for evaluation of active neck rotation if patients have none of 3 high-risk criteria and at least 1 of 5 low-risk criteria. This substudy prospectively evaluated the accuracy of rotation and flexion for ruling out c- spine injury. METHODS: This prospective cohort study was conducted in 9 tertiary care EDs and involved alert (GCS 15) and stable adult trauma patients at risk for neck injury. More than 350 physicians completed standardized examinations for active rotation and flexion and recorded their findings on data forms. Patients underwent radiography to determine the outcome, clinically important c-spine injury. Analyses included sensitivity, specificity, and descriptive statistics, with 95% CIs. RESULTS: 5,442 patients were enrolled over 30 months and had these characteristics: age range 16-100, male 50.6%, ambulance arrival 51.9%, important c-spine injury 0.6%, unimportant injury 0.2%, CCR low-risk 68.8%, medium-risk 4.0%, high-risk 27.2%. For patients capable of rotation or flexion, the accuracy and probability of injury, stratified by risk category, were:

TEST/RISK	SENS	SPEC	NPV	95% CI	PROB	95%CI
Rotation						
Low	.50	.80	1.0	1.0-1.0	.0003	.000-.002
Medium	1.0	.59	1.0	.97-1.0	.000	.000-.04
High	.59	.82	.99	.98-.98	.01	.004-.04
Total	.61	.84	1.0	.99-1.0	.003	.001-.006
Flexion						
Low	.50	.84	1.0	1.0-1.0	.000	.000-.002
Medium	1.0	.51	1.0	.97-1.0	.000	.000-.05
High	.78	.78	.99	.99-1.0	.006	.001-.06
Total	.77	.81	1.0	1.0-1.0	.002	.001-.004

CONCLUSIONS: Both rotation and flexion demonstrate 100% negative predictive value and can be considered accurate techniques for evaluating cervical spine injury in alert and stable patients. For patients classified as low-risk by the CCR and capable of neck rotation, the probability of injury is 0.03%. Key words: clinical prediction rule, diagnostic imaging, cervical spine injury

TOPIC: ADMINISTRATION/OTHER

051 Development and Application of an Abbreviated Tool to Estimate Length of Stay for the Emergency Department Clientele

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OBJECTIVE: To develop an abbreviated tool which will allow for the estimation of the length of stay (LOS) for the emergency clientele using intrinsic patient characteristics. METHOD: The project included several phases, beginning with the collection of data from about 3 000 patients recruited in 6 participating hospitals. A first series of in-depth statistical analysis on the data collected had identified 12 patient characteristics which influenced LOS. A second series of analysis was performed to estimate the pertinence of only keeping two of these variables, i.e. ? age ? and ? transportation ? (using ambulance or not), to predict LOS. Both variables are currently available in existing administrative database as opposed to the other characteristics previously identified. The LOS was modelled as a mixture of two

distinct distributions by evidence from a descriptive analysis and clinical appropriateness. Estimations of the maximum likelihood are obtained via the EM algorithm. RESULTS: Coefficients to estimate the LOS attributable to each combination of age categories (<25, 25-44, 45-64, 65-74, >or = 75) and transportation categories (using ambulance or not) vary from 4.276 to 11.911. These coefficients are used to obtain a predicted LOS according to the clientele's prevalence for each of the 10 combined categories. CONCLUSIONS: Using both age and means of transport, an estimation of the ED clientele LOS can be calculated. This estimate can be used to evaluate the burden that a clientele poses on the ED. Moreover, an internal performance index of the ED (IPI) can be calculated for different hospitals. Therefore, despite variations in clienteles between EDs, the IPI would allow for comparisons between and within EDs over time, facilitating the evaluation and understanding of the overcrowding phenomenon. Key words: overcrowding, length of stay

052 Impact of Ambulance Transportation on the use of Resources in the Emergency Department

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OBJECTIVE: Ambulance diversion is sometimes used to manage emergency department (ED) overcrowding. Our objective was to determine how ambulance transportation is associated with the use of various resources in the ED. METHODS: Retrospective administrative database review of visits to a Montréal tertiary care hospital ED over one year, from April 2000 through March 2001. Resource-use measures: consults and radiology/imaging tests (excluding plain-film X-rays) ordered from the ED, ED length of stay, and admission to the hospital from the ED. RESULTS: During the study interval, 39,674 patients made 59,142 visits to the ED. Of all visits, 15.6% were by ambulance. Ambulance visits were more likely than non-ambulance visits to be made by older patients (68 years old [95% CI: 67.7-68.6] vs. 47 [46.8-47.2]), by female patients (59% female vs. 55%) [odds ratio (OR): 1.18 (95% CI: 1.13-1.23)], to be triaged more urgently (2% non-urgent vs. 44%) [OR: 0.021 (0.0183-0.025)], and to occur during off-hours (47% between 5pm and 9am vs. 43%) [OR: 1.19 (1.14-1.25)]. Ambulance visits were more likely than non-ambulance visits to result in consults (56% with consults vs. 20%) [OR: 5.15 (4.92-5.40)] and imaging tests (20% with tests vs. 12%) [OR: 1.90 (1.79-2.01)], to have a longer length of stay [13.2 hours (13.0-13.5) vs. 5.9 (5.9-6.0)], and to result in hospital admission (40% admitted vs. 10%) [OR: 6.01 (5.71-6.32)]. In multivariate models that accounted for the effects of age, sex, home origin of visit, triage level and ED stretcher use, ambulance transportation had independent associations with greater use of consults, longer length of stay, and more hospital admissions, but was not independently associated with use of imaging tests. CONCLUSIONS: This preliminary study indicates that patients transported by ambulance generally use more resources in the ED. Key words: utilization

053 Documentation of Substance Abuse in a Canadian Tertiary Care Emergency Department Patient Population.

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INTRODUCTION: For many patients with substance related issues, the ED is the sole provider of medical care and an ED visit may present an opportunity for intervention. This needs assessment sought to determine the prevalence and characteristics of substance related medical problems in ED patients, as defined by documentation in the medical record. METHODS: Trained evaluators using explicit criteria reviewed sequential ED charts from 25/06/02 to 6/08/02 at a Canadian tertiary care teaching centre. Data was collected on demographics, documentation of problematic substance use and whether the ED visit was due to substance related issues. RESULTS: Of 6040 visits, 6026 charts (99.8%) representing 5229 patients were captured for review. 673 visits (11.2%: 95%CI 10.4%-12.0%) by 599 patients had documentation of problematic substance use and 521 visits (8.6%: 95%CI 7.9%-9.4%) by 469 patients were due to substance related medical problems. The mean age of patients with substance related visits was 38.4 years (standard deviation 37.4, median 36) compared with 48.6 years (standard deviation 20.5, median 45) for other visits ($p<0.0001$). The mean/SD/median duration of visits due to substance related problems was 323/324/232 minutes compared with 252/405/164 minutes for other visits ($p<0.0008$). During this 6 week period there was no significant difference in the proportion of revisits between patients with and without substance related medical issues (12.4% and 13.5% respectively, $p=0.43$). CONCLUSIONS: Substance abuse contributes significantly to tertiary ED visits and duration of ED stay. Our methodology likely underestimates the scope of the problem and with universal screening the prevalence would probably be found to be even higher. The magnitude of this problem supports the need for an interdisciplinary identification and intervention program for ED patients with substance related issues. Further research and efforts of this nature are being pursued at our institution. Key words: substance misuse

054 Wide Complex Tachcardia and Severe Hypotension Following Low Dose Propafenone: Response to Bicarbonate.

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INTRODUCTION: Propafenone is an orally available antidysrhythmic frequently used in the management of atrial fibrillation (Afib). We report a case of significant toxicity following the ingestion of only 450 mg of propafenone. Case Report: A healthy 73-year-old female presented with acute Afib. Her pulse was 120/min and BP was 118/80 mm Hg. Rate was controlled with diltiazem and propranolol. She received 1200 mg of procainamide IV but remained in Afib. She was then given 300 mg of propafenone PO and discharged with a prescription for propafenone and propranolol. On discharge, her pulse was 90/min and BP 125/82 mmHg. Six hours later she took 150 mg of propafenone as prescribed. Within 1 hour she became dyspneic and vomited. On arrival in hospital she was unconscious and in wide complex tachycardia with femoral pulses but no obtainable blood pressure. With defibrillation and lidocaine she converted to sinus rhythm with a QRS width of 158 msec. For the next 20 min she remained in sinus rhythm but had no obtainable BP despite receiving 3.6 mg of epinephrine and a dopamine infusion at 25 mg/kg/min. After 100 mEq of hypertonic sodium bicarbonate (HCO3-) her BP was 72/40 mmHg and QRS width narrowed to 136 msec, after another 100 mEq of HCO3- her BP was 94/40 mmHg and the QRS was 104 msec. A pill count revealed that one tablet of propafenone and no propranolol tablets had been taken. Troponin and CKMB remained normal, as were potassium, magnesium, and calcium. Procainamide and N – acetyl procainamide were not detected. The patient had an uneventful recovery. CONCLUSION: We report a case of severe cardiac toxicity with response to bicarbonate following 450 mg of propafenone. Key words: propafenone, toxicity

055 Are Injection Drug Users at Higher Risk of Adverse Outcomes During Procedural Sedation?

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INTRODUCTION: Because of tolerance to opioid and sedative medications, injection drug users (IDU) require different drugs and doses for procedural sedation, which may put them at higher risk of adverse events (AE). Our objective was to compare drugs used, dosing variability and AE rates in IDU vs. non-IDU patients undergoing procedural sedation. METHODS: This review of prospectively-gathered PS data was performed at St. Paul's Hospital, an inner city teaching centre that cares for most of Vancouver's IDU population. The primary outcome was the combined rate of hypoxia (O2 saturation <90%), hypotension (systolic BP <90 mmHg) and bradycardia (pulse <50) in the 2 groups. RESULTS: Between Jan.1997 and Sept. 2002, 843 patients were studied, including 516 non-IDU, 247 IDU, and 80 unknown status. IDU patients were more likely to be sedated for abscess drainage and non-IDUs for orthopedic reductions. The primary sedation regimen in non-IDUs vs. IDUs, respectively, was fentanyl/midazolam in 95% vs. 73%, ketamine in 2.5% vs 26%, and propofol in 2.5% vs. 1%. In non-IDUs vs. IDUs respectively, the mean midazolam dose was 3.4 vs. 4.7 mg; the mean fentanyl dose was 201 vs. 313 mg; the mean ketamine dose was 75 vs. 87 mg; and the mean propofol dose was 120 vs. 140 mg. No mortality or significant morbidity occurred in this series, and the primary composite endpoint (AE rate) was similar between groups.

