CAEP/ACMU 2002 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 or *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 Patients Who Refuse Transport: A Canadian Perspective.
Lehnhardt KR, Lewell MP. University of Western Ontario. London, ON

INTRODUCTION: One area of potential medicolegal risk in prehospital care comes from patients who refuse transport to hospital after emergency medical services (EMS) have established contact. This study was conducted to determine the frequency of these so-called no service (NS) calls, to identify patient population demographics, and to evaluate documentation on these calls. METHODS: A retrospective chart review was performed on all NS calls in January and July 2001. The setting was an urban environment (population 340 000) that uses a single provider EMS system, consisting of both advanced and basic life support paramedics (ALS and BLS). RESULTS: Over the 2 months, 299/4811 patients refused transport (6.2%). The male:female ratio was approximately 1.05:1 and the average age was 47.0 years (range 1–94). The most common chief complaints were trauma (36.8%) and general medical conditions (19.7%). Documentation was found to be incomplete on 91% of these calls. A complete set of vital signs was not recorded for 59/299 calls (19.7%), and specifically, blood pressure was not measured in 47.8% of patients. An initial Glasgow Coma Scale (GCS) rating was not calculated 14.4% of the time while the number of patients with a GCS <15 at presentation was 41/299 (13.7%). The average time on scene for a NS call was 17 min ± 9 min. CONCLUSIONS: A significant number of patients refuse transport to hospital. Many of these patients exhibit concerning features upon presentation, such as an initial GCS score of less than 15. The true number of patients at risk of adverse outcome is unknown, due to the lack of complete documentation in this population. Further study is planned to develop strategies that will reduce the number of NS calls.

002 The Positive Impact of Implementing a Fast Track in an Urban Emergency Department.
Hall C, Wang D, Young B. Calgary Health Region, University of Calgary. Calgary, AB.

INTRODUCTION: Urban Emergency Department (ED) overcrowding negatively impacts patient care. Dedicating limited resources to less acute patients (CTAS Level IV & V) may be perceived to be at the expense of the care of more seriously ill (CTAS Level III). This study determined the impact of triaging CTAS Level V and some Level IV patients through a Fast Track system, on both Length of Stay (LOS) and percentage of patients who leave without being seen (LWBS) in an urban ED. METHODS: The ED was redesigned to allow CTAS Level IV & V patients to be diverted 16 hrs/day to a separate area of the ED (FAST TRACK) with waiting room, dedicated physician, nursing and clerical staff. Patient data was collected prospectively on ED census, CTAS categories, LOS in hours, number of LWBS. Data were analyzed for the 4 months pre and 2 months post redesign. Statistical analysis utilizing ANOVA was carried out to assess differences in LOS, LWBS and LWBS by CTAS category. RESULTS: ED census during the study interval was consistently over 5000 patient visits per month. Mean overall LOS decreased from 4.24 hrs (SE 0.065) to 3.74 hrs (SE 0.075), $p = 0.011$. Overall LWBS also decreased from 9.20% (SE 0.46) to 4.64% (SE 0.53), $p = 0.006$. Significant reductions in LWBS were not restricted to CTAS IV and V but also occurred in CTAS III. CTAS III LWBS decreased from 8.90% (SE 0.39) to 5.99% (SE 0.25), $p = 0.008$. CTAS IV LWBS decreased from 11.10% (SE 1.02) to 4.55% (SE 0.73) with a p value of 0.015. Finally CTAS V LWBS decreased from 11.50% (SE 0.89) to 5.21% (SE 2.56), $p = 0.038$. CONCLUSION: Fast Tracking ambulatory patients in a busy urban ED positively impacts the LOS and numbers of LWBS for patients in all of CTAS category Levels III, IV and V.

003 Changing Patterns of Investigation and Treatment of Deep Vein Thrombosis in Two Emergency Departments.
Rowe BH, Holroyd BR, Willis G, Meurer D, Sukhrani N, Spooner CH, Bullard M, Kelly KD. Division of Emergency Medicine, University of Alberta, Edmonton, AB.

OBJECTIVES: For patients presenting to the Emergency Department (ED) with suspected deep vein thrombosis (R/O DVT), diagnostic and treatment approaches vary widely. One way to reduce variation involves the use of clinical practice guidelines (CPG) and this study examined the effect of incorporating a CPG for R/O DVT. METHODS: The CPG was developed using Wells' clinical model (CM), D-dimer testing and venous Dopplers and was approved by a majority physician vote. In addition, justification of venography ordering was required prior to completion of the testing. Control hospital MDs received passive CME interventions, but had access to Dopplers and D-dimer testing. Patients presenting to the 2 EDs from 1999–2001 were eligible for chart review if they were >16 years of age with a R/O DVT. Primary investigations (Doppler ultrasounds, venograms, and D-dimers) were recorded; the main outcome was the percentage of venograms ordered as the first test at each hospital. RESULTS: Overall, during the study period 89 control and 338 intervention hospital charts were reviewed. Patients with R/O DVT were more likely to be female (59%) and older (mean age: 55) at both sites ($p > 0.05$) but control patients had fewer co-morbid conditions. Laboratory evaluation of hemoglobin, plts, and INR were similar. However, CM use (59% vs 0%; $p < 0.001$), D-dimer (59% vs 35%; $p < 0.01$) were more common at the CPG hospital, and venograms were less frequently ordered as the first test (6% vs 33%; $p < 0.001$) at the CPG hospital. Overall, both hospitals had low admission rates for confirmed DVTs. CONCLU-

SIONS: Clinical practice guidelines in the ED are potentially valuable tools for improving quality of care. This study demonstrated the successful application of a CPG for R/O DVT, specifically by reducing the percentage of patients receiving venography. Further research is required to determine how to enhance uptake of CPGs by emergency physicians.

004 Increased Emergency Department Volumes but Decreased Overall Utilization: Ontario's Hospital Restructuring Paradox.
Schull M, Chan B, Schultz S. Institute for Clinical Evaluative Sciences, Sunnybrook & Women's College Health Sciences Centre, University of Toronto. Toronto, ON.

OBJECTIVE: The hospital system in Ontario underwent substantial restructuring in the 1990s. We sought to compare the number of emergency departments (ED) in the province with the total number of ED visits during this period. METHODS: Over the study period (fiscal years 1993 to 2000), most ED physician services were paid for on a fee-for-service (FFS) basis. We obtained data on all FFS physician billing records for ED patient visits in Ontario. EDs where physicians' services were not continuously remunerated by FFS were excluded. To confirm ED status, billing data was supplemented by surveys of District Health Councils (DHC), and telephone calls to individual hospitals. Limited service EDs were defined as those limiting patient visits or ambulance arrivals to <24 hours/day. Statistical tests were not conducted since we included virtually the entire ED patient population. RESULTS: In 1993, there were 201 EDs in Ontario. By 2000, 20 (9.5%) had closed, 7 (3.5%) had reduced services and 0 had opened, leaving 181 full or limited service EDs. Across the 17 regional DHCs, the proportion of EDs that closed ranged from 0% (0 of 19) to 36% (4 of 11). Over the same period, the population of Ontario increased by 8.9%, but the overall per capita ED visit rate declined by 10.3%; these trends resulted in a decrease in the total number of ED visits of 2.2% (from 3.34 to 3.27 million visits). As a result, the average number of visits per ED rose by 10%, from 19,111 visits per ED in 1993 to 21,096 visits per ED in 2000. CONCLUSION: As a result of ED closures, the average ED in Ontario had a substantially higher visit volume in 2000 than in 1993, despite reduced overall utilization. Planners should consider these trends when trying to predict future demand for ED services.

005 Successful Implementation of a Combined Pneumococcal and Influenza Vaccination Program in a Canadian Emergency Department.
Pearson E, Lang E, Colacone A, Goulet M, Rahmani S, Virgona M, Trudel N, Afilalo M. Sir Mortimer B. Davis Jewish General Hospital. McGill University. Montreal, QC.