Characteristics	Non-IDU	IDU	Adverse event	Non-IDU	IDU
Mean age	44.1	33.4	Hypotension	4.1%	8.5%
% male	56%	53%	Hypoxia	4.1%	2.4%
Systolic BP	135	120	Bradycardia	1.6%	1.6%
Pulse	82	84	Composite AE	9.7%	12.5%
Abscess	14%	75%			
Shoulder reduct'n	26%	12%			

CONCLUSION: IDUs require higher medication doses during procedural sedation, but are no more likely to suffer significant adverse events. Key words: procedural sedation, injection drug user

056 Length of Stay in the Emergency Department for Women with First Trimester Problems

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INTRODUCTION: Abdominal pain and bleeding in the first trimester of pregnancy are very common presenting complaints to the emergency department (ED). The first priority in evaluating these patients is to rule out ectopic pregnancy (EP). It has become clear that history and physical exam are not effective and therefore ultrasound scan (USS) is recommended. This observational study was performed in an ED without a dedicated ultrasound machine to document (1) the disposition patterns and (2) the length of stay (LOS) in the emergency department, for patients with first trimester problems requiring USS. METHODS: This retrospective chart review was performed in a tertiary care academic centre using a standardized data collection form. Computer searches of two separate databases identified women presenting with (a) a positive b-HCG or (b) a discharge diagnosis of a first trimester complication. Exclusion criteria included: previous ultrasound confirming intrauterine pregnancy (IUP), not first trimester, missing data and patients seen directly by gynecology. RESULTS: 158 charts were identified. 66 were excluded. 92 were therefore included in the analysis. Disposition: 31 (33.7%) patients had their ultrasound performed during the presenting visit, while 34 (37%) had a scan planned for another day. 24 (26.1%) had no mention of planned USS.LOS: Those who had their USS during the primary visit had an average LOS of 387 minutes while those sent home had LOSs of 142 minutes at the primary visit and 116 minutes when returning for results. Interrater agreement was very high. CONCLUSIONS: This review suggests that at our centre, almost one third of patients are being sent home without mention of follow-up USS. Furthermore, it demonstrates that LOS for women awaiting USS during their index visit is substantial. This suggests that if emergency physician-performed ultrasound were able to demonstrate an IUP as part of the physical exam, 63% of the ED time might be avoided in this common ED presentation. Key words: ectopic pregnancy, ultrasound

057 An Evaluation of the Effectiveness of Intravenous Ethanol in the Treatment of Ethylene Glycol and Methanol Poisonings

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INTRODUCTION: Management of methanol and ethylene glycol poisoning includes inhibition of alcohol dehydrogenase with either intravenous ethanol or fomepizole. There is a lack of contemporary data on intravenous ethanol to allow comparison of outcomes with fomepizole. OBJECTIVE: To evaluate the effectiveness of intravenous ethanol for the treatment of ethylene glycol and methanol poisonings. DESIGN AND SETTING: Retrospective chart review of patients with ethylene glycol or methanol poisoning treated with at least 6 hours of intravenous ethanol in a tertiary care hospital. PATIENTS: Patients had initial serum methanol or ethylene glycol concentrations of at least 3.1 mmol/L or 6.2 mmol/L respectively or laboratory findings consistent with poisoning. MAIN OUTCOMES: In-hospital mortality, incidence of renal dysfunction secondary to ethylene glycol, incidence of visual disturbances secondary to methanol, incidence of hypoglycemia secondary to intravenous ethanol, success in achieving target ethanol concentration of > 22 mmol/L. RESULTS: Twenty-seven patients met eligibility criteria and 25 of these patients survived. Twenty-six of 27 patients received concurrent hemodialysis. Renal dysfunction occurred in two of 11 patients with ethylene glycol poisoning, with only one requiring long-term dialysis upon hospital discharge. No incidence of visual disturbance could be attributed to methanol in patients admitted for methanol poisoning. There were no episodes of hypoglycemia in any patient during ethanol infusions. Forty-four percent of all ethanol levels were < 22 mmol/L during ethanol treatment. CONCLUSION: Intravenous ethanol, combined with hemodialysis, is effective and safe therapy for the management of patients with methanol and ethylene glycol poisoning. Clinical outcomes appear to be similar to those achieved with fomepizole despite inconsistency in achieving recommended ethanol serum levels. Key words: methanol, ethylene glycol, ethanol

058 Trends in the Use of Diagnostic Imaging for Acute Appendicitis

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INTRODUCTION: The accurate diagnosis of acute appendicitis remains a clinical challenge for emergency physicians and surgeons. Numerous published studies have reported the high diagnostic accuracy of ultrasound (US) and computed tomography (CT) for the diagnosis ofacute appendicitis. The routine use of CT for suspected appendicitis has been recommended to both decrease the negative laparotomy rate and reduce total cost. We sought to examinethe recent local experience with diagnostic imaging for appendicitis compared withhistorical controls. METHODS: For 1995 and 2001, adult cases of appendicitis managed at LHSC were identified from the surgical pathology database. 221 cases were identified; 206 were available

for review. A retrospective chart review using a structured data extraction tool wasconducted. The use of imaging modalities and clinically important outcomes such asnegative laparotomy rate, perforation rate, time to surgery and hospital length of stay(LOS) were analyzed. RESULTS: The baseline patient demographics were the same between the two study periods. In 2001 as compared to 1995, the use of plain radiographs dropped (18.6% vs. 34.9%, p<0.01), the use of ultrasound increased (45.7% vs. 31.8%, p<0.05), and the use of CT significantly increased (10% vs. 0.01%, p<0.01). There were no significant differences in the negative laparotomy rate (14.7% vs. 11.9%, p=0.29), perforation rate (18.6% vs. 19%, p=0.5), or time to surgery (10.3 hrs vs. 9.75 hrs., p=0.32). The LOS was significantlyreduced (77.5 hrs. vs. 102.7 hrs., p=0.005). CONCLUSIONS: This retrospective study at a single institution demonstrated increase use of US and CT for suspected appendicitis from 1995 to 2001. Despite the increased use of advanced imaging the negative laparotomy rate and perforation rate did not change. Further research is needed to identify the appropriate and cost-effective diagnostic role of US and CT for patients with suspected acute appendicitis. Key words: computed tomography, appendicitis

TOPIC: EMS

059 How are Pediatric Patients Managed by EMS and what are their Outcomes?

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INTRODUCTION: There has been little research describing the effectiveness of prehospital care and the outcomes of children managed by EMS. We evaluated the prehospital interventions and outcomes of pediatric cases within the Ontario Prehospital Advanced Life Support (OPALS) Study, which is a large multicenter initiative to evaluate the impact of EMS programs on 40,000 critically ill and injured patients. METHODS: We conducted a prospective cohort study in a single city with a 2-tiered BLS-D/ALS EMS system. Enrolled were all children <16 years managed by EMS over a 6-month period. Data were collected from ambulance reports, centralized dispatch data, ED records, and in-hospital records. We performed descriptive statistics with 95% CIs. RESULTS: The 1,368 study patients had these characteristics: Mean Age 8.0 (range 0-15); Male 57.5%; EMS Case Severity: life-threatening 2.4%, severe 14.3%, moderate 39.5%, minor 34.6%; EMS Return Priority urgent 8.1%; Primary Problem: minor trauma 44.7%, seizure 11.0%, respiratory distress 8.5%, overdose 4.4%, allergic 2.7%, psychiatric 2.7%, major trauma 1.0%, cardiac arrest 0.1%; Pick-Up Location: residence 52.0%, street 16.9%, public place 15.6%, school 9.6%. 28.0% of patients were not transported (parental transport 24%, monitoring at home 17%). BLS interventions were oxygen 19.6%, glucose measurement 16.8%, immobilization 12.0%, salbutamol 3.4%, SC epinephrine 0.7%. ALS interventions were cardiac monitor 21.0%, IV insertion 8.5% (mean volume 98.1 ml), IV diazepam 0.9%, IV morphine, 0.8%, intubation 0.1%. Disposition from ED was home 94.5%, ward 3.5%, ICU 0.9%, death 0.5%. CONCLUSIONS: This is the most comprehensive review of EMS pediatric management and reveals that most children are not severely ill, most do not receive ALS interventions, there is a high rate of non-transport, and the vast majority are discharged home from the ED. Future research should evaluate the effectiveness of ALS interventions and the efficiency of EMS care for children. Key words: emergency medical services, pediatrics

060 Use and Yield of Investigations for Alert Patients with Possible Subarachnoid Hemorrhage.

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INTRODUCTION: There is little evidence to guide investigation to rule out subarachnoid hemorrhage (SAH) in alert ED patients with acute headache. This study evaluated the current use and yield of computed tomography (CT) and lumbar puncture (LP) in ED patients with possible SAH. METHODS: This prospective cohort study was conducted at 3 university tertiary care EDs. Adult patients with normal neurological examination, GCS score of 15, and a complaint of a non-traumatic acute headache were enrolled over 2 years. Exclusion criteria included: history of recurrent headache of similar quality/intensity, referral with confirmed SAH, papilledema, previous SAH or known brain neoplasm. The outcome criterion was SAH on CT, xanthochromia in the CSF or the presence of red blood cells in the final tube of CSF with positive cerebral angiography. Analysis included descriptive statistics including 95% confidence intervals and ANOVA for length of stay. Positive cases were excluded in the length of stay calculations, so that the sickest patients did not bias testing. RESULTS: The 589 patients had the following characteristics: mean age 42.9 years, 60.6% female, 78.2% worst headache of life, 31.0% vomiting, 4.8% transient loss of consciousness, 80.5% CT, 44.7% LP (85.0% with either CT or LP) and 6.8% SAH. Only 8.4% CT and 0.8% LPs were positive for SAH. There were no missed cases with CT. All positive LPs had positive CT scans. 176 (42.1%) patients underwent a normal CT without subsequent LP. The mean length-of-stay for patients without SAH was as follows: 3.6 hours (2.9-4.2) without testing, 6.1 hours (5.8-6.4) with CT, 7.1 hours (6.7-7.5) with LP; (P<0.001). CONCLUSIONS: This study demonstrated that headache patients who underwent testing spent much more time in the ED. CT scans were often not followed by LP, which when performed, provided no additional information. CT and LP had very low yield suggesting the need for a clinical decision rule for the investigation of acute headache to rule out SAH. Key words: subarachnoid hemorrhage, clinical prediction rule

061 Quality of Life Outcomes for Respiratory Distress Patients Treated by EMS.

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INTRODUCTION: Little is known about the outcomes of respiratory distress patients treated by EMS. We followed a group of these patients to measure their health-related quality of life (HQRL). METHODS: The Ontario Prehospital Advanced Life Support (OPALS) Study is a large multicenter initiative to evaluate the impact and cost-effectiveness of EMS programs on 40,000 critically ill and injured patients. As part of the ongoing OPALS Study economic evaluation, we conducted a prospective cohort study and included consecutive adult respiratory distress patients treated in the BLS-D/ALS EMS system of one OPALS Study city over a 5-month period. Patients were interviewed every 3 months for up to one year after discharge by a study nurse using the Health Utilities Index Mark 3 (HUI3) HQRL tool. HUI3 consists of 8 attributes (vision, hearing, speech, mobility, dexterity, emotion, cognition, and pain), and is scored from 0 (equal to dead) to 1 (perfect health). Results were evaluated by using descriptive and regression analyses. Secondary analyses will compare these scores to those after cardiac arrest and correlated HUI3 scores with process measures. RESULTS: Of 169 eligible patients, 152 were interviewed at least once and had these characteristics: mean age 67.7 (SD 18.3), female 54.4%, EMS status severe or life threatening 42.6%, length of stay in days median 6.0 (IQR 2.5-10.5) and survival to discharge 85.7%. During the follow up period, 70 patients died (41% of eligible). HUI3 scores at 3, 6, 9

and 12 months post discharge were median (IQR): 0.47 (0.17-0.78); 0.51 (0.21-0.80); 0.41 (0.11-0.70); and 0.54 (0.26-0.81), P value for trend >0.05. CONCLUSIONS: This is the first longitudinal study of HRQL of patients with respiratory distress transported by EMS. HRQL is stable in this population but the scores are much lower than those for cardiac arrest patients (median 0.80). These data are critical inputs to analyses of whether ALS EMS care for respiratory distress patients is cost-effectiveness. Key words: respiratory distress, emergency medical services

062 A Novel Surveillance System to Measure the Burden and Acuity of Illness in the Community.

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INTRODUCTION: The Public Access Defibrillation Trial (PAD) trial is an international clinical trial of a community approach to victims of OOHCA. The primary objective of this study is to determine if a PAD Surveillance Net (PSN) can be established to reflect the complete burden of illness (cardiac and noncardiac) for local PAD units. The secondary objective is to evaluate the sensitivity (undertriage) and specificity (overtriage) of the PAD volunteer/911 Dispatcher Interface (PVDI) for determining the acuity of the emergency request. METHODS: Demographic data from the 51 community PAD units was collected and a 900 volunteer responder pool was maintained. The Emergency Medical Services (EMS) Records Management System (RMS) was modified to collect the types of calls to PAD sites: [I] 'Events' (any EMS call), [II] 'Episodes' (any unconsciousness or collapse; any CPR or AED attempted; and/or any death), and [III] OOHCA. Hospital outcome data was collected for both Episodes and OOHCA. RESULTS: From January 2002 to January 2003, a novel 'real-time' PSN platform has recorded over 1446 Events, with 240 subsequent Episodes, and 11 OOHCA. The types of dispatch calls and types of illnesses varied by individual site (2 casinos, 2 office towers, 4 recreation centres, 6 hotels, 6 malls, 6 senior complexes, 7 entertainment complexes, 9 grocery stores, and 11 pools). The sensitivity and specificity of the PVDI for Events, Episodes and OOHCA was determined to be 85.0% and 42.4% respectively. This trial is ongoing and will close in September 2003. CONCLUSION: For the first time a novel PSN has been created to accurately reflect the burden of illness in selected PAD sites. Analysis of the EMS data coupled with the site demographic data and outcome data will serve to facilitate the PAD site's risk management and emergency response specific to the burden of illness that they encounter. Key words: public access defibrillation

063 A Location-Specific Utility Measure to Guide the Distribution of Public Access Defibrillation (PAD) Programs within the Community.

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INTRODUCTION: There is little published data regarding the strategic placement of PAD programs. We identified a location-specific utility measure to guide the implementation of PAD. METHODS: This prospective cohort included all adult, out-of-hospital cardiac arrests occurring before EMS arrival in the multicenter, Ontario Prehospital Advanced Life Support (OPALS) Study. EMS response included firefighter defibrillation, BLS-D and ALS. The provincial property assessment roll identified the specific property type for each cardiac arrest address and the total number of sites, per location type, within the study boundary. Analyses included frequencies, incidence rates, and utility scores: i.e., the number of PAD programs needed to treat one witnessed VF/VT cardiac arrest (NPNT) during a 5-year period. We estimated the effect of PAD in those sites with the highest utility using a prior model that predicts 18% survival to hospital discharge for cases with a defibrillation response interval of ? 3 minutes. RESULTS: From 1995-2000, there were 7,707 cardiac arrests. Higher utility locations included (cardiac arrests, sites, incidence rate, NPNT): casinos (28, 2, 14, 0.1); non-acute hospitals (42, 42, 1, 5); shopping malls (77, 394, 0.2, 9); nursing/retirement homes (457, 460, 1, 10); hotels (65, 604, 0.1, 19); penal institutions (6, 21, 0.3, 21); golf courses (9, 156, 0.06, 26); recreation/community halls (165, 3206, 0.05, 27); air/rail/bus terminals (4, 83, 0.05, 42); restaurants/bars (48, 1410, 0.03, 47). The placement of 1502 PAD programs to treat the 669 cardiac arrests that occurred in the top 5 locations would have yielded an estimated 87 additional survivors during the study period. CONCLUSIONS: Strategic placement of PAD programs within those locations with only the highest utility may lead to clinically important survival benefits. Location-specific utility measures should be used to guide the initial placement of PAD programs and the redistribution of public AEDs already within the community. Key words: public access defibrillation, cardiac arrest

064 The Direction of Electronic Patient Care Reporting in Alberta Emergency Medical Systems.

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INTRODUCTION: Technology is playing a larger role in collection, manipulation, and storage of medical data. Software companies are currently offering a variety of products to assist in the prehospital patient care report (PCR). We surveyed Alberta prehospital services to determine the direction they are moving in implementing this technology. METHODS: Cross-sectional survey of Provincial Emergency Medical Services (EMS) in September 2002 by e-mail. The main outcomes were the plans to use electronic patient care report (e-PCR) software. RESULTS: Of the 12 services contacted 9 (75%) responded to the first e-mail survey and 3 (25%) responded to a reminder e-mail for a total of 100% response. All services stated they had done some type of investigation into e-PCR software and 5 (42%) state they had participated in some form of trial using e-PCR software. 4 (33%) indicate they have bought or developed an e-PCR solution, of these only 1 (8%) is fully implemented. 11 (92%) indicate they have or are planning to implement an e-PCR solution within the next 3 years. All services reported currently using a variety of technologies that may impact or be impacted by the use of e-PCR technology (Table I). 8 (67%) reported having money budgeted for e-PCR software. The top 3 critical success factors identified by respondents were user friendliness, scalability/ customization, and ability to interface with existing software.

Technology	% Reporting Usage
Computer aided dispatch	92
Electronic database	75
Billing software	67
Wireless data transmission	42

CONCLUSION: Most prehospital services have identified e-PCR as a technology that they will implement within the next 3 years. There is a wide variety of steps being taken by prehospital services to move toward the implementation of e-PCRs. Key words: emergency medical services, information systems

065 Alberta PCR: Alberta Prehospital Consortium on Research.
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INTRODUCTION: Research in the prehospital environment has been in evolution and continues to grow with large scale clinical trials. Many of these studies occur in isolation and occur with non-emergency groups who want to conduct research in the prehospital domain. Objective: Phase I: To inventory and establish a communication network amongst the provincial EMS systems. Phase II: To determine the need and feasibility of a prehospital research platform and consortium amongst emergency medical services within Alberta. METHODS: Phase I: An inventory of EMS services was completed using Health databases for the 17 Albertan Health Districts. Phase II: A cross-sectional survey was sent to 18 of the larger EMS agencies. RESULTS: Phase I: Amongst 17 Albertan Health Districts and a population of 2,302,389, ninety-five hospitals are currently serviced by 47 Advanced Life Support services (240 ambulances) and 59 Basic Life Support services (156 ambulances). Phase II: 93% (13/14) stated that research is feasible and 93% (13/14) that research important in the prehospital setting. The top three barriers to EMS research were listed as funding (13/14), EMS operational issues (6/14) and physician barriers (5/14). 86% (12/14) felt that prehospital research would provide novel results, and 100% (14/14) ranked the body of evidence for prehospital care as "Fair or poor evidence to support". 64% (9/14) stated that paramedics are able to obtain informed consent in the prehospital setting. 50% (7/14) felt that a "waiver of informed consent" (WOIC) is appropriate in the prehospital setting, but only 36% (5/14) had an infrastructure in place to deal with WOIC. There was broad interest in the types of studies and patients for potential prehospital research. CONCLUSION: An Alberta PCR is feasible with substantive interest in the implementation and maintenance of such an infrastructure. Key words: emergency medical services, research

066 EAR: Edmonton Airway Registry.
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INTRODUCTION: Despite previous research, the determinants of airway intubation success remain elusive and are affected by a number of interactions and confounders. A statistical construct termed a 'causal pathway' was created in this study to allow multivariate analyses of predictor variables on airway success. This causal pathway is as follows:

Medic —> Environment —> Patient —> Airway —> Medications ===> Airway Success

We propose that the individual predictors in each domain incrementally affect the next domain, ultimately affecting the outcome measure of airway intubation success. The objective of this study is to evaluate the determinants of intubation success or failure using a novel causal pathway model. METHODS: Prospective observational cohort for invasive airway management in an Emergency Medical Service (EMS) using an intubation registry completed concurrent to patient prehospital care. There are no 'Rapid Sequence Protocols' utilized in this EMS service staffed by 300 EMS personnel and 24 ambulances. RESULTS: The EAR encompasses comprehensive evaluation of invasive airway management between November 2001 and December 2002 and is ongoing. In total there were 589 cases requiring invasive airway management with 83% (488/589) being intubated with a median number of attempts of 1 (Range 1 to 4). Of the remaining 101 cases: 50 had insertion of a combitube; 17 failed combitube and required simple Bag-Valve-Mask (BVM) maneuvers till Emergency Department (ED) arrival; and 34 had BVM until ED arrival. No surgical airways performed in this cohort. Multivariate analysis with the causal pathway model is currently under data interrogation. CONCLUSION: Our endotracheal intubation (ETI) success rate of 83%, and a combitube success rate of 75% for those failing ETI. Further multivariate modeling using a causal pathway paradigm will serve to determine the key predictors for the airway success. Key words: airway management

067 Use of a Combitube in the Prehospital setting.
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BACKGROUND: Although endotracheal intubation is the definitive technique for airway management, many alternative airway devices have been developed for use in difficult airway situations and in Emergency Medical Services (EMS) systems whose policies restrict endotracheal intubation. The Combitube is an esophageal tracheal double lumen tube designed for emergency intubation and has recently been introduced to Edmonton_s EMS system. This study proposes to evaluate the insertion success and complication rate after the implementation of this new airway device. METHODS: The Combitube was placed on all ambulances in November 2001 after didactic and hands-on training was provided to EMT-As and EMT-Ps. The Combitube was to be inserted when three attempts at intubation have been unsuccessful. EMS crews recorded study results on a Patient Care Report (PCR) form and an intubation log form. A consecutive sampling of all intubations and combitube insertions was completed for success rates and frequency of complications on all patients requiring intubation in the field. A chart review of the inpatient records was completed to look for complications from Combitube use. RESULTS: Between Nov.10, 2001 and Jan.20, 2002 the Combitube was attempted as an airway device in 19 patients with a success rate of 89% (17/19). In 53% (10/19) cases the EMS crews described difficulty in inserting the combitube, and 37% (7/19) required multiple attempts at insertion. In 11% (2/19) of cases there were clinical and radiographic diagnoses of pneumomediastinum. 48 additional cases are currently under evaluation under the Edmonton Airway Registry. CONCLUSIONS: In the first year after the education and implementation of a new airway device, for patients who failed intubation a combitube insertion success rate of 89% was seen with a 11% reported complication rate. Potential interactions and confounders by patient and prehospital variables is currently under interrogation under a cumulative series of 67 cases in total. Key words: airway management, emergency medical services

TOPIC: RESPIRATORY/PEDIATRICS

068 Changing Patterns of Pneumonia Presentations to Emergency Departments in Alberta.
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INTRODUCTION: This study examines emergency department (ED) presentations of pneumonia with regards to epidemiology, disposition and trends over time. METHODS: All patients presenting to Alberta EDs were eligible for inclusion. Data were derived from a sample of ED patients treated in 17 health regions over 1 year (2000/01) with a diagnostic code of pneumonia, both bacterial (481, 482.x, 483.x, 484.x, 485, 486) and viral (480, 487). Data were extracted from the Ambulatory Care Classification System (ACCS)

database, consisting of computerized abstracts coded similarly across regions. Diagnostic categories were coded by medical record nosologists using ICD-9 codes for the primary discharge diagnosis. Descriptive statistics, crude and adjusted rates and trends over time are reported. RESULTS: Overall, 1.7 million ED visits were recorded in the fiscal year of 2000/2001 and of these, 26,975 visits were made by 15,707 people for pneumonia (crude ED visit rate: 15.9/1000 visits). Males and female proportions and rates were similar in all age groups, except over the age of 75 years where men experienced higher rates. There was a bimodal distribution in age, with peaks at 1-4 years and >75 years. There was significant seasonal variation, with 33% of pneumonia visits occurring during the months of December (16.6%) and January (16.4%). Most visits resulted in discharge home (74.4%), but 25% (6788) of visits resulted in admission to hospital, compared to a 9% admission rate for all ED visits. Current age and gender-adjusted rates (9.84/1000) are lower than 1998/99 (11.1/1000) and admissions have decreased (36% vs. 25%) over the same period. CONCLUSIONS: Pneumonia is a common presentation to the ED, however, changes in ED epidemiology are being observed. Moreover, decreased admissions suggest changes in diagnostic and treatment approaches in this setting. Reasons for these changing patterns warrant further investigation. Key words: pneumonia, pediatrics