INTRODUCTION: Although many emergency departments (EDs) see a high concentration of patients that are unprotected by either pneumococcal or influenza vaccines, few centres have developed an ED vaccination program. This study assessed the extent to which a pneumococcal and influenza vaccination program could be successfully implemented in a Canadian ED. METHODS: *Design:* Prospective cohort study. *Setting:* Tertiary-care academic centre. *Participants:* All patients eligible to receive either influenza or pneumococcal vaccine and presenting to the ED on weekdays from 8 AM to 4 PM from November 1–30 were approached. *Interventions:* A questionnaire was administered to all consenting patients. Unvaccinated patients who did not plan on being vaccinated elsewhere were offered vaccination in the ED. If willing, the patient was vaccinated by a dedicated study nurse and completed a satisfaction questionnaire. RESULTS: During the study period, 753 patients (36%) presenting to the ED were eligible for vaccination with either vaccine; 86.8% (95% CI: 84–89%) on the basis of age, and 13% (95% CI: 11–15%) on the basis of chronic disease. 169 patients (22%) were excluded due to predefined exclusion criteria, 20 (3%) were missed, 35 (5%) refused consent, and 529 (70%) consented to participate in the study and completed a questionnaire. Of the study patients, 282 (53%; 95% CI: 49–57%) were unvaccinated against influenza that year and did not plan on being vaccinated elsewhere, and 279 (53%; 95% CI: 49–57%) were unvaccinated against pneumococcus and did not plan on being vaccinated elsewhere. Influenza vaccine was administered to 187 study patients (36%; 95% CI: 32–40%) while 165 (32%; 95% CI: 28–36%) received pneumococcal vaccine. CONCLUSIONS: In this setting, an ED-based vaccination program can reach a significant proportion of the clientele at risk who would otherwise go unprotected. Similar programs merit implementation on an annual basis.

006 Influenza in the Elderly and Emergency Department Overcrowding.
Schull M, Mamdani M, Redelmeier D. Institute for Clinical Evaluative Sciences, Sunnybrook & Women's College Health Sciences Centre, University of Toronto. Toronto, ON.

OBJECTIVE: Influenza outbreaks may contribute to Emergency Department (ED) overcrowding. We sought to determine the impact of influenza on ED utilization. METHODS: We obtained weekly totals of laboratory-confirmed cases of influenza (A and B) and other respiratory viruses in Toronto from January 1996 to April 1999 (number of weeks = 170). Weekly proportions of total visits to Toronto EDs due to upper respiratory (URT) and lower respiratory tract (LRT) conditions were determined, along with cardiac and psychiatric conditions as 2 control groups. Time series modeling tested the association of ED utilization and influenza cases. Covariates were other respiratory virus cases, average ED patient age and sex distribution. RESULTS: A total of 1,882,702 ED visits over the study period, with a weekly mean of 11,075. Patient age averaged 40 years with 51% female. Weekly cases of influenza ranged from 0–236 (mean = 20); cases of other viruses ranged from 0–91 (mean = 24). Among patients aged <65 years, the mean proportion of total ED visits per week due to LRT conditions was 4% and for URT conditions 6%. Among patients aged >65 years, the mean proportions were LRT 1.8% and URT 0.4%. In time series models, influenza was a significant predictor of increased ED utilization for both LRT ($p < 0.001$) and URT diagnoses ($p < 0.001$), but only among patients >65 years. For every 100 cases of influenza, there was an absolute increase of 2% and 1% in the proportion of total visits due to patients >65 years with LRT and URT diagnoses respectively. This was equivalent to relative increases of 111% for LRT and 250% for URT over their weekly means. Influenza was associated with a small decrease in cardiac utilization among the elderly (–0.2%/100 cases; $p = 0.04$), and was not associated with psychiatric utilization. CONCLUSIONS: Influenza virus is a major predictor of increased ED utilization for respiratory conditions among the elderly.

007 Serum Alpha-Glutathione S-Transferase Following Supratherapeutic Dosing of Acetaminophen in Human Volunteers.
Sivilotti MLA, Montalvo M, Brison RJ, Linden CH. Departments of Emergency Medicine, and of Pharmacology & Toxicology, Queen's University. Kingston, ON.

INTRODUCTION: Alpha-Glutathione S-transferase (alpha-GST) is a promising new biomarker of end-organ toxicity following acetaminophen (APAP) overdose. Previous work has shown alpha-GST appears in the serum shortly after overdose, but not after therapeutic doses of APAP. Understanding the temporal dose-response profile of serum alpha-GST release is necessary prior to clinical application of this biomarker, and to explore its potential as a surrogate

outcome for interventional studies in humans. We sought to characterize the early response of serum alpha-GST to a single supratherapeutic dose of APAP in healthy subjects. METHODS: Prospective human volunteer study. Fasting subjects received 100 mg/kg liquid APAP, and serum assayed every 2 hours until 10 hours for APAP, AST, ALT, bilirubin and alpha-GST concentrations. Patients with known risk factors for APAP hepatotoxicity were excluded. RESULTS: 24 healthy subjects (age 18–42; 13 male) achieved serum APAP levels of (mean ± sd) 347 ± 65 micromole/L (4 h), and 93 ± 53 micromole/L (10 h). AST and ALT remained unchanged (final–initial AST –11 ± 18, ALT –2.0 ± 3.1 IU/L). On average, alpha–GST levels did not change substantially (average peak-baseline 2.6 ± 6.3 microgram/L). Two subjects, however, were clear outliers ("responders") with substantial increases in alpha-GST (final 35 and 14.5 microgram/L vs initial 7.5 and 0.5 microgram/L, respectively), despite unchanged serum transaminse concentrations (final–initial AST +2 and +9, ALT –5 and +6 IU/L). CONCLUSIONS: Serum alpha-GST is unlikely to rise appreciably following supratherapeutic but subtoxic ingestions in healthy subjects, supporting its use as an early "rule out" marker in the overdose setting. Moreover, the ability to demonstrate a response in alpha-GST in a small subset of subjects suggests a model to screen patients for vulnerability to APAP-induced hepatic injury. This biomarker might ultimately improve the specificity and dosing of N-AC therapy, and help resolve controversy regarding risk factors (e.g. alcoholism) for hepatic injury following APAP exposure.

008 Diagnostic Accuracy of Helical Computed Tomography in the Diagnosis of Renal Colic in the Emergency Department: A Meta-Analysis.

Meyers C, Lang E, Dankoff J, Moore S, Martin K, Afilalo M. Sir Mortimer B. Davis–Jewish General Hospital, McGill University. Montreal, QC.

INTRODUCTION: Non-enhanced helical computed tomography (NHCT) has replaced intravenous pyelography as the diagnostic test of choice for suspected renal colic in many institutions. Several studies have reported diagnostic parameters for this test, but many have been flawed by small numbers and methodologic problems. The objective of this study was to perform a systematic review of all available evidence and to pool data from studies meeting specific methodologic criteria in order to better define the diagnostic accuracy of NHCT in emergency department (ED) patients with suspected renal colic. METHODS: Prospective studies reporting the sensitivity and specificity of NHCT in patients with acute flank pain were identified by computerized MEDLINE and manual searching. Using validated criteria, retrieved studies were reviewed by 2 investigators who were blinded to authorship, journal of publication, and results. Our a priori criteria for study inclusion were prospective data collection, enrolment of individuals with and without disease, CT done without contrast and interpreted by a blinded investigator, and comparison to an acceptable reference standard. Patient data from studies meeting these inclusion criteria were extracted and analyzed as a summary receiver operating characteristic curve using a random effects model, from which pooled sensitivity, specificity, and likelihood ratios were derived. RESULTS: Four studies met all a priori inclusion criteria, for a total of 313 patients. For the purposes of the meta-analysis, 1patient originally classified as a true positive, and 3 patients originally classified as true negatives, were reclassified as false positives based on definitions used for the analysis. This resulted in a pooled sensitivity of 95% (95% CI: 91%–97%), a specificity of 93% (85%–97%), and positive and negative likelihood ratios of 13.57 (6.07–32.33) and 0.054 (0.031–0.106), respectively. CONCLUSIONS: NHCT is a useful test for the diagnosis of renal colic in the ED.

009 Serum Alpha-Glutathione S-Transferase Becomes Elevated Shortly after Subtoxic Acetaminophen Overdose.

Sivilotti MLA, Bird DB, Montalvo M, Aaron CK, Brison RJ, Linden CH. Departments of Emergency Medicine, and of Pharmacology & Toxicology, Queen's University. Kingston, ON.