069 Anti-inflammatory Treatment of Asthma in Canadian Emergency Departments.

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INTRODUCTION: Current patterns of emergency department (ED) treatment for airway inflammation are unknown; this study examines ED management of asthma using anti-inflammatories. METHODS: Multicenter, web-based survey was completed by ED physicians affiliated with a national research network between 07/02-10/02; contact was made by the local network representative. Data collection focused on MD respondent approach to three cases of acute asthma using inhaled (ICS) and systemic corticosteroids (SCS). E-mail contact was made by each site leader and two reminders were sent to staff to access a secure website. RESULTS: A total of 242 (52%) physicians from 19 community and academic EDs in 6 provinces completed the survey. Respondents were more commonly male (75%), less commonly fellowship trained (36%), and often had < 10 years of clinical experience (58%). In severe acute asthma, most MDs would use SCS (95%) via the oral route (66%), and less would use ICS (32%); few would use IV MgSO4 (13%). In discharged patients, MD less commonly would prescribe SCS for episodic asthma than chronic asthma (76% vs 88%; p = 0.0004). Almost all would prescribe corticosteroids as a fixed dose (74%) of prednisone (96%; 50mg/day) for 7 days or less (93%). Physicians reported they would commonly add ICS after discharge for acute asthma (87%) if patients were not on ICS at the time of their exacerbation. Physicians were unclear if they should maintain (59%), increase (37%), or stop (4%) agents in patients already on ICS. CONCLUSIONS: Overall, there is practice variation among ED physicians in Canada with respect to the in-ED and post-ED treatment of acute asthma, which appears more pronounced with ICS than with SCS. Further primary research is required to determine the most effective treatment to prevent admission and reduce relapses using ICS agents and also the most effective method to disseminate results to busy clinicians. Key words: asthma, corticosteroids

070 Multicenter Study of Emergency Department Visits for Pneumonia.

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INTRODUCTION: Current patterns of emergency department (ED) diagnosis and treatment for pneumonia are unknown. The objectives of this study were to define the epidemiology of ED visits for pneumonia, including pneumonia type, antibiotic selection, and ED disposition. METHODS: Multicenter, retrospective chart review over a consecutive 4-week period between 12/01-04/02. Using standardized protocols, 23 EDs abstracted data for patients, age 18+, with a physician-diagnosis of pneumonia. Data collection focused on patient characteristics, diagnostic testing, and treatment. Pneumonia severity index (PSI) was calculated for patients where data were complete. Proportions are presented with 95% confidence intervals (CI). RESULTS: A total of 1,268 charts were reviewed. Patients had a mean age of 62 years; 51% were female (95% CI: 49-54%); and 57% were white, 20% black, 6% Hispanic, and 17% other race/ethnicity. Community acquired pneumonia (75%) was more common than institutional (11%) and aspiration (2%) pneumonia; 12% of pneumonia cases were unclassified. Admissions were common (61%), even for low PSI scores (Table). Overall, median length-of-stay was 5.3 hours in the ED and 10 days for those hospitalized. Three in four (74%) patients received antibiotics during their ED stay. Although antibiotic selection varied by PSI group, many ED patients were given a quinolone.

			In ED			
PSI	n (%)	Admitted n (% of row)	Overall (% of row)	-ceph	Macro-lide	Quin-olone
I	92 (9)	11 (12)	50 (54)	8 (9)	25 (27)	9 (21)
II	268 (25)	172 (64)	206 (77)	66 (24)	66 (24)	94 (35)
III	222 (21)	161 (73)	172 (77)	47 (21)	37 (17)	96 (43)
IV	323 (30)	267 (83)	266 (82)	92 (28)	72 (22)	129 (40)
V	156 (15)	133 (85)	133 (85)	41 (26)	13 (8)	83 (53)

CONCLUSIONS: ED patients with pneumonia are a heterogeneous population. Antibiotic selection and ED disposition vary by PSI score, and appear suboptimal. Key words: pneumonia

071 Variation in Management of Acute Allergic Reactions.

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INTRODUCTION: There is little high-quality evidence to guide the emergency department (ED) management of acute allergic reactions. This study determined the variation in therapies administered to patients with acute allergic reactions. METHODS: A formal health records review was performed for the period January 1, 1997 to December 31, 2000 in a university tertiary referral center. Inclusion criteria included patients of any age who presented to the ED with a diagnosis of an allergic reaction of less than 4 hours duration. A single reviewer identified cases using discharge diagnoses of allergic reaction, anaphylaxis, and angioedema and abstracted data into a standardized electronic database. Patients were then categorized according to a modified Ring classification: Grade I: dermatological manifestations only; Grade II: dermatological and/or gastrointestinal, and respiratory involvement; Grade III: any of Group I and/or II and hypotensive; Descriptive and chi-square statistics were used. RESULTS: 139 patients met the inclusion criteria with a mean age of 40 (Range 4-100). 35% were male. 11% were categorized to Group I, 83% to group II and, 6% to group III. Patients were kept in hospital for less than 4 hours 83%, 60% and 66% of the time for Grade I,

II, and III patients, respectively. Epinephrine was given to 40%, 59%, and 88% of Grade I, II, and III patients, respectively (p=0.09). H1-blockers were given to 53%, 95%, and 100% of Grade I, II, and III patients, respectively (p<0.01). Salbutamol was given to 0%, 12%, 38% of Grade I, II, and III patients (p<0.05). Fluid bolus was given to 0%, 5%, 50% of Grade I, II, and III patients, respectively (p<0.01). Steroids were given to 20%, 42%, and 38% of Grade I, II, and III patients. CONCLUSIONS: Although epinephrine is recommended as a first-line treatment it was used much less than H1-Blockers in Grade II and III patients. Further research needs to be conducted to determine which patients would benefit from epinephrine and other therapies. Key words: allergic reaction

072 Peritonsillar Abscess in the Paediatric Population.
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INTRODUCTION: Peritonsillar abscess (PTA) in the paediatric population has not been well described. Outpatient therapy and steroid use have become increasingly popular despite lack of evidence to support these practices. Objectives: 1) To determine the incidence of PTA in children 2) To conduct an analysis to examine factors associated with i) corticosteroid use and ii) outpatient management of PTA. METHODS: We conducted a retrospective chart review of patients <18 years who resided in the Calgary Health Region (CHR) who were diagnosed with PTA in the CHR between Mar/94–Dec/02. RESULTS: We identified 220 children who presented with 240 episodes of PTA. The incidence for PTA among children in the CHR was 13 per 100,000 person-years. The incidence was highest among adolescents (40 per 100,000 person-years). The incidence was stable over time. Medical management was received by 62% and surgical intervention by 38% (8% needle aspiration, 28% incision and drainage, 2% quincy tonsillectomy). IV antibiotics were given to 85% at presentation and 68% were discharged home at the time of diagnosis. Among those initially discharged, 7% failed outpatient therapy. All of these patients had received IV antibiotics, 6 developed progressive uvular deviation and 3 developed dehydration. Factors associated with initial inpatient management included uvular deviation (OR 2.74), decreased oral intake (OR 2.51), dehydration (OR 1.86), white count > 15 x 10 9 /L (OR 5.54), and IV antibiotics (OR 3.32). Steroid therapy was received by 36%. Factors associated with the use of steroids included IV antibiotics (OR 2.54) and dehydration (OR 1.46). CONCLUSIONS: PTA is primarily a problem of adolescence. Outpatient management was successful for two thirds of patients. Among those admitted, there were several important clinical features including uvular deviation and decreased oral intake. Corticosteroid use was common although no clear patterns of usage emerged. Further research on the role of steroids is necessary. Key words: peritonsillar abscess

073 Playground Safety: Attitudes and Practices of Parents and Guardians.
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INTRODUCTION: In 1998 the Canadian Standards Association (CSA) implemented new construction standards for playgrounds. Despite the improvements children continue to sustain injury. How parental attitudes about playground risk contribute to childhood injury is unknown. We sought to assess parents / guardians (PG) supervision, attitudes, and knowledge regarding playground safety. METHODS: PG were observed by the research assistant (RA) in municipal playgrounds in London, Ontario, Canada for 5 minutes recording: the number of children supervised, the distances to each child, and PG behaviors. After disclosure and consent the RA surveyed the PG assessing knowledge of playground injuries and need for medical treatment, supervising practices, and attitudes regarding playground safety. Data was analyzed using SPSS 6.1. RESULTS: Fifty PG (92% female, 8% male) agreed to participate. 42% of the PG were observed interacting with other adults and 16% of PG ignored their children. PG were noted to interact (44%) or play (32%) with their children. On average 2.6 (+/- 0.9 SD) children were supervised per adult. The average distance to the nearest and farthest child was 8.2 +/- 12 m and 19.3 +/- 15 m, respectively. PG implicated climbers (67%), swings (15.6%) and slides (17.8%) as causes of injury. PG reported that children using the playground were supervised 96.6 +/- 7.5% of the time. PG felt that children should be supervised until 10.7 +/- 1.7 years of age. Using a 10 point agreement scale PG attitudes about playground safety were: "Playgrounds are safe" (7.0 +/- 2.1)> "Playgrounds could be made safer" (7.7 +/- 2.2), "Playgrounds are safer than in the past" (8.2 +/- 2.6), "Falls are the most common cause of injury" (8.8 +/- 1.5). CONCLUSIONS: PG feel that Canadian playgrounds are safe, and safer than in the past. PG thought they supervise their children most of the time but spend less than 50% of the time involved with them. Despite PG knowledge about the risk, they did not modify their behavior. Key words: injury prevention

074 Factors Influencing Parental Decision in Seeking Emergency Services for Non Urgent Visits.
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INTRODUCTION: To determine which factors are involved in parental decision making when seeking care for unscheduled visits that are judged non urgent by triage in a paediatric emergency department (PED) and parental perception of the severity of their child's illness. METHODS: Pre-tested questionnaire during 3 consecutive weeks in March 2002 in a PED. If assigned a non urgent triage level (Paediatric CTAS), parents were asked to participate; a researcher then either completed a standardized questionnaire or helped the parents do it when consent was obtained. RESULTS: A total of 135 of the 160 (84%) eligible families participated; A total of 49 (36%) phoned a medical information line before and 17 of those were told to consult. The mean age of the patient was 5.6 years +/- 4.0. The mean number of any medical visits in the past 6 months was 4.5 +/- 6.2 SD. 70% had a primary care physicians (79% a paediatrician and 20% a family physician). However, only 16% mentioned that their primary care physician was the usual source for unscheduled visits; they consulted instead the PED (42%), community clinics (29%), or other hospital ED (4%). The most common reasons for PED visits were: PED are specialized in children care (41%), previous good PED experience (11%), and nearby location (6%). 61% said that if a paediatrician could see their child, they would use other hospital EDs or community clinics. Waiting time was not a determinant in their decision. 78% felt that their child's illness was urgent and 49% were afraid of complications if not seen right away. CONCLUSION: A large number of parents feel that their child's illness is serious even if classified as non urgent by the triage protocol. Neither the location nor the waiting time seemed to be important in their decision. The notion of a paediatrician seen as the child's specialist seems extremely important for parents. These issues must be addressed before a reduction in the number of non urgent visits in our overcrowded PED can be realized. Key words: utilization