INTRODUCTION: Alpha-Glutathione S-transferase (alpha-GST) is a promising new biomarker of end-organ toxicity following acetaminophen (APAP) overdose. Unlike traditional liver function tests, alpha-GST appears in the serum shortly after overdose in patients who fall above the Rumack–Matthew nomogram threshold for initiating N-acetylcysteine (N-AC). The serum alpha-GST profile following lesser ingestions of APAP in humans is unknown. We sought to quantify the early alpha-GST response following subtoxic exposures to APAP. METHODS: Prospective, observational pilot study of patients presenting within 4 hours of a single acute APAP overdose, with a 4-hour serum APAP level of 500–1000 micromole/L (i.e. below but within 50% of the nomogram threshold). Levels were measured every 2 hours until 10 hours post ingestion. RESULTS: 8 patients (median age 18 years, range 15–59; 2 male) were studied. 4-hour APAP levels were (mean ± sd) 815 ± 212 micromole/L, and all patients were considered low-risk by conventional criteria. Despite persistently normal serum AST and ALT in all patients, 4 had serum alpha-GST levels above the 95% ile upper limit of normal (peak 13, 30, 72, and 79 microgram/L; normal <7.5 microgram/L). Three of these patients had elevated alpha-GST at presentation, and levels had normalized by 10 hours (in the absence of N-AC therapy) in 2 of these 3. CONCLUSIONS: alpha-GST appears in the serum shortly after APAP exposure in patients falling below the "possible hepatotoxicity" nomogram zone. Small elevations in alpha-GST may represent reversible, subclinical injury to vulnerable centrilobular hepatocytes. This phenomenon suggests end-organ toxicity occur even during the classically taught 8-hour window of adequate glutathione protection. This biomarker deserves further study, given its potential to help risk-stratify patients in whom the nomogram cannot be applied (uncertain time of ingestion, repetitive dosing), and to reduce unnecessary or prolonged antidotal treatment with N-acetylcysteine

010 Does Taking a History Help in the Evaluation of Potential Cervical Spine Injury?

Stiell IG, Brison R, Clement C, Bandiera G, Holroyd B, Dreyer J, McKnight RD, Morrison L, Reardon M, Worthington JR, Battram E, Wells GA, for the CCC Study Group. Division of Emergency Medicine, University of Ottawa, Ottawa, ON.

OBJECTIVES: Many physicians pay little attention to history-taking in patients with potential C-spine injury. This study measured the accuracy and reliability of specific history findings in alert trauma patients. METHODS: We conducted a prospective cohort study in 10 tertiary care EDs and enrolled alert and stable adult trauma patients at risk for neck injury. MDs took a standardized history from patients and recorded results. In some cases, 2nd physicians performed interobserver assessments. Patients underwent radiography to determine the outcome, clinically important C-spine injury. Analyses included univariate association, kappa, sensitivity, specificity, adjusted odds ratio by stepwise logistic regression. RESULTS: We enrolled 8,924 patients with mean age 36.8 years and important C-spine injury 1.7%. The following Table shows % of injury and non-injury patients with the history findings, p-value, kappa coefficient, sensitivity, specificity, adjusted odds ratio.
CONCLUSIONS: A history of 'age 65', 'dangerous mechanism', or 'paresthesias' put patients at significantly higher risk of C-spine injury. A history of 'rear-end MVC' or 'delayed onset neck pain' put patients at much lower risk. All 5 of these findings are also reliable

and should be useful to clinicians evaluating the risk of C-spine injury in alert trauma patients.

History/ Finding	Injury	No injury	P-Value	Kappa	Sens	Spec	O.R.
Age >=65 years	23%	7%	0.001	N/A	23%	93%	3.3
Dangerous mechanism	59%	13%	0.001	N/A	59%	87%	4.9
Rear-end MVC	1%	26%	0.001	0.91	99%	27%	0.05
Ambulatory after injury	44%	68%	0.001	0.87	44%	32%	NS
Posterior neck pain	93%	86%	0.05	0.71	93%	14%	NS
Delayed onset neck pain	21%	47%	0.001	N/A	79%	47%	0.5
Paresthesias	24%	9%	0.001	0.77	24%	91%	2.5
Weakness in extremities	8%	3%	0.001	0.54	8%	97%	NS

011 Management and Outcomes of Out-of-Hospital Seizure Patients Attended to by EMS.

Saginur M, Stiell IG, Nesbitt L, Martin MT, Brisson D, Doherty J, Beaudoin T, for the OPALS Study Group. Division of Emergency Medicine, University of Ottawa, Ottawa, ON.

OBJECTIVES: Little is known about the outcomes and diagnoses of seizure patients seen by EMS. This study describes the management, hospital disposition, and final diagnoses of these patients. METHODS: This health records review constitutes the seizure sub-study of the Ontario Prehospital Advanced Life Support (OPALS) Study, the largest prehospital study yet conducted. The OPALS Study will assess the impact of prehospital ALS on patient outcomes. This substudy was conducted in a city of 750,000 with a BLS-D EMS system. Included were all adult out-of-hospital seizure patients seen over a 6-month period. Data sources were ambulance call reports, centralized dispatch data, ED and in-hospital records. Seizure duration was defined as the total time of individual seizures plus interictal periods not interrupted by regained consciousness (GCS ≥14). Analysis included descriptive statistics with 95% CIs. RESULTS: Of 154 suspected seizures, 129 were true seizure cases, with the following characteristics: mean age 46 (range 18–92), male 70%, seizure history 80%, generalized 90%, not transported 7%. Prehospital seizure activity ended prior to EMS arrival in 65% of cases and prior to arrival at ED in 78%. Mean prehospital seizure duration was 20 minutes (range 1–220). ED records were available in 111 of 120 cases (92.5%): 33% received IV anticonvulsants and 6% were intubated. From the ED, 35% were admitted (ICU 5%), 62% discharged, and 3% left AMA. Admitted patients' median length of stay was 5 days (range 1–610), including 0.3 days in ICU. Overall survival was 97.5%. Discharge CPC scores were: 'good' 50%, 'moderate disability' 9%, 'severe disability' 41%. Chronic epilepsy caused 78% of cases; new-onset seizure diagnoses were: tumour 4%, alcoholism 2%, trauma 2%, CVA 1.5%, other known 5%, and unknown 9%. CONCLUSIONS: This comprehensive review offers the first in-depth profile of prehospital seizure patients. These data are essential for the design of future studies of EMS seizure management.

012 Comparison of Three Immobilization Techniques in the Management of Acute Distal Radius Fractures.

Grafstein EJ, Jackson C, Innes GD, Christenson JM, Boychuk BA, Stothers K, McCormack R. Providence Health Care, St. Paul's Hospital, UBC. Vancouver, BC.

OBJECTIVE: To compare the effectiveness of cylindrical casts (CC), volar–dorsal (VD) splints and Muenster modified sugar tong splints (M) for the immobilization of distal radius fractures. METHODS: A multicentre, randomized trial at 4 Vancouver hospitals. Emergency physicians/orthopedic residents reduced all fractures primarily. Patients with undisplaced fractures or unsuccessful primary reductions were excluded. Patients >18 years of age who underwent successful closed reduction of a displaced distal radius fracture were randomized to CC, VD or M immobilization. Physicians were trained in all 3 techniques. Patients had telephone follow up at 2 days, x-ray and orthopedic follow up at 7 and 28 days, and functional assessment at 2 and 6 months. Individual x-ray views from all patients were placed in random sequence, and a blinded radiologist assessed shortening, dorsal angulation, radial inclination, and dorsal comminution. The primary radiological outcome, loss of reduction, was based on explicit criteria. The primary clinical outcome was need for secondary reduction. RESULTS: 40 CC patients, 31 VD patients and 30 M patients were analyzed (n = 101). Baseline fracture characteristics, including shortening, angulation, radial inclination, and dorsal comminution pre-reduction, were similar in all groups. By 7 days, 23% had radiographic loss of reduction, including 8 (20%) in the CC group, 5 (16%) in the VD group, and 9 (30%) in the M group (p = .17). Overall, 17% underwent secondary reduction, including 9 (23%) CC patients, 2 (6.4%) VD patients and 6 (20%) M patients (p = 0.16). Categorical pain scores and analgesic requirements at 1 week did not differ between groups. CONCLUSION: Volar–dorsal splints were associated with less surgery and better radiographical outcomes. Differences were clinically important but not statistically significant because of sample size. Ease of application suggests that volar–dorsal splints may be the best ED immobilization method for distal radius fractures.

013 What is the Role of the History in the Assessment of Patients with Minor Head Injury?

Stiell IG, Greenberg G, Reardon M, Brison R, Clement C, Battram E, MaPhail I, McKnight RD, Schull M, Eisenhauer M, Rowe BH, Cass D, for the CCC Study Group. Division of Emergency Medicine, University of Ottawa, Ottawa, ON.