075 Aerosolized Magnesium Sulfate in the Treatment of Acute Asthma.
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OBJECTIVE: Acute asthma is a common emergency department (ED) presentation which is initially treated with cortico steroids and inhaled agents (beta-agonist and anticholinergics). The objective of this review was to determine the effect(s) of inhaled magnesium sulfate (MgSO4) in acute asthma. METHODS: A comprehensive search for trials was conducted using the "Asthma and Wheez* RCT" register, a comprehensive search of EMBASE, MEDLINE, and CINAHL maintained by the Cochrane Airways Group. In addition, hand searching of the top 20 respiratory care journals was completed. Studies were included if patients with acute asthma were randomized to receive inhaled MgSO4 versus beta-agonists or control. Two reviewers performed selection, methodological quality, and data extraction independently. For dichotomous variables, relative risk (RR) with 95% confidence intervals (CI) were calculated; for continuous variables weighted (WMD) and standardized mean differences (SMD) with 95% CI were calculated. RESULTS: More than 200 articles were reviewed and from 31 potentially relevant citations, 5 papers met the inclusion criteria. These trials were produced in the past 10 years and represent moderate methodological quality. Overall, inhaled MgSO4 reduced admission to hospital (RR = 0.61; 95% CI: 0.38 to0.98). Changes in peak expiratory flow rate (PEFR) measures over the short term (< 2 hours) demonstrate a non-significant trend in favor of inhaled magnesium (%PEFR WMD: –7.77; 95% CI: -27.5 to 11.94; SMD = -0.13; 95% CI: -0.66 to 0.4) effect favoring inhaled magnesium. This agent is well tolerated, easy to administer and free of serious adverse events. CONCLUSIONS: Inhaled MgSO4 appears to be an efficacious agent for the treatment of acute asthma in the ED. Despite its minimal short-term benefit on airway caliber, compared to control use results in a fewer admissions. Given its ease of administration and low cost, further research into the use of this agent seems warranted. Key words: asthma, magnesium

TOPIC: INFECTIOUS DISEASE/INFORMATICS/ METHODOLOGY

076 Emergency Department Presentations of Cerebral Malaria.
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INTRODUCTION: Malaria continues to be a major problem in tropical countries. Cerebral malaria, a diffuse encephalopathy caused by Plasmodium falciparum is characterized by fever, altered state of consciousness, and a convulsion. METHODS: This study was a prospective review of all patients with presumed Cerebral Malaria for one year to the Emergency Department (ED). All patients fulfilling inclusion criteria were enrolled and were entered on specially designed proforma. Their peripheral smear was studied based on which the diagnosis was classified as definite cerebral malaria and probable cerebral malaria. All patients were treated by intravenous quinine and specific syndromes were managed according to standard guidelines. RESULTS: The review revealed 107 cases over 1-year period. There were 82 males and 35 females. Average age was 34.2 years (range 6 - 70 years). The average duration of symptoms was 1.0 days (range 0 - 12 days) before presentation to the ED. All patients presented with fever and CNS involvement, 72% had convulsion, 12 developed coma, anemia was seen in 60%, but only 25% required blood transfusion. Initial ED WBC counts was normal in 64 patients, elevated in 14, and low in 29 patients. 66 out of 107 patients with jaundice had indirect hyperbilirubinemia and elevated liver enzymes suggesting hemolysis and the hepatocellular damage while thrombocytopenia was found in 76 patients. Smear was positive in 90% of patients, while others responded to quinine infusion given empirically. Complications like respiratory failure, renal dysfunction, hypoglycemia, bleeding diathesis, and severe anemia developed, and three patients died. The important observations of this study were stormy presentation, increased incidence of haemoglobinuria and jaundice, and the presence of neck rigidity. CONCLUSIONS: Presumed Cerebral Malaria is an entity which should be kept in mind when treating fever without definite focus in tropical countries, because timely and specific therapy is lifesaving. Key words: malaria

077 Is Individual Emergency Physician Efficiency a Significant Determinant of ED Overcrowding?
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INTRODUCTION: Overcrowding in emergency departments (ED) has become widespread worldwide. ED overcrowding has been found to correlate with increased patient mortality rates and increased patient dissatisfaction. Patients frequently perceive that delays to treatment are due to poor ED management rather than problems in the health care system, and emergency physicians often believe that the problem is out of their sphere of influence because it stems from extra-ED issues. As yet, the sensitive topic of contribution of individual physician emergency physician (EP) efficiency to ED overcrowding has been neglected in the literature. METHODS: We collected data on the number of patients seen per hour (Pt/Hr) by each physician (n=22) and average times from triage to EP, nurse to EP and EP to discharge, from July 1, 2001 to June 30, 2002, at the ED of the QEII Health Sciences Centre in Halifax, Nova Scotia, a 975 bed hospital with 72,000 adults ED visits annually. RESULTS: The variation between physicians in Pt/Hr was found to be considerable, (average 3.0/hr, range 2.3 - 4.8), and variation was consistent when times were compared for 'fast-track' and 'acute' patient areas, with 'faster' physicians seeing over double the number of patients than 'slower'. There were trends to shorter times in each time category with increased Pt/Hr. CONCLUSION: Significant variations exist among emergency physicians with regard to the Pt/Hr. Rapid transit of patients through the ED should not be achieved at the cost of good, appropriate patient care, and an ideal standard should be developed for training and quality management purposes. Wait times correspond weakly with Pt/Hr, and should not be used in isolation to evaluate emergency physician efficiency. Key words: overcrowding, quality

078 Clinical Practice Guideline Utilization by Emergency Medicine Staff with Varying Access.
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OBJECTIVES: Access to clinical practice guideline (CPG) information in emergency medicine (EM) has the potential to improve practice efficiency and patient care. This study examines the perceptions of EM staff using a computer-based system focussed on CPG applications. METHODS: A desktop computerized tracking system was accessible to all staff of two linked EDs. This was supplemented with EM-specific desktop CPG materials including decision tools, order sets, full care maps, and discharge instructions using an intranet website (eCPG); access was provided to 38 full-time EM staff at two major teaching hospitals. Staff completed a questionnaire after 12-18 months of eCPG access. Users were classified as control (CON; Peds EM = 12), regular adult users (REG; n = 16) and expert users (EXP; n =10) who were exposed to a supplemental laptop research study. Analyses were completed using ANOVA. RESULTS: Groups were similar in age, years of practice, home use of computers and access to the internet; more female physicians practiced in the CON group (p = 0.01). REG and EXP users rated the eCPG decision tools and order sets as equally easy to find and useful (p > 0.05). Compared to CON and REG users, EXP users prefer the order sets and decision tools more than patient information sheets (p =

0.004). EXP users also more commonly used the eCPG sites as a first-line resource for accessing CPG information than the CON and REG users (p = 0.046). EXP would more often seek CPG from the website than REG users (p = 0.02); CON staff employed a wide variety of alternatives to access CPG resources. CONCLUSIONS: An intranet based EM-specific eCPG site is used widely by all users; however, users with more exposure appear to find it easier to use and a preferred resource. Knowledge developers should consider ease of access and incorporate training into dissemination to enhance the future use of electronic resources. Electronic interventions to improve use of CPG resources appear warranted. Key words: clinical practice guideline, quality

079 A Review of the Limitations of the Number Needed to Treat.
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INTRODUCTION: The results from randomized trials in the emergency medicine literature can be difficult to apply in a clinical setting and the number needed to treat (NNT) has been advocated as the most clinically relevant measure of effect. However, the number needed to treat is not without limitations. The purpose of this study was to systematically review the published literature to identify limitations of the number needed to treat. METHODS: Design: Systematic review. Search strategy: A MEDLINE search was performed using 'number needed to treat' as keyword (.mp). Reference lists from relevant articles were handsearched and applicable book chapters were also accessed. Study inclusion: Eligibility criteria were applied to select articles that were focused on methodologic and statistical properties of the NNT. Blinded eligibility was checked by more than one observer with disagreements resolved by consensus. This resulted in 425 relevant articles. Data extraction: A data extraction form was used and extraction performed by more than one observer. RESULTS: Ten limitations were identified - five specific to NNT and five common to all measures of effect. Specific to NNT are: 1. Underestimates benefit of therapy; 2. Undesirable mathematical and statistical properties; 3. Not applicable to all patient subgroups; 4. Not valuable as a tool to compare therapies, and; 5. Problematic in meta-analyses. Common to all effect measures, but important, are: 1. Does not incorporate costs; 2. Does not consider adverse outcomes of therapy; 3. Not appropriate to extrapolate NNT values beyond the period of the trial; 4. Not relevant for decisions at a population level, and; 5. No consideration of patient expectations and preferences. CONCLUSIONS: NNT should not be applied as a definitive measure, but rather examined in conjunction with other measures of effect. Awareness of these limitations will allow more educated interpretation of trial results and, hopefully, enhance evidence-based emergency care. Key words: number needed to treat, critical appraisal

080 Pitfalls of Email Survey Research.
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INTRODUCTION: Surveys are widely administered in health research. Electronic mail (email) is a relatively new, convenient, cost-efficient method to conduct survey research. However, email survey research has significant obstacles that require consideration. The purpose of this study is to present the methodology of email survey research and outline its numerous pitfalls. METHODS: Design: Qualitative Study. Data: The authors were involved in a national survey of emergency physicians conducted by email in 2002, sponsored by a Canadian Association of Emergency Medicine (CAEP) Research Grant. Recipients were randomly selected from the CAEP membership roster. Response rate was poor at 96/340 (28%) after three emailings. Through participant observation and analysis of comments from survey respondents, hypotheses for the marginal response rate were identified. An iterative process was performed to identify categories. RESULTS: Three major categories of pitfalls were identified specific to email survey research: A. Sampling issues - out-of-date or invalid addresses, mailbox limits, and unable to capture intended sampling frame; B. Process issues - respondent computer skills, heterogeneity among computer hardware and software, document formatting, and incentives, and; C. Questionnaire issues - questionnaire completion and complex survey design issues. These are examined in detail and methods to avoid these problems are discussed. This is contrasted to traditional mail-out surveys. CONCLUSION: Although email survey research is a convenient and cost-efficient method to conduct questionnaires, it may not achieve response rates comparable to traditional methods. Awareness of the pitfalls in conducting email survey research will allow Investigators to obtain high response rates and valid results from future surveys. Key words: survey research, methodology

TOPIC: GERIATRICS/EDUCATION/CARDIOVASCULAR

081 Attracting Top CaRMS Candidates: A Survey of Important Program Attributes.
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INTRODUCTION: FRCP Emergency Medicine residents work intimately with staff in the department, and many will become staff at the institution that trains them. As such, it is in the best interest of each site to attract the best candidates to their respective centers. The goal of this study was to determine those factors that were most important in the decision-making process for medical students applying to FRCP Emergency Medicine Programs. METHODS: Seventeen out of eighteen University of Western Ontario 2003 Emergency Medicine candidates completed a paper survey on the day of their interview in London. Respondents ranked various factors that went into their decision-making process in selecting a residency program on a scale of 1 (least important) to 5 (most important). The surveys were kept completely anonymous. The mean and median responses for each category were calculated. RESULTS: The twenty-one surveyed factors were broken down into 4 broad categories. The following tables illustrate the calculated mean for each category.