OBJECTIVES: The history is often ignored in patients with minor head injury. This study measured the accuracy and reliability of specific history findings in minor head injury. METHODS: This prospective cohort study enrolled patients who presented with GCS 13–15 after loss of consciousness, amnesia, or confusion at 10 tertiary care EDs. MDs recorded standardized history findings and in some cases 2nd physicians performed interobserver assessments. Patients underwent CT to determine the outcome, clinically important brain injury. Analyses included univariate association, kappa, sensitivity,

History/ Finding	Injury	No injury	P-Value	Kappa	Sens	Spec	O.R.
Age >=65 years	30%	10%	0.001	N/A	30%	90%	4.1
Dangerous mechanism	53%	22%	0.001	N/A	53%	78%	2.8
Witnessed loss of consc.	55%	46%	0.01	0.83	55%	54%	N/A
Loss of consc. >5 mins.	16%	10%	0.001	N/A	16%	90%	1.6
Any amnesia	95%	87%	0.001	0.52	95%	13%	N/A
Amnesia >30 mins before	38%	19%	0.001	N/A	38%	81%	1.4
Headache	66%	58%	N/S	0.61	66%	42%	N/A
Repeated vomiting	30%	8%	0.001	0.86	30%	92%	3.8
Suspected chronic alcohol	17%	10%	0.001	0.71	17%	90%	NS

specificity, adjusted odds ratio by stepwise logistic regression. RESULTS: We enrolled 3,121 patients with mean age 38.7 years, important brain injury 3.0%, neurological intervention 1.4%. The Table shows % of injury and non-injury patients with the history findings, p-value, kappa coefficient, sensitivity, specificity, odds ratio. CONCLUSIONS: A history of 'age 65', 'dangerous mechanism', 'loss of consciousness >5 mins', 'amnesia >30 mins prior to injury', or 'repeated vomiting' each puts patients at higher risk of important brain injury. These findings are also reliable and should be incorporated into decision rules for the management of minor head injury patients.

014 Protective Equipment Use in In-Line Skating: an Observational Survey.

Rowe BH, Cheung M, Wiebe N, Nykolyshyn K, Belton K, Petruk J, Klassen TP. University of Alberta, Edmonton, AB.

INTRODUCTION: In-line skating is an increasingly common cause of injuries in emergency departments. Some protective equipment (helmets, wrist guards) have been shown to reduce injuries and others are recommended (elbow and knee pads); however, use of these devices varies. This study examined the variations in the use of in-line protective equipment. METHODS: A prospective survey of in-line skaters was performed between 06–08/2001 in an urban Alberta centre. Trained research assistants recorded skaters' demographics (age, gender) and protective equipment wearing patterns (helmets, wrist guards, elbow and knee pads) during a summer period. A random selection of roadways, commuter paths, valley trails, parks, schools and campuses were sampled. Rates are reported with 99% confidence intervals (99% CI). RESULTS: Overall, 615 valid observations were made. The sample's protective unadjusted equipment wearing percentages, from highest to lowest, were: 41% (99% CI: 36, 46) for wrist guards, 19% (99% CI: 15, 22) for knee pads, 15% (99% CI: 11, 18) for helmets, and 7% (99% CI: 4, 9) for elbow pads. Only 3% (99% CI: 1, 4) of observed in-line skaters wore all 4 forms of protective gear. Fifty-four per cent (99% CI: 49, 60) wore no protective gear at all. Fewer males than females used all forms of protective wear; the only difference between genders that was not significant was use of elbow pads. Children were more likely to wear helmets as compared to both adolescents ($p < 0.0001$) and adults ($p = 0.0006$). Overall, the models predicting helmet use were different for each age grouping (e.g., youth, adults). DISCUSSION: These results identify large within region variation in the use of protective devices for in-line skating in a large urban area. Injury prevention planners must use these data to adopt interventions that are focused on age and gender groupings. Further work is urgently required to understand these variations and design implementation strategies to correct these disparities.

015 The Reliability of the Canadian Emergency Department Triage and Acuity Scale in the Prehospital Setting: Interrater Agreement between Paramedics and Nurses.

Murray MJ, Bondy S. Royal Victoria Hospital. Barrie, ON.

OBJECTIVE: To determine the rate of interobserver reliability of the Canadian Triage and Acuity Scale (CTAS) between paramedics and emergency department triage nurses. METHODS: Two hundred and ten paramedics were trained on the use of the CTAS in an 8-hour didactic course. They applied the scale to every patient transferred to the 7 area hospital emergency departments participating during the 4-week study period. The paramedic CTAS assignment was done on arrival to hospital and compared to the triage nurse on arrival in the ED. The triage nurse score was taken as the gold standard. Scores were not revealed by the paramedic or the RN. The rate of agreement was determined between the groups of raters using k statistics and overall correlation using Pearson's rho. RESULTS: There were 1636 patients transferred to hospital during the study period. Of those 1437 had CTAS scores assigned by both the paramedic on arrival and by the triage nurse in the ED. The distribution of CTAS scores and mean scores were the same for both groups of raters. The probability of agreement between the 2 observers on a given patient was 0.599 and the overall agreement within 1 level was 96%. Overall correlation (using Pearson's rho) between the 2 scores was 0.62 (95% Cl 0.59 to 0.65). The overall chance corrected agreement k using quadratic weights was 0.61 (95% Cl 0.56 to 0.66). Further analysis showed meaningful differences between hospitals in terms of degree of agreement. Observed levels of agreement from 1 centre to another showed the overall correlation between the 2 sets of raters ranging from a high of 0.70 to a low of 0.47. CONCLUSIONS: The observed rate of agreement between the 2 raters was significantly greater than by chance alone and consistently in the moderate to substantial range. This suggests that paramedics understand and can apply the CTAS scale to patients similar to nurses.

016 How Accurate and Reliable is Examination of the Neck in Alert and Stable Trauma Patients?

Stiell IG, McKnight RD, Clement C, Brison R, Lesiuk H, Wells GA, Greenberg G, Reardon M, Cass D, Schull M, Morrison L, Eisenhauer M, for the CCC Study Group. Division of Emergency Medicine, University of Ottawa. Ottawa, ON.

OBJECTIVES: Many physicians are reluctant to examine the neck of alert and stable trauma patients. This study assessed the accuracy and reliability of physical examination of the neck. METHODS: This prospective cohort study was conducted in 10 tertiary care EDs and involved alert (GCS 15) and stable adult trauma patients at risk for neck injury. Physicians loosened the neck collar and performed a standardized clinical exam for midline tenderness, postero–lateral tenderness, deformity, active rotation to 45 degrees, and active flexion. Where feasible, 2nd physicians performed interobserver assessments. Patients then underwent radiography to determine the outcome criterion, clinically important C-spine injury. Data analyses included univariate association, kappa, sensitivity, specificity, odds ratio by stepwise logistic regression. RESULTS: The 8,924 patients had these characteristics: important C-spine injury 1.7%; mean age 36.8 years; postero–lateral tenderness 65.5%; midline tenderness 57.8%; deformity 1.3%; able to rotate neck 55.5%; able to flex neck 52.9%. This Table shows % of injury and non-injury patients with findings, p-value, kappa coefficient, sensitivity, specificity, adjusted odds ratio.

Assessment	Injury	No injury	P-Value	Kappa	Sens	Spec	O.R.
No midline tenderness	13.9%	42.7%	0.001	0.78	86%	43%	0.4
No posterolat tenderness	48.7%	34.2%	0.001	0.32	51%	34%	NS
No deformity	96.1%	98.8%	0.05	N/A	4%	99%	NS
Able to rotate	4.0%	56.4%	0.001	0.67	96%	56%	0.07
Able to flex	1.3%	53.8%	0.001	0.63	99%	53%	0.05

CONCLUSIONS: The most reliable and discriminating neck findings for identifying patients at low risk for cervical spine injury are 'ability to actively flex', 'ability to actively rotate the neck', and 'absence of midline tenderness'. Guidelines or decision rules for the management C-spine injury should incorporate these physical findings.

017 Effect of Socioeconomic Status on Pre-Hospital Transport Delays of Patients with Chest Pain.

Govindarajan A, Schull M. Institute for Clinical Evaluative Sciences, Department of Emergency Services, Sunnybrook & Women's College Health Sciences Centre, University of Toronto, Toronto, ON.