Table 1. Overall Rankings

1.	Program factors: 3.8
2.	Interactions with the program: 4.1
3.	City/province factors: 3.3
4.	Personal factors: 3.2

Table 2. Composite

1.	Factors within programs' control: 3.9
2.	Factors beyond programs' control: 3.3

CONCLUSIONS: Based on this survey, those factors relating to previous interactions with a program and those relating to the characteristics of the program itself are most important in the minds of the FRCP Emergency Medicine interviewees. The items that make up these two categories are largely within a program's control. By tailoring certain variables relating to their program, interview days, and electives offered to medical students, a residency program will be more capable of attracting the strongest CaRMS candidates. Key words: medical education

082 Mathematical Model Predicting the Potential Impact of Various Community Bystander CPR Rates on Overall Survival from Cardiac Arrest.
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INTRODUCTION: Survival from cardiac arrest remains low. Bystander CPR is a crucial yet weak link of the chain of survival for cardiac arrest. We sought to determine the potential impact of various community bystander CPR rates on overall survival from cardiac arrest. METHODS: We used descriptive analysis and mathematical modeling of data prospectively collected within the Ontario Prehospital Advanced Life Support Study. This study has the largest population-based cohort of adult out-of-hospital cardiac arrests in 20 communities with BLS-D and ALS paramedics. We used the following assumptions from the literature for our mathematical model: 1) bystander CPR is well-performed in 50% of cases; 2) the odds of survival with well-performed CPR compared to technically incorrect CPR is 3.4; 3) increasing CPR teaching in the community will increase bystander CPR rates; and 4) improved bystander CPR rates will be in the well-performed CPR group. We determined baseline bystander CPR and survival rates for witnessed and un-witnessed cardiac arrest cases. Victims receiving bystander CPR were divided in two equal groups and assigned a 3.4 differential survival rate. We varied bystander CPR rate between 20% and 60%. RESULTS: From 1995 to 2000, there were 7,707 consecutive cardiac arrest cases: mean age 68.9, 67% male, 37% VF/VT. Bystander CPR and survival to discharge were: 49% witnessed (23%, 6.8%), and 51% un-witnessed (11%, 1.3%). Estimated overall survival and additional number of lives saved with various bystander CPR rates are: 20%(4.1%, 2), 25%(4.6%, 9), 30%(5.1%, 17), 35%(5.6%, 24), 40%(6.1%, 32), 45%(6.5%, 39), 50%(7.0%, 47), 55%(7.5%, 54), and 60%(8.0%, 62). CONCLUSION: We used the largest known multicenter cardiac arrest database to model the potential impact of various bystander CPR rates. Community interventions designed to improve bystander CPR rates could have a significant impact on survival from cardiac arrest. These results may be used for sample size calculation in cardiac arrest research. Key words: cardiac arrest, resuscitation

083 Patient Satisfaction with an Emergency Department-Based Outpatient Deep Vein Thrombosis Treatment Program.
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INTRODUCTION: The purpose of this survey was to evaluate patient satisfaction with the emergency department (ED)-based outpatient deep vein thrombosis (DVT) treatment program at Vancouver General Hospital (VGH). METHODS: An 18-question patient satisfaction survey was mailed to all patients enrolled in the VGH outpatient DVT program following discharge from the program from June/99-Dec/02. In addition to overall satisfaction with the outpatient program, the survey was designed to evaluate specific aspects of the program which included comfort/convenience of having condition treated at home, knowledge and care provided by hospital staff, education provided and efficiency of hospital visits. Finally, questions were asked to assess future expansion of the program such as willingness to be treated again if a recurrence occurred and willingness to self-inject low-molecular-weight heparin (LMWH), if taught, and be treated at home. RESULTS: 134 patients were mailed a survey following discharge from the program of which 112 were returned resulting in an 83.6% response. Overall, 96.4% of patients were comfortable having their condition treated as an outpatient while 82.1% felt it was more convenient to return to hospital daily for medications and assessment than to be admitted to hospital. Most respondents (97.3%) felt that the nursing staff was courteous and understanding as well as very satisfied/satisfied (97.3%) with the education provided by the clinical pharmacist. 76.8% of patients were very satisfied/satisfied with the efficiency of treatment at each return visit to the ED. Overall, 97.3% of respondents were very satisfied/satisfied with the treatment received in the outpatient program and 92.9% would enroll again if future treatment was indicated. If taught, 51.8% of patients were willing to self-inject LMWH at home if future treatment was indicated. CONCLUSIONS: The VGH ED-based outpatient DVT treatment program appears to be achieving a high level of patient satisfaction. Key words: deep vein thrombosis, low-molecular-weight heparin

084 Fibrinolytic Administration for Acute Myocardial Infarction in a Tertiary Emergency Department: A Retrospective Review and Analysis of Factors Associated with an Increased Door-to-Needle Time.
Zed PJ, Abu-Laban RB, Cadieu T, Purssell RA, Filiatrault L. CSU Pharmaceutical Sciences, Vancouver General Hospital & Faculty of Pharmaceutical Sciences, University of British Columbia, Vancouver, BC.

INTRODUCTION: The purpose of this study was to evaluate door-to-needle time for fibrinolytic administration for AMI at Vancouver General Hospital (VGH) and identify factors associated with time prolongation. METHODS: A retrospective chart review of all patients fibrinolysed for AMI in the emergency department (ED) at VGH was performed from January 1/98 to December 31/99 to determine door-to-needle time. A mixed-effects linear regression model was fit to the fibrinolytic data with the door-to-needle time to identify factors associated with prolonged times. RESULTS: 140 patients were included in the final analysis. The mean and median door-to-needle times were 58 and 43 minutes, respectively. A door-to-needle time of under 30 minutes was achieved in 24.3% of patients; 30-40 minutes in 24.3%; 40-60 minutes in 22.1%; and over 60 minutes in 29.3%. The strongest predictors of prolonged door-to-needle time were prescriber specialty, mode of arrival, time of arrival and time between chest pain onset and ED arrival. Emergency physician prescriber without prior cardiologist consultation resulted in a significantly shorter door-to needle time compared to requesting a cardiology consult prior to administration (mean [median] 41 [35] minutes versus 108 [90] minutes respectively, $p<0.001$). Patients who arrived by ambulance had shorter door-to-needle times than those who did not (mean [median] 50 [38] minutes versus 71 [57] minutes respectively, $p=0.008$). Patients who arrived during the night shift (2300-0700h) had significantly shorter door-to-needle times than those patients who arrived during the day (0700-1500h) or afternoon (1500-2300) shifts ($p=0.0481$); and patients who had a longer time from chest pain onset to ED arrival also had longer door-to-needle times ($p=0.0233$). CONCLUSIONS A significant number of AMI patients fibrinolysed at VGH do not meet the national guideline for door-to-needle time less than 30 minutes. Factors associated with this should be addressed to improve the care of patients with AMI. Key words: myocardial infarction, fibrinolysis

085 Practice Patterns in the Care of Patients with ST Elevation Myocardial Infarction.
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INTRODUCTION: Improper care of patients with acute coronary syndromes can lead to significant morbidity and mortality. METHODS: This retrospective chart review describes the care of adult patients diagnosed with ST elevation myocardial infarction (MI) admitted through the emergency department at London Health Sciences

Centre, South Street Campus (LHSC-SSC) during the year of 2000. The purpose of the study was to compare and contrast the standard of care at our institution with the 1999 American Heart Association (AHA) guidelines. The secondary party of the study involved a blinded analysis of all included patients' electrocardiograms (ECG's) by an emergency physician and a cardiologist to determine agreement for the decision to thrombolyse. RESULTS: There were 66 patients and 67 admissions. 64.2% of the population were male and the mean age was 65 years. The proportion of patients who received aspirin in the emergency department or en route was 88.1%, which is in fair agreement with the AHA guidelines. The mean time to first ECG was 16 minutes and the mean door-to-needle time for thrombolysis was 47 minutes. These both exceed the recommended 10 and 30 minutes respectively. 94.7% of those who received Tissue Plasminogin Activator (TPA) did not receive the recommended 60 U/kg or maximum of 4000U bolus of IV heparin. Of those who received lytics, 3.3% had a documented major contraindication, and 21.7% had a documented minor contraindication as described by the guidelines. 16.4% of all patients died, 20.9% suffered a bleeding complication, and 16.7% failed lytics requiring urgent percutaneous transluminal coronary angioplasty (PTCA). The kappa for ECG analysis by the emergency physician and the cardiologist in the decision to thrombolyse was 0.58, which shows moderate agreement. CONCLUSIONS: It is apparent that the care of patients with ST elevation MI at LHSC-SSC falls short of the AHA guidelines in several important areas. Key words: myocardial infarction, fibrinolysis

TOPIC: INJURY/TRAUMA

086 Multicenter Comparison of the Predictive Value of the Revised Trauma Score and the Glasgow Coma Scale

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INTRODUCTION: Identifying risk of mortality is an important aspect of ED care of multiple trauma patients. This study compared the predictive accuracy of the Revised Trauma Score (RTS) and Glasgow Coma Scale (GCS) and their components. METHODS: This multicenter prospective cohort study was conducted in 20 communities as part of the Ontario Prehospital Advanced Life Support (OPALS) Study. Included were adult trauma patients with ISS >12 and who were treated at 12 regional Level 1 trauma hospitals. Physician trauma team leaders assessed each patient for the RTS and GCS. For the RTS, GCS and their subscales we analyzed: 1) Receiver Operating Characteristic (ROC) curve areas and Kendal_s Tau c correlation coefficient (Tc) for survival to hospital discharge, 2) Mann-Whitney U-test for ICU admission, 3) Spearman_s Correlation Coefficient for the disability measures, Glasgow Outcome Scale (GOS) and Functional Independence Measure (FIM). RESULTS: We enrolled 912 patients with these characteristics: median age 39, male 71.3%, blunt trauma 90.1% and mortality 20.3%. This table shows ROC curve area and Tau c for survival, Spearman_s for GOS and FIM, and P-value for ICU admission:

	ROC	Tc	FIM	GOS	ICU
RTS TOTAL	.80	.29	.01	.21	.13
- RR	.69	.19	-.16	.16	.11
- SBP	.62	.16	-.25	.10	.79
GCS TOTAL	.81	.34	.11	.21	.03
- Eye	.76	.32	.28	.22	.36
- Verbal	.81	.34	.13	.17	.03
- Motor	.80	.37	.15	.24	.06

CONCLUSIONS: The GCS score and its Motor and Verbal components predicted survival and ICU admission. The Motor and Eye components predicted disability better than either GCS or RTS. The RTS failed to show an advantage over the GCS in our study population, which was mostly blunt trauma patients. These findings validate the use of GCS for triage of trauma patients, and the use of the Motor component where the GCS may be unobtainable, as for intubated patients. Key words: trauma, emergency medical services

087 Survey of Canadian Emergency Physicians' Management of Traumatic Corneal Abrasions.

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INTRODUCTION: Current literature on the ED management of traumatic corneal abrasions(TCA) lacks evidence and consensus. We sought to determine the practice patterns of Canadian emergency physicians for TCA management. METHODS: Using a modified Dillman technique, we conducted a formal mail survey of a random sample of emergency physicians from the CAEP membership list. We used a web-based survey for members with an email address (400) and a postal survey for those without (70). We distributed a pre-notification letter, a survey of 15 multiple choice questions, and follow-up surveys to non-responders. The survey focused on the indications and utilization of 3 therapeutic modalities: patching, topical antibiotics and analgesia (oral and topical). Demographic information was also gathered. We performed descriptive analyses with 95% CIs. We obtained REB approval. RESULTS: The 275 respondents had these characteristics: median age 39, male 78.2%, fulltime emergency physician 71.6%, certified in EM 85.6%, practice in a teaching hospital 65.0%. Patching was uncommonly used(78.8% never/rarely patched) with the most common indications being large size 38.6%, severe pain 34.9% and photophobia 30.2%. Topical antibiotics were used for TCA by 70.6%; particularly for contact lens wearers 74.1%, and FB 70.7%. The topical antibiotics of first choice were: sodium sulfacetamide 36.7%, bacitracin/polymyxin 13.8%, erythromycin 12.0%, and ciprofloxacin 6.6%. The following were offered for pain management: oral analgesics 81.4%, cycloplegics 62.0% and topical NSAIDs 52.2%. Tetanus immunization was offered by 65.1% for TCA with FB and only 45.5% for those without FB. Routine follow-up was arranged by only 11.6%. CONCLUSIONS: To our knowledge, this is the largest formal mail survey of emergency physician TCA management and demonstrates considerable variation in practice. Much research is required regarding the best ED management of TCA, especially regarding use of antibiotics, cycloplegics, and topical NSAIDs. Key words: corneal abrasion

088 Secondary Falls Prevention in the Emergency Department - A Pilot Study.

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INTRODUCTION: Fall-related injuries in older adults comprise a significant proportion of the total burden of injury in Canada. This results in loss of independence, increased risk of fractures, and early admission to nursing homes. In addition, many seniors present to the Emergency Department (ED) as a result of a fall, placing significant strain on the health care system and dollars. By educating individuals on preventing falls these consequences can be decreased. The purpose of this pilot study is to determine the feasibility of delivering a community based, multidisciplinary falls prevention program from the ED. METHODS: Patients, over 65 years, that presented to the ED after falling were randomized to an intervention or control group. The control group received a social visit unrelated to falls prevention. The intervention group received an initial home assess-

ment from HomeCare. A physiotherapist (PT), occupational therapist (OT) or nurse conducted a maximum of three subsequent home visits, including standardized and individualized falls prevention education. Patients recorded falls for a 2-month follow-up period. RESULTS: Fifteen patients (m=3,f=12) were recruited into the study (77yrs,SD=6.7). HomeCare identified the need for home visits from OT and PT in 63% (5/8) of patients in the intervention group. For one patient OT was the only area of need identified. Only 25% (2/8) of patients were recommended no further intervention. Nursing was not identified as a need for any of these patients. Follow-up assessment of falls was 100% for both groups. CONCLUSIONS: This pilot study shows evidence that an ED randomized control trial is a feasible way to deliver falls prevention education. This multidisciplinary approach is necessary to identify modifiable hazards within the home that may otherwise go unrecognized. A large multi-centered study is underway to further evaluate this intervention. Key words: injury prevention

089 The Epidemiology of Parasuicide Presentations to the Emergency Department.

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INTRODUCTION: Parasuicide (attempted but not completed suicide including overdose and self-inflicted injury) is a common presentation to the emergency department (ED) and is often a pre-cursor to death by suicide. The objective of the present study was to examine the epidemiology of parasuicide presentations to EDs in Alberta. METHODS: Self-poisoning/self-injury records for the fiscal years 1998/1999, 1999/2000, and 2000/2001 were accessed from the Ambulatory Care Classification System, a database that captures all emergency department encounters in the province of Alberta. Available data for each case included demographic details, location and time of visit, diagnoses and procedures with 1998/99 serving as the index year. RESULTS: There were 22,396 parasuicides presenting to Alberta EDs over the three year period. Parasuicide rates were highest among females (219 per 100,000 compared to 159/100,000 for males in 1998/99) and those younger in age (228/100,000 for under 45 years vs. 99/100,000 for 45 years plus). Rates were particularly high among those on social services (1,296/100,000) and those with Aboriginal treaty status (849/100,000). Rates of return visits to the ED in the year following the parasuicide were also high (66% returned to ED, 18% returned for parasuicide after an initial 1998/99 visit). There was marked regional variation in the data; particularly notable was that of the two major urban centers, the city of Edmonton consistently had significantly higher parasuicide rates than the city of Calgary. Finally, clear trends could be seen in the timing of parasuicide presentations by hour of day, day of week, and month of year. CONCLUSIONS: Parasuicide is common in the ED, with particularly high rates demonstrated among marginalized populations (Aboriginal and impoverished). This study provides comprehensive data on those who present with parasuicide, and can be used to guide further treatment, research and evaluation in order to serve this population more effectively. Key words: suicide

090 Parenteral Corticosteroids for Acute Migraine: A Systematic Review of the Literature

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INTRODUCTION: Corticosteroids may be beneficial in relief of acute migraine headache and in the prevention of relapse of the attack. This systematic review was designed to evaluate the effectiveness of parenteral corticosteroids in the treatment of episodes of acute migraine. METHODS: Randomized controlled trials were identified using MEDLINE, EMBASE, other computerized databases, hand searching, bibliographies, and contact with pharmaceutical companies and authors. Studies in which a corticosteroid was compared to placebo or any other standard migraine therapy were considered. Relevance, inclusion, and study quality were assessed independently by two reviewers. RESULTS: 1,246 potentially relevant abstracts were reviewed, but only 2 studies met the inclusion criteria. One study was of high quality and included 98 patients; the other was of low quality and included 21 patients. No significant differences were noted between corticosteroid groups and comparison groups with regards to pain reduction or improvement in functional ability. However, corticosteroids (specifically dexamethasone) reduced the likelihood of relapse of acute migraine within 48 hours (odds ratio = 0.28, 95% confidence interval: 0.11, 0.69). CONCLUSIONS: Although corticosteroids are widely used in the treatment of acute episodes of migraine headache, there is little evidence to support this practice. One high quality study suggests that dexamethasone may reduce relapses of migraine after emergency department discharge. Further research in this important area should be encouraged. Key words: migraine, corticosteroids

TOPIC: ADMINISTRATION

091 Feasibility of Emergency Department Based Daily Random Patient Satisfaction Surveys.

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INTRODUCTION: Patient satisfaction is a key quality measure. Commercial (CM) satisfaction surveys are often telephone or mail surveys, which may be conducted well after the ED visit and have poor response rates. Sampling and recall bias may lead to invalid results. For cost reasons, our last ED satisfaction survey was conducted in 1995, having a 32% response rate. Our hypothesis was that internal daily (ID) random exit surveys are feasible and will provide higher response rates and more valid results than previously conducted CM surveys. METHODS: On a daily basis, 5 random clock times were generated. The first patient registering after each clock time was identified as the survey patient. Patients were excluded if they were comatose, confused, violent, psychotic, intoxicated, critically ill, or had a language barrier and no translator. Research assistants obtained consent and instructed patients how to complete the survey. Those who failed to return completed surveys after their ED visit were surveyed by telephone within a week. Our sample size for this study was 300 patients, based on that of the 1995 commercial survey. RESULTS: Response rates were 139/300 (43%) and 95/300 (32%) for the internal and CM surveys respectively (p=0.007). Response rates for specific survey items ranged from 37.3-42.0% in the internal survey and 19.7-31% in the CM survey. Internal survey respondents more closely matched actual ED patients than did CM survey respondents (table). The proportion of patients who rated care as good to excellent was similar in the ED survey (88%; 95%CI, 83-93) and CM survey (92%; 95% CI, 87-98).

Age	Actual	Internal	CM
<18 yr	2.0%	2.5%	3%
18-44	57%	55%	51%
45-64	25%	24%	31%
>64	15%	18%	16%
Male	62%	58%	49%

CONCLUSIONS: Internal daily random exit surveys are feasible and may provide more valid patient satisfaction data, but response rates for both survey methods fall below levels generally acceptable in survey research. Key words: quality, patient satisfaction

092 Emergency Department Overcrowding: Impact of Hospital Occupancy on Length of Stay in Emergency.
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INTRODUCTION: Tertiary emergency departments (ED) struggle with ED overcrowding. The ED relies on inpatient beds to enable ED outflow of admitted patients. The number of occupied inpatient beds is intuitively associated with the ability to clear admitted patients from the ED. No direct relationship has previously been described between hospital occupancy and average ED length of stay (ALOS). METHODS: The Calgary Health Region ED is a multisite, singly administered tertiary care system serving ~900,000 citizens through 3 adult ED's. Data from all sites are prospectively collected regarding inpatient and ED visits. (hospital occupancy = number of admitted pts/number of inpatient beds). Data are presented from April 1997 - June 2002 from a representative adult site. RESULTS: ED ALOS increased disproportionately to ED visits.

	Annual ED visits	ALOS in hours
1997-1998	67059	3.68
2001-2002	68555	5.59
Absolute increase	1496	1.91
% Increase	2.2%	51.9%

For admitted ED pts, hospital occupancy has a predictable effect on ALOS. Above 90% occupancy, each 1% rise increased ED ALOS for admitted pts by 20 min, without a significant effect on ALOS for discharged pts. (see below) This relationship between ALOS and occupancy has not been previously described.

% Occupancy	LOS admitted, hrs	LOS discharged, hrs
90	8.3	3.42
91	8.8	3.46
92	9.0	3.52
93	9.4	3.66
94	10.0	3.66
95	10.3	3.68
96	10.3	3.66
97	11.2	3.68
98	12.6	3.77
99	13.7	3.90
100	14.5	3.93

CONCLUSIONS: There is a predictable increase in ALOS for admitted ED patients as hospital occupancy increases. The current trend toward operating hospitals near full inpatient capacity, therefore, contributes significantly to a decrease in functional capacity for the ED. The resultant risks to patients inherent in ED overcrowding are significant and must be considered by health care planners. Key words: overcrowding

093 Patients Who Leave the Pediatric Emergency Department without Being Seen: Why Don't They Stay and Where Do They Go?
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INTRODUCTION: Numerous children visiting Pediatric Emergency Departments (EDs) leave prior to being seen by a physician (LWBS). Of potential concern is the inability to provide them with a timely assessment and treatment. The objective of this study was to examine the acuity (triage score) of children who LWBS compared to children who have stayed to be seen in the ED. METHODS: We conducted a prospective cohort study during a 3 month period in the ED of a tertiary pediatric hospital in Toronto, Canada. All families who LWBS were contacted and asked questions about their child's condition, use of follow-up health services, and socio-demographic variables. Logistic regression analysis was used to compare LWBS children with controls matched for age and gender. RESULTS: During the study period, 289 (2.6%) families left the ED, of whom 180 (62%) consented to participate in the study. The study and control groups consisted of 158 and 316 children respectively. Waiting for too long and improved symptoms accounted for 58% and 37% of premature leaving. Of the LWBS, 15% were triaged as "urgent" and two-thirds of them sought further medical care, of whom one child was admitted. Multivariable analysis showed that patients who left had a lower acuity, compared to those who left (OR 4.95, 95% CI:2.6-9.4). Most of them sought further medical attention after leaving (OR 4.63, 95% CI: 2.8-7.8), and were more likely to register in the ED between midnight and 4 am (OR 4.86, 95% CI: 2.2-10.5). CONCLUSIONS: Children who LWBS have a lower acuity level, seek follow-up care elsewhere, and usually leave because they get better or the wait is too long. Sizable proportions are "urgent" but their outcome is favorable. Key words: quality, outcomes

094 Emergency Section and Overcrowding in a Teaching University Hospital of Karachi, Pakistan.
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INTRODUCTION: Emergency section (ES) overcrowding is a serious and growing global problem. Ideally, ES provides key access to acute care services. The initial evaluation and stabilization of patients can take 1 to 2 hours. Patients without major problems are discharged promptly, and those who require further evaluation and treatment are admitted to inpatient services. Overcrowding occurs when the patients needing admission are delayed in ES because of the unavailability of inpatient beds. The objective of this study was to quantify the extent of Emergency Section (ES) overcrowding at our hospital and to identify possible solutions. METHODS: The ES log was reviewed for all patients who presented to the Aga Khan University Hospital's ES from January 2001 through March 2001. The ES information system has an automatic patient log and generates daily report for patients who stay longer than 6 hours. All charts of patients who stay longer than 6 hours are pulled and reviewed as a quality assurance process. RESULTS: Among 9360 patients, 1669 (17.84%) were held in the ES for more than 6 hours. Of those 134 (8%) were discharged from the ES, while 1535 were admitted to the hospital. Of 1535 patients, the delay in 982 (64%) was because of the unavailability of bed, in 276 (18%) because of financial constraints, 123 (8%) because more than one specialty were involved, and 92 (6%) patients were delayed because the admitting residents wanted to investigate the patients more thoroughly. 62 (4%) had the miscellaneous reasons. CONCLUSIONS: Significant overcrowding exists in ES at our hospital. Four solutions are proposed: (1) early discharges of in-patients, (2) creation of a holding unit, (3) flexible ward assignment, (4) active inter-facility transfer. These efforts will

lead to an optimal care in our ES in rising patient demand. Key words: overcrowding