OBJECTIVE: Socioeconomic status (SES) is an important determinant of health, but its impact on pre-hospital care has not been widely studied. This study sought to determine whether SES was associated with pre-hospital transport delays for patients with chest pain. METHODS: A retrospective study of patients with chest pain transported by ambulance in Toronto, Canada from January to December 1999 was conducted. The primary outcome measure was the 90th percentile for System Response Interval (SRI), with secondary outcomes being 90th percentile Transport interval, On-scene interval and Total pre-hospital interval (TPHI). The primary dependent variable was SES, defined by the median income for each patient's postal region. Other covariates studied by quantile regression analysis included age, gender, dispatch and return priority, time of day, day of week, type of paramedic crew and percent of highrise dwellings in the region. RESULTS: 4896 patients transported by ambulance met inclusion criteria. The median age was 70, and 50.2% were female. The median income was $19,215. 90th percentile SRI and TPHI were 11 min and 49 min respectively. In univariate analyses, high SES patients had lower mean case severity ($p < 0.01$) and similar dispatch priorities ($p = 0.2$), yet were more likely to be transported by an ALS crew ($p < 0.01$). In multivariate analyses, SES was not significantly associated with any transport intervals. However, age (+50.4s/10yrs; 95% CI 21.0–83.6), female gender (+170.6 s; 95% CI 65.3–273.5) and ALS crews (+351.7 s; 95% CI 263.6–477.2) were associated with delays in TPHI. CONCLUSIONS: SES was not associated with pre-hospital transport intervals for chest pain patients. However, age, gender and ALS crews were associated with delays. Patients from high SES groups were more likely to be transported by an ALS crew, which, in turn, was associated with a 12% increase in total pre-hospital interval.

018 Prospective Validation of the NEXUS Low-Risk Criteria for Cervical Spine Radiography.

Stiell IG, Clement C, Wells GA, Morrison L, Greenberg G, Dreyer J, Holroyd B, Bandiera G, Reardon M, McKnight RD, Brison R, Battram E, for the CCC Study Group. Division of Emergency Medicine, University of Ottawa. Ottawa, ON.

OBJECTIVES: The NEXUS Low-Risk Criteria (NLC) for C-spine radiography in trauma were derived in a 974 patient cohort, validated in a multicentre 34,069 case study, and found to have very high sensitivity. The NLC require radiography unless all 5 low-risk criteria are met. This study prospectively and explicitly evaluated the accuracy, reliability, and acceptability of the NLC in new hospital sites. METHODS: We conducted a prospective cohort study in 9 tertiary care EDs and included all alert (GCS 15) and stable adult trauma patients at risk for neck injury, regardless of whether the physician ordered radiography. More than 350 MDs completed 15-item data forms and interpreted the NLC status for all patients who then underwent radiography to determine the outcome, clinically important C-spine injury. A 2nd MD independently examined 120 patients. Patients were followed by a 14-day telephone interview. Analyses included sensitivity, specificity, kappa coefficient, and descriptive statistics, with 95% CIs. RESULTS: Over 30 months, we enrolled 7,017 patients with these characteristics: mean age 37.5 (range 16–100), male 52.7%, dangerous mechanism 19.5%, arrival by ambulance 62.6%, clinically important C-spine injury 2.0%, unimportant injury 0.5%, internal fixation 0.6%, halo 0.6%. The NLC classified patients for 140 important injuries with sensitivity 91.4% (95% CI 85–96), specificity 33.7% (33–35), and would have required radiography for 66.8%. The kappa value for MD interpretation of the NLC was 0.52 (0.33–0.72). MDs misinterpreted the rule in 3.8% of cases and indicated discomfort applying the rule in 7.1%. Of the 12 important injury cases not identified, 3 required halo fixation and 2 underwent internal fixation; 10 of the 12 were clearly injured by a dangerous mechanism. CONCLUSIONS: These data suggest that the NLC are less sensitive than previously believed, have fair interobserver agreement, and would have little impact on C-spine radiography ordering rates outside of the U.S.

019 Safety and Efficacy of Intravenous Lidocaine During Intubation of Head Injury Patients: a Systematic Review and Meta-Analysis.

Vaillancourt C, Kapur A, Stiell IG, Wells GA. Division of Emergency Medicine, University of Ottawa, Ottawa, ON.

INTRODUCTION: Endotracheal intubation is believed to result in detrimental intra-cranial pressure (ICP) rise and cerebral perfusion pressure (CPP) decline in head injury patients. We sought to determine the safety and efficacy of IV lidocaine in preventing such changes. METHODS: For this systematic review and meta-analysis, we searched 9 electronic databases, 4 trial registries, and 6 scientific Web sites. We performed hand searches and contacted 12 international content experts. We reviewed without restriction all Randomized Controlled Trials reporting IV lidocaine and endotracheal intubation as interventions. Two investigators used standardized forms to review papers for inclusion, quality and data extraction. We used Kappa for inter-observer agreement and Review Manager 4.1 to calculate weighted mean differences (WMD) and 95% Confidence Intervals using random effect model. RESULTS: We electronically identified 331 papers and selected 56/331 for further evaluation (Kappa 0.92). 17 papers from non-electronic sources were also evaluated. We included 55/73 papers in the systematic review (Kappa 0.84). Only 2/55 papers reported ICP measures. One had insufficient information, 1 reported a 12.1 (95% CI 1.4–22.8) decrease in ICP compared to placebo when using 1.5 mg/kg of IV lidocaine 2 min before intubation of patients with brain tumours. We meta-analysed 24/55 papers measuring mean arterial pressure (MAP) with 463 patients, elective surgery 79%, mean dose lidocaine 1.6 mg/kg and mean timing before intubation 1.9 min. We found a WMD of –6.6 mm Hg (95% CI 2.1–11.2) in MAP with lidocaine. CONCLUSIONS: After controlling for other interventions, we found that MAP drops in patients receiving IV lidocaine. Instead of improving CPP, the use of IV lidocaine could be detrimental or at best not useful. There is little or no evidence to support the current use of IV lidocaine during rapid sequence induction of head injury patients. Further studies looking at final neurological outcomes are needed.

020 (Plenary Session) Multicentre Prospective Validation of the Canadian C-Spine Rule.

Stiell IG, Clement C, Wells GA, McKnight RD, Brison R, Worthington JR, Schull M, Eisenhauer M, Rowe BH, MacPhail I, Cass D, Lesiuk H, for the CCC Study Group. Division of Emergency Medicine, University of Ottawa, Ottawa, ON.

OBJECTIVES: The Canadian C-Spine Rule (CCR) for radiography in alert and stable trauma patients was previously derived in a cohort of 8,924 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 study prospectively and explicitly evaluated the accuracy, reliability, and acceptability of 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. More than 350 physicians completed 15-item data forms and interpreted the CCR status for all patients who then underwent radiography to determine the outcome, clinically important C-spine injury. Some patients were independently examined by a 2nd MD. Patients were followed by a 14-day telephone interview. Analyses included sensitivity, specificity, kappa coefficient, and descriptive statistics, with 95% CIs. RESULTS: The 7,017 patients en-

rolled over 30 months had these characteristics: mean age 37.5 (range 16–100), male 52.7%, ambulance arrival 62.6%, clinically important C-spine injury 2.0%, unimportant injury 0.5%, internal fixation 0.6%, halo 0.6%. The CCR classified patients for 140 important injuries with sensitivity 99.3% (95% CI 96–100), specificity 40.4% (39–42), and would have required radiography for 49.9%. The kappa value for MD interpretation of the CCR was 0.66 (0.52–0.81). MDs misclassified the rule in 8.7% of cases, did not evaluate range of motion when indicated in 10.5%, and were comfortable applying the rule in 92.2%. The single case not identified was an ambulatory male without midline tenderness, whose initial radiographs were normal, and who was eventually treated with a hard collar. CONCLUSIONS: The CCR has proven to be an accurate, reliable, and acceptable decision rule. Widespread implementation would lead to more efficient use of immobilization procedures and radiography for alert and stable trauma patients.

021 (Plenary Session) The Validity of Clean-Voided (Bag) Urinalysis (UA) in the Diagnosis of Urinary Tract Infection (UTI) in Nontoilet-Trained Children: A Head-to-Head Comparison with Catheter UA.

McGillivray DL, Kramer MS, Mulrooney ET, Mok E. Montreal Children's Hospital, McGill University. Montreal, QC.

INTRODUCTION: Urine cultures (UC) from clean-voided bag specimens in nontoilet-trained infants and young children are often contaminated. The UA from such specimens is believed to be adequate since it relies on tests for the presence of leukocytes and nitrite rather than on viable bacteria. This belief has not previously been subjected to head-to-head comparison with the UA of simultaneously obtained catheterized (cath) specimens. The study objective was to compare the validity of a clean-voided bag versus cath UA in determing the presence of a UTI based on cath UC. METHOD: We compared the sensitivity (Se) and specificity (Sp) of simultaneous bag and cath UA collected in 311 children presenting to a tertiary-care pediatric ED. A cath UC yielding ≥10,000 organisms/ml of single pathogen was used as the gold standard to define UTI. A positive UA was defined as a dipstick positive for leukocyte esterase and/or nitrite. Secondary analysis included the addition of microscopic pyuria (>5wbc/hpf) to define a positive UA. P values are based on the paired (McNemar) chi-squared test. RESULTS: The bag was more Se than the catheter UA in all age groups, 0.80; 95% CI, (0.72, 0.89) versus 0.66 (0.57, 0.76) respectively, (P value < .02). Bag/cath UA in infants ≤90 days had low Se, 0.57 (0.31, 0.83) and 0.36 (0.11, 0.61) respectively, (P value NS). For infants >90 days Se for bag and cath UA were 0.84 (0.76, 0.93) and 0.71 (0.61, 0.82) respectively with a P value < 0.02. Bag/cath Sp for all ages was 0.44 and 0.96. Addition of microscopic pyuria did not alter the bag/cath UA comparison. Se increased to 0.91 and 0.79. CONCLUSION: The bag had a higher Se than the cath in a head-to-head comparison using cath culture as the gold standard. In infants ≤90 days, neither bag nor cath UA is sufficiently sensitive. In low risk infants >90 days, the 9–16% false-negative rate associated with the bag UA may be sufficient to decide initial management.

022 (Plenary Session) Nurses, Patients and Physicians: an Analysis of Causes of Emergency Department Overcrowding.

Schull MJ, Lazier K, Vermeulen M, Mawhinney S, Morrison LJ. Institute for Clinical Evaluative Sciences, Sunnybrook and Women's College Health Sciences Centre, Prehospital Research Group of Toronto Emergency Medical Services, Department of Medicine, University of Toronto, ON; Faculty of Medicine, Dalhousie University. Halifax, NS.

OBJECTIVE: To determine the relationship between physician, nursing and patient factors on emergency department (ED) overcrowding. METHODS: Data were collected on ED overcrowding (defined as ambulance diversion) at 1 hospital in Toronto, Canada, during consecutive 8-hour intervals from January 1 to December 31, 1999 (n = 1095). Using autoregressive integrated moving average methods, the association between overcrowding and nurse-hours, physician on-duty, and admitted patients held in the ED was determined. Covariates included ambulance, walk-in and major trauma patient volume, admitted patient volume, average time for assessment and disposition, time of day and day of week. RESULTS: 37,999 patients were treated in the ED over the study period; 2% were trauma patients, 16% arrived by ambulance and 22% were admitted. ED nurse-hours per interval averaged 60, but varied by three-fold. A mean of 3.2 admitted patients were held in the ED each interval. For admitted patients, the time from registration to admission order (Assessment time) and from admission order to ED departure (Holding time) averaged 5.2 and 3.5 hours respectively. There was no overcrowding during 170 (15.5%) intervals while 17 (1.5%) were overcrowded the entire interval. In multivariate analyses, ED nurse-hours (p = 0.8) and physician on duty (p = 0.06–0.8) were not associated with overcrowding. The number of admitted patients held in the ED (p < 0.001), number admitted per interval (p = 0.04), assessment time (p = 0.008), holding time (p < 0.001) were all associated with overcrowding. Ambulance patients were associated with overcrowding (p < 0.001), but walk-in (p = 0.2) and major trauma patients (p = 0.4) were not. CONCLUSION: Admitted patients held in the ED are significant determinants of overcrowding, while ED physician on duty and nurse-hours are not. A minority of patients is admitted, yet they contribute disproportionately to overcrowding. Reducing the volume of walk-in patients is unlikely to lessen overcrowding.

023 (Plenary Session) Prospective Multicentre Study of Relapse Following Emergency Department Treatment of COPD Exacerbation.

Rowe BH, Kim S, Emerman CE, Cydulka RK, Clark S, Camargo CA Jr. University of Alberta. Edmonton, AB.

OBJECTIVE: Risk of relapse after ED treatment of COPD exacerbations is uncertain. Our objective was to determine the relapse rate and identify risk factors for relapse. METHODS: 29 North American EDs enrolled patients (pts) 24 hrs/day for a median of 2 weeks. Enrolled pts underwent a structured ED interview and telephone interview 2 weeks later. Inclusion criteria were MD diagnosis of COPD, age 55+, and discharge to home. Relapse was defined as an urgent visit to any ED or clinic within 2 weeks of ED discharge. Data analysis used Chi-2, t-test, K–W test, and logistic regression. RESULTS: Of 419 subjects, 160 (38%) were sent home; follow-up was available in 149 (93%). Relapse was 9% at 1 week, and 21% (95% CI, 14%–28%) at 2 weeks. Body mass index (BMI) was higher in pts who relapsed (29.4 vs 26.0, p = 0.02). Pts who relapsed had higher number of ED or urgent clinic visits for COPD exacerbation during the past year (7 vs 4, p = 0.01). Relapse pts were more likely to report activity limitations (none, mild, moderate, severe) in the 24 hours before the ED visit (p = 0.002), while other subjective symptom ratings were not significant (p = 0.06 and p = 0.16). Relapse was associated with initial respiratory rate (26 vs 23, p = 0.003), but not with other objective severity measures such as O2 saturation or initial peak flow (both p > 0.4). Discharge medications did not predict relapse after adjustment for initial respiratory rate. Controlling for age, sex, and number of ED or urgent clinic visits (all NS), significant predictors of relapse were higher BMI (OR, 1.08 per unit; 95% CI, 1.01–1.14), more activity limitation preceding ED visit (OR, 4.0 per unit; 1.5–10.1), and initial respiratory rate (OR, 1.13 per breath/min; 1.02–1.26). CONCLUSION: On multivariate analysis, BMI, activity limitation, and initial respiratory rate predicted COPD relapse. Future research might target interventions,

such as tailored outpatient therapy or a lower admission threshold, for this high-risk group.

024 (Plenary Session) Identification of High-Risk Locations of Cardiac Arrest for Optimal Implementation of Public Access Defibrillation (PAD) Programs.

De Maio VJ, Stiell IG, Wells GA, Vaillancourt C, Spaite DW, Nesbitt L, Martin MT, Cousineau D, for the OPALS Group. Department of Emergency Medicine, University of North Carolina. Chapel Hill, NC, U.S.A.

OBJECTIVES: Many agencies are promoting widespread availability of AEDs in public places despite a lack of evidence for the best locations for PAD. We attempt to identify high-risk cardiac arrest locations to guide the optimal distribution of AEDs in our communities. METHODS: This was an analysis of a prospective cohort study of all adult, out-of-hospital cardiac arrests occurring before EMS arrival within the 20 communities of the Ontario Prehospital Advanced Life Support (OPALS) Study. EMS response included firefighter defibrillation, BLS-D and ALS paramedics. Case definitions followed the Utstein guidelines. The place of arrest was identified from a centralized dispatch database. Unique property type codes were identified for each address from the provincial property assessment roll and grouped into 26 location categories. Analysis was descriptive. RESULTS: From 1995–2000, there were 6151 consecutive cardiac arrests occurring at 5401 separate addresses. Private residences comprised 87% of these addresses and the remaining 13% were public locations. The number of addresses with multiple cardiac arrests during the study period include: >2 arrests, 404 addresses; >3 arrests, 123 addresses; >4 arrests, 57 addresses; >5 arrests, 30 addresses. Those sites with an average of 1 arrest per year (>5 from 1995–2000) accounted for only 201 (3.3%) of all cardiac arrests. The number of separate addresses for each of these high-risk location categories include: nursing homes 16, apartments 8, stores/strip mall 3, college 1, office building 1, mobile-home park 1. CONCLUSIONS: Most cardiac arrests occur as isolated events in private residences. We identified few locations within 20 OPALS communities that may be amenable to PAD. Further study will evaluate the utility of providing PAD for each of the location categories. All communities considering public placement of AEDs should similarly identify high-risk sites to guide the rational deployment of these devices.

025 (Plenary Session) Treated Versus Untreated HIV Positive Patients in an Urban Emergency Department.

Grafstein EJ, Kimel G, Hogg RS, Craib KJP, Innes GD, Christenson JM, Sherlock C, Palepu A, O'Shaughnessy MV. Providence Health Care, St. Paul's Hospital, UBC. Vancouver, BC.