095 Development of an Activity Based Costing Tool for Trauma Care.
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INTRODUCTION: Repeated budgetary cutbacks increasingly force physicians to economically justify clinical decisions, yet traditional costing methods are inadequate in providing relevant cost information for funding decisions. Activity Based Costing (ABC) is an accounting method that defines costs in term of an organization's activities (e.g. medical services). The purpose of this project was to develop a cost-tracking tool to measure the costs of interventions performed on trauma patients. METHODS: Clinical observations, established treatment protocols (the ATLS, Advanced Trauma Life Support) and recognized care delivery databases (the GRASP collection of nursing interventions) were used to create lists of activities for the Emergency Department (E.D.), the Operating Room (O.R.), the Intensive Care Unit (ICU), and the ward. Each activity was then assigned either an intensity (number used) or a duration (time spent) value. The activities were then grouped and the lists were combined into a single user-friendly database using Palm-based and bar code scanner technology. RESULTS: The Palm-based data collected by the ABC tool was exported to statistical analysis software to combine the financial data and the clinical information from the trauma registry. We validated the data collection process by tracking the costs incurred during two videotaped events. Two independent cost-trackers recorded no differences on 30 entries in an E.D. case and 2 differences in 44 entries in an ICU case. CONCLUSIONS: We offer practitioners and administrators a validated method to track resource consumption, and to improve economically justifiable treatment decisions. Key words: utilization, trauma

096 Interpretation of Plain Radiographs by Pediatric Emergency Physicians: Do we Need Routine Review by a Radiologist?
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INTRODUCTION: To evaluate the accuracy of diagnostic interpretation of plain radiographs by Pediatric Emergency Physicians (PEPs) and pediatric radiologists. To determine the effect of incorrect radiologic interpretation by PEPs on patient management. METHODS: Series of all consecutive patients (0-18 years) who underwent plain radiographs while they presented to a pediatric Emergency Department (ED) during September 2001, were reviewed. The radiologic interpretation of the PEP, documented at the time of the ED visit, was compared to the pediatric radiologist's report, documented within 72 hours. Data were obtained via the ED Hospital Information System, the Radiological Information System and the medical records. RESULTS: Data were available from 1644 of the 1651 sets of plain radiographs ordered by the PEPs during the study period: chest (42%), abdomen (19%), upper extremities (17%), lower extremities (7%), sinus (4%), skull (3%), clavicle (3%), spine (2%), pelvis (2%) and others (1%). The prevalence of positive radiological studies as per the radiologists was 32.2% (529/1644). Overall the PEP's accuracy (range) was 98.1% (1613/1644) (94.6-100%), sensitivity 96.4% (33.3-100%), specificity 98.9% (98.5-100%), NPV 98.3% (88.9-100%) and PPV 97.7% (90.6-100%). The proportion of false negatives (FN) was 1.2% (19/1644) and of false positives was 0.7% (12/1644). Of the 19 FN, 1 required immediate follow-up, 2 required follow-up in 1-2 days, 2 required follow-up in several days, 13 had a missed abnormality but no change in therapy was required and 1 had a questionable diagnosis. CONCLUSIONS: Plain radiographs interpretations by PEPs were extremely accurate. Infrequently, a severe diagnosis (1/1644) was missed by the PEPs. The routine review by a radiologist must be further evaluated. A selective approach may be more cost-efficient. Key words: diagnostic imaging,

097 Decision Analysis of Computed Tomography for Suspected Appendicitis.
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INTRODUCTION: While the use of computed tomography (CT) to increase the accuracy of clinical examination has been studied, the most cost-effective strategy for the diagnosis of acute appendicitis remains unresolved. CT has been demonstrated to be highly accurate for the diagnosis of acute appendicitis and several researchers have recommended the routine use of CT for all patients with suspected appendicitis as a cost-effective diagnostic strategy. No Canadian economic analysis has been published on the use of CT for suspected appendicitis. METHODS: A decision analysis model was constructed (DATA 3.5, TreeAge Software, Boston, MA) to compare a clinical diagnostic strategy to a CT strategy. The baseline values for the model variables and probabilities were estimated from the published literature and from a Canadian hospital cost-accounting database. A cost-minimization methodology was used and separate analyses were conducted from both a governmental and societal perspective. Sensitivity analysis and Monte Carlo simulation were employed to test the robustness of the model. RESULTS: For the reference case, the use of a CT strategy for all patients with suspected appendicitis was less costly ($231, governmental; $425, societal) than the clinical strategy. From the governmental perspective, this result was sensitive to the cost of the CT and the prevalence of appendicitis in the study population. From the societal perspective, the dominance of CT over the clinical strategy was not sensitive to changes in any variable over their plausible ranges. CONCLUSIONS: This decision analysis, using Canadian cost data, suggests that the routine use of CT for patients with suspected appendicitis is less costly than relying on clinical diagnosis alone. Reduced cost arises from less admissions for observation and a reduced negative laparotomy rate. Further prospective Canadian cost-effectiveness studies are needed to determine the most cost-effective diagnostic strategy for emergency department patients with possible appendicitis. Key words: computed tomography, appendicitis

098 Nontraumatic Chest Pain in the Emergency Department: Need for Chest Radiography?
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INTRODUCTION: Patients presenting with non-traumatic chest pain (NTCP) is a frequent occurrence in the emergency department and more often than not these patients end up undergoing plain chest radiography (CXR). There currently exists no evidence-based, standardized criteria by which emergency department physicians order this investigation. Using a standard questionnaire sent to physicians certified in emergency medicine I sought to determine the variation of physician practices in ordering CXR in patients with NTCP. METHODS: A standardized questionnaire compromised of 6 questions was sent out to a random sample of 150 members of the Canadian Association of Emergency Physicians. Questions were formulated to assess practices of emergency department physicians in ordering CXR in patients presenting with NTCP. RESULTS: A total of 72 responses were gathered and analyzed. The majority of the respondents (46/72, 64%) had >10 years of experience in emergency medicine. Furthermore, most of the respondents had emergency medicine training in the CCFP program (41/72, 57%) versus RCPS

program (19/72, 26%). The majority of the respondents listed suspicion of spontaneous pneumothorax (70/72, 97%), pneumonia (64/72, 88%), congestive heart failure (40/72, 55%), pulmonary embolus work-up (39/72,54%) and thoracic aortic dissection (37/72, 51%) as their main reasons for ordering a CXR. The following unexpected findings on CXR, which could change initial management were listed as pneumothorax (50/72, 69%), consolidation (39/72, 54%), signs of thoracic aortic dissection (35/72, 49%), significant pleural effusion (23/72, 32%). The number of times in the last 10 shifts that initial management was changed because of initial CXR findings were 0 (39/72, 54%), 1 (12/72, 17%), 2 (10/72, 14%), 3 (4/72:5%). CONCLUSIONS: Physicians did not vary greatly in their practice of ordering CXR for patients presenting with NTCP. It was however rare for management to be changed based on initial CXR findings. Furthermore, it could be argued that for most of the suspected diagnosis for which a CXR was ordered is either mainly a clinical diagnosis or for which CXR is neither specific nor sensitive. These findings underlie the need for the development of clinical guidelines by which one can identify those patients presenting with NTCP for whom a CXR is needed in their work-up. Key words: diagnostic imaging, chest pain

099 Economic Evaluation of the Potential Impact of the Canadian CT Head Rule.

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INTRODUCTION: The Canadian CT Head Rule (CCHR) is designed to improve the efficiency of ED management of minor head injury patients. This economic analysis estimated the potential cost savings to the Canadian health care system with widespread use of the CCHR. METHODS: This economic analysis used a probabilistic-based decision analytic model comparing current clinical practice to that assuming 100% uptake of the CCHR. Costs savings were assessed from a Canadian health care system perspective. The sensitivity and specificity of the rule was estimated by combining data from the derivation (N=3,121) and validation (N=2,588) studies. For our base analysis, current CT ordering rate was estimated to be 80.2%. Sensitivity analyses assumed rates of 90% and 100%. Cost data were obtained from provincial health care fee schedules, hospital cost accounting systems and the literature. The probabilistic model employed Monte Carlo simulation that was based on 5,000 replications. We estimated the expected values for potential cost savings and reduction in CT rates. RESULTS: In our base analysis, based upon the high-risk criteria and an absolute reduction in CT use of 44.5% (from 80.2% to 35.7%), the expected cost savings per patient was $27.52 (95% credibility interval $6.75-$44.34). For analysis based on the medium risk criteria and an absolute reduction in CT use of 17.8 %, the expected cost savings per patient was $17.56. Total annual cost savings, assuming 200,000 minor head injury cases per year, would be $5.5 million based on the high risk strategy and $3.5 million based on medium risk. Results were sensitive to the rate of use of CT in current practice. Assuming CT rates of 90 and 100%, the expected annual cost savings were $7.3 million and $9.5 million, respectively. CONCLUSIONS: Widespread use of the CCHR is expected to lead to cost savings as low as $3.5 million per year or as high as $9.5 million. Future studies should evaluate the potential economic impact of the CCR in other countries. Key words: diagnostic imaging, clinical prediction rule, computed tomography

100 Do Co-intoxicants Increase Adverse Event Rates In Patients With Opioid Overdose?

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INTRODUCTION: Patients frequently arrive in emergency departments after being resuscitated from opioid overdose. Autopsy studies suggest that multi-drug intoxication is a major risk factor for adverse outcomes after overdose. If this is true, there may be high-risk drug combinations that identify patients who require more intensive monitoring and observation. Our objective was to determine the impact of co-intoxication with alcohol, cocaine or CNS depressant drugs on adverse event rates in patients resuscitated from acute opioid overdose. METHODS: Data were extracted from the database of a prospective opioid overdose cohort study. Patients who received naloxone for presumed opioid overdose and were treated at this inner city ED between May 1997 and May 1999 were prospectively enrolled. Investigators gathered clinical, demographic and other predictor variables, including co-intoxicants used. Patients were followed to identify pre-specified adverse outcome events occurring within 24 hours, and multiple logistic regression was used to determine the association of concomitant drug use with adverse event rates. RESULTS: Of 1155 patients studied, 58 (5%) had pure opioid overdose and 922 (80%) reported co-intoxicants, including alcohol, cocaine and CNS depressants. Overall, there were 123 major adverse events (11.6%) and 194 minor adverse events (18.4%). After adjustment for age, gender, HIV status, cardiovascular disease, pulmonary disease and diabetes, we found that co-administration of alcohol, cocaine or CNS depressants, alone or in combination, was not associated with increased risk of death or adverse events during the 24-hour follow-up period. CONCLUSION: Most opioid overdoses involve mixed ingestions. In patients resuscitated from acute opioid overdose, outcomes are similar for patients with pure opioid overdose and multi-drug intoxications. A history of co-intoxication cannot be used to identify high-risk patients who require more intensive monitoring and prolonged observation. Key words: opioid overdose