BACKGROUND: There are an estimated 9,000 injection drug users of whom approximately 2,000 are HIV positive in Vancouver. Many present to the emergency department (ED) without antiretroviral therapy (ART). OBJECTIVE: To identify sociodemographic characteristics of HIV patients presenting to the emergency department who are not on ART. METHODS: A survey was performed between June 1 and September 30, 2001 at St. Paul's Hospital Emergency Department, an urban, academic, tertiary care centre in Vancouver, Canada. All patients between the ages of 18–65 were screened to determine their HIV status. Consented HIV positive patients also provided a blood sample for CD4 count, viral load, and Hepatitis C antibody status. RESULTS: For the 4 month period we screened 447 patients who admitted to being HIV positive. 323 patients consented and 5 who were found to be HIV negative were withdrawn. CD4 counts were obtained in 300 (94%) and VL was obtained in 292 (92%) patients. 37% of patients were on ART and 63% were not. Of those patients not on ART (n = 200), 53% had been on ART and stopped and 47% had never been on ART. 33% of patients not on ART were injection drug users (IDUs) compared to 25% of patients on ART identified as IDUs. In univariate analyses, gender [OR = 2.0, 95% CI: 1.1, 3.6] aboriginal status [OR = 1.8, 95% CI: 1.0, 3.2], injection drug use [OR = 1.6, 95% CI: 1.0, 2.8], unstable housing [OR = 2.0, 95% CI: 1.2, 3.3], age (mean-ART = 40 vs. mean-no ART = 38; p = 0.009) were significantly associated with lack of ART. In multivariate analysis, unstable housing (p = 0.011) was the only significant predictor of lack of treatment. Mean CD4 count was 310/muL ± 233 in untreated IDUs and 368/muL ± 211 in untreated non-IDUs. CONCLUSION: There is a significant untreated HIV patient population using the emergency department for medical treatment. Stable housing appears to be important to receiving ART. A rapid access clinic may improve the ability to provide ART to untreated HIV patients seeking care in the ED.

026 (Plenary Session) Does Access to a STAT Cardiology Follow-Up Clinic Reduce ED Length of Stay in Patients with Chest Pain?

Christenson J, Clarke T, Innes G, Anis A, McKnight D, Boychuk B, Grafstein E, Thompson C, Rosenberg F, Gin K, Tilley J, Singer J. St. Paul's Hospital, UBC. Vancouver, BC.

OBJECTIVE: Rapid access to outpatient cardiology evaluation may, in some cases, reduce the need for emergency investigations and shorten ED disposition time. Our objective was to determine the impact of a STAT cardiology outpatient clinic on ED length of stay (LOS) for patients presenting with chest pain METHODS: This observational study was performed at 2 urban EDs with similar patient populations, ED staffing, invasive capability, and teaching responsibilities. Both are cardiac referral centres, but 1 has access to a STAT cardiology outpatient clinic (STAT) for urgent follow-up within 1–2 days. Consecutive, consenting patients >24 years old who presented to the ED with chest discomfort over a one-year period were prospectively enrolled. Investigators assigned a 30-day outcome diagnosis of definite acute coronary syndrome (ACS) or no ACS based on pre-defined explicit criteria. Patients discharged with a non-ACS diagnosis and no arrangements for urgent follow-up investigations were classified as "missed ACS." Index visit LOS, disposition, diagnostic test utilization and patient outcomes were ascertained for each case through a structured review of the clinical record. Statistical significance was determined using Wilcoxon Rank Sum Test, t-test or the chi-square statistic. RESULTS: 885 patients were enrolled at the STAT hospital and 936 at the NOSTAT Hospital. Median (IQR) index ED LOS was 4.3 (3.0, 6.4) hours in the STAT group and 4.9 (2.9,8.8) hours in NOSTAT ($p < 0.01$). Admission rates were 33.3% and 39.4% respectively ($p < 0.01$). Rates of missed ACS (1.4 vs 1.1%), noninvasive (18.6 vs 16.3%) and invasive testing (17.3 vs 19.7%) were similar. CONCLUSION: ED LOS and admission rate is reduced in a centre with access to a stat cardiology clinic with fewer ETTs, scans and echos during the index visit. These data suggest that a STAT cardiology clinic is effective in reducing index ED utilization in patients with chest pain without increasing the number of patients with missed ACS.

027 Agreement Among Pediatric Health Care Professionals with New Triage Guidelines.

Bergeron S, Gouin S, Bailey B, Amre D, Patel H. Divisions Of Emergency Medicine, Research Institute & Intensive Ambulatory Care Service, Ste-Justine & The Montreal Children's Hospitals. Montreal, QC.

BACKGROUND: Recently, the 5 category Canadian Paediatric Triage and Acuity Scale (PaedCTAS) has been proposed for the triage

of pediatric patients coming to an Emergency Department (ED). OBJECTIVE: To compare triage level assignment, using case scenarios, in a pediatric ED between registered nurses (RN) and pediatric emergency physicians (PEP) using PaedCTAS. To compare triage level assignment by RNs and PEPs to a consensus agreement derived from the PaedCTAS. To compare triage level assignment using the PaedCTAS vs previous 4 category triage tool. METHODS: Cross-sectional questionnaire survey sent to all RNs and PEPs working in the ED after 5 months of the PaedCTAS implementation in our ED. The survey included 55 case scenarios providing details of patient's symptoms, signs and mode of arrival. Participants were instructed to assign triage category on each case, using the following scale: resuscitation, emergent, urgent, less urgent, non urgent. Kappa statistics and the mean number (±1 SD) of correct responses were calculated. RESULTS: A response rate of 95% was achieved (29 RNs, 15 PEPs). The kappa level of agreement (±1 SD) amongst the RNs was 0.51 ± 0.02 and was 0.39 ± 0.03 amongst the PEPs ($P < 0.001$). The mean number of correct responses (±1 SD) for the RNs was 64% ± 27% and for the PEPs was 60% ± 22% ($P = 0.31$). There were no significant differences by stratifying the RNs and the PEPs by experience level (<10 vs. >10 years) or by the type of shift work (day vs. evening vs. overnight). The same survey conducted a year ago with our previous triage tool, yielded levels of agreement for the RNs of 0.453 ± 0.003 and of 0.419 ± 0.005 for the PEPs. CONCLUSIONS: With the introduction of the PaedCTAS, the level of agreement and accuracy of triage categorisation remained moderate for both RNs and PEPs.

028 Randomized, Double-Blind, Placebo-Controlled Trial of Oral Salbutamol in Outpatient Infants with Acute Viral Bronchiolitis.

Patel H, Gouin S, Platt RW, Smith MBH. Divisions of Ambulatory Care Service, Emergency, Epidemiology & Biostatistics and Pediatrics, McGill University. Montreal, QC, Queen's Universities, Canada & Northern Ireland.

BACKGROUND: Many infants with acute viral bronchiolitis are treated with oral salbutamol. Evidence is lacking to support this widespread practice. OBJECTIVE: To determine if oral salbutamol is effective in reducing the short-term symptom severity of infants with mild to moderate bronchiolitis. METHODS: In this randomized, double-blind trial, previously well infants with first time wheezing were randomized upon discharge from the Emergency Department to receive either salbutamol (SAL) (0.1 mg/kg/dose) TID or placebo (PLAC) TID for 7 days. Daily standardized telephone interviews inquiring about symptom frequency and severity were conducted with caregivers for 14 days. The primary outcome of interest was the time to resolution of symptoms (ROS). Secondary outcomes included time to: normal feeding and sleeping, resolved cough, resolved coryza and quiet breathing. Re-visit and hospital admission rates were also measured. RESULTS: During the study period (winters 1999–2001), 127 infants were enrolled (SAL = 63, PLAC = 64). Baseline demographic features, symptoms and signs were similar between groups. The overall mean age was 4.9 months, 60% were male and 76% positive for respiratory syncytial virus. The mean time (SD) to ROS (days) was similar: SAL = 8.9 (4.0), PLAC = 8.4 (3.7) ($p = 0.5$). There were no significant group differences in the secondary outcomes for SAL vs PLAC groups respectively: 4.4 vs 3.3 days for normal feeding, 3.0 vs 3.3 days for normal sleeping, 5.9 vs 5.4 days for resolved cough, 3.9 vs 2.7 days for resolved coryza and 4.4 vs 4.9 days for quiet breathing. Health care re-visit and admission rates were similar between groups. CONCLUSIONS: No significant group differences in the short-term symptom resolution in infants with mild-moderate bronchiolitis treated with oral salbutamol versus placebo were found. The widespread practice of oral salbutamol in this patient group is not recommended.

029 Pediatric Intravenous (IV) Insertion in the Emergency Department (ED): Bevel Up or Bevel Down?

Black KJL, Pusic M, Harmidy D, Larson C, McGillivray D. Montreal Children's Hospital. Montreal, QC.

INTRODUCTION: Intravenous catheters are usually inserted bevel up. Bevel down insertion may be superior in small and/or dehydrated children. We seek to determine whether there is a difference in the success rate of IV insertion using these 2 methods. METHODS: We recruited children requiring an IV in the ED where there was time to obtain consent. Patients were randomized to have the first attempt bevel up or bevel down. If the first attempt was unsuccessful, the alternate technique was used on second attempt. Attempts beyond 2 were not tracked. RESULTS: We recruited 400 patients. Data are available from 380 (206 bevel up; 174 bevel down). At least 63 nurses participated (some were unidentified). The nurses participated in the study a median number of 2 times (maximum 36). The success rate on first attempt was 75.7% for bevel up and 58% for bevel down. The success rate on second attempt was 59.6% for bevel up and 42.9% for bevel down. The nurses who participated fewer than or equal to 2 times had a success rate of 82.7% (95% CI: 69.4, 95.9) bevel up and 50% (95 CI: 31.2, 68.8) bevel down. The 12 nurses who attempted bevel down more than 5 times had a success rate of 65% on the first attempt. CONCLUSION: The limitations of this study include a small sample size, the learning curve of a new technique, and a large number of nurses performing a limited number of procedures. While the success with the bevel down technique improved with experience, a larger number of nurses with experience in the technique are needed to determine if it is superior to the established method.

030 Evaluation of the Pediatric Risk of Admission (PRISA) Score in a Pediatric Emergency Department.

Gravel J, Gouin S, Bergeron S, Amre D, Lacroix J. Divisions of Emergency Medecine, Research Institute and Intensive Care, Department of Pediatrics, Sainte-Justine Hospital, Montreal University. Montreal, QC.

BACKGROUND: Few studies have evaluated the case severity of patients visiting a pediatric Emergency Department (ED). Recently, a pediatric risk of admission score (PRISA) was developed to predict the risk for children of being hospitalised on the basis of their ED evaluation. It was retrospectively evaluated in 1 centre. OBJECTIVES: To evaluate the predictive value of the PRISA score with respect to the risk of admission in a pediatric ED. METHODS: Prospective cohort study conducted in a pediatric tertiary centre ED with 65,000 patient-visits annually. From November 1st 2000 to October 31st 2001, 3 periods of 8 hours per month, were randomly chosen. During these periods, all patients triaged to the ED were evaluated. Data required for calculation of the PRISA score were collected by a single investigator uninvolved in the treatment of patients before the decision regarding admission or discharge was made. Analysis of the odds ratio of each variable for admission and PRISA score were calculated. The criterion validity of the score was evaluated. RESULTS: During the study periods, 1,930 patients were evaluated. Of these patient-visits, 203 admissions were observed while the PRISA score predicted 231. The overall accuracy of the score was 97%. It had a sensitivity of 0.94, a specificity of 0.98, a positive predictive value of 0.82 and a negative predictive value of 0.99. The Hosmer–Lemeshow goodness-of-fit test demonstrated good agreement in consecutive deciles of admission probability: X2 was 28.15 ($P = 0.78$). The area under the receiver operating characteristic curve was 0.79. Some variables of the score did not reach statistical significance as risk factor of admission in our population. CONCLUSION: Probability of admission can be predicted with the

PRISA score in a pediatric ED. Some variables could be deleted or modified in order to optimise the accuracy of the score.

031 How Accurate and Reliable is Mental Status Evaluation in Minor Head Injury Patients?
Stiell IG, Rowe BH, Clement C, Morrison L, Bandiera G, Dreyer J, MacPhail I, Holroyd B, McKnight RD, Schull M, Greenberg G, Worthington JR, for the CCC Study Group. Division of Emergency Medicine, University of Ottawa. Ottawa, ON.

OBJECTIVES: Many physicians take a casual approach to mental status evaluation in minor head injury patients. This study assessed the accuracy and reliability of the Glasgow Coma Scale and the Object Recall Test. METHODS: This prospective cohort study was conducted in 10 tertiary care EDs and involved adult head injury patients who presented with GCS 13–15 after loss of consciousness, amnesia, or confusion. Physicians made standardized assessments of the Glasgow Coma Scale and the Object Recall Test. 2nd physicians performed interobserver assessments for 101 cases. The 2-minute Object Recall Test consisted of showing patients 3 objects and asking them to recall the objects after 2 minutes and was scored from 0 to 3. Patients then underwent CT to determine the outcome criterion, clinically important brain injury. Data analyses included univariate association, kappa, sensitivity, specificity, odds ratio by multivariate logistic regression. RESULTS: We enrolled 3,121 patients with mean age 38.7 (16–99) and important brain injury 8.1%. This Table shows % of injury (N = 254) and non-injury (N = 2867) patients with findings, p-value, kappa, sensitivity, specificity, adjusted odds ratio.

Assessment	Injury	No injury	P-Value	Kappa	Sens	Spec	O.R.
Initial GCS 13	18%	2%	0.001	0.84	18%	98%	2.2
Initial GCS 13/14	53%	17%	0.001	0.84	53%	83%	NS
GCS <15 at 2 hours	65%	13%	0.001	N/A	65%	87%	7.3
GCS <15 at 4 hours	64%	7%	0.001	N/A	64%	93%	NS
GCS <15 at 6 hours	38%	4%	0.001	N/A	38%	96%	NS
Any drop in GCS	21%	1%	0.001	N/A	21%	99%	NS
Object recall <3/3	72%	42%	0.001	0.64	72%	58%	NS

CONCLUSIONS: The most reliable and accurate mental status findings for identifying patients at risk for brain injury are 'initial GCS 13' and 'GCS <15 2 hours after injury'. Decision rules for the management of minor head injury should incorporate these findings.

032 Evaluation of the Canadian Paediatric Triage and Acuity Scale in an Emergency Department.
Gravel J, Bergeron S, Amre D, Gouin S. Division of Emergency Medecine, Department of Pediatrics, Research Institute, Sainte-Justine Hospital, Montreal University. Montreal, QC.

BACKGROUND: The Canadian Paediatric Triage and Acuity Scale (PaedCTAS) was proposed for the triage of pediatric patients coming to an Emergency Department (ED). The validation of this 5-category triage tool was not previously reported. Admission rate and Pediatric Risk of Admission Score (PRISA) may be used for case severity evaluation. OBJECTIVES: To compare the PaedCTAS to a previous triage tool with respect to admission rate, diagnostic and therapeutic interventions and PRISA score. METHODS: A before-and-after study was conducted in a pediatric tertiary centre ED. Data were prospectively collected for 4 months before (Feb–May 2001) (group pre) and for 4 months following (July–Nov 2001) (group PaedCTAS) the implementation of the PaedCTAS. Three periods of 8 hours were randomly chosen each month. During these periods, all the patients triaged to the ED were included. A single investigator, not involved in the treatment of the patients, collected the variables of interest. RESULTS: 744 patient-visits were analysed in the group pre and 537 in the group PaedCTAS. Both groups had similar characteristics: chief complaints, admission rates and mean PRISA scores. In group PaedCTAS, more patients were triaged in the most urgent categories (64% vs 53%, $p < 0.05$) but the admission rates for these categories were lower (15% for group PaedCTAS vs 37% for group pre, $p < 0.05$). The Goodness-of-fit test demonstrated a weaker correlation between triage score and admission rate for the group PaedCTAS vs group pre ($p = 0.43$ vs $p = 0.85$). Both triage tools predicted similarly the interventions required (hemoculture, IV bolus, nebulizations) and the PRISA score. CONCLUSION: The PaedCTAS seems to attribute a higher level of severity to patients but is less accurate for the prediction of admission than a previous triage tool. The PaedCTAS does not appear to perform, as a more discriminatory triage tool regarding interventions and treatments needed than a previous triage tool.

033 Plain Gut versus Non-Absorbable Nylon Sutures in Traumatic Pediatric Lacerations: Long-Term Outcomes.
Karounis H, Gouin S, Eisman H, Chalut D, Pusic M, Morin I, Williams B. Divisions Of Emergency Medicine, Biostatistics & Plastic Surgery, The Montreal Children's & Ste-Justine Hospitals. Montreal, QC.

OBJECTIVE: To compare long-term cosmetic outcomes in pediatric traumatic lacerations repaired with absorbable plain gut versus non-absorbable nylon suture material. METHODS: Randomized clinical trial conducted in a pediatric Emergency Department (ED). Patients (1–18 year-old) who presented to the ED with lacerations <12 hours old were recruited between Jan 1999 and Dec 2001. Patients were randomized into 1 of 2 groups: absorbable plain gut sutures (group A) and non-absorbable nylon sutures (group NA). BE/BC pediatric emergency physicians performed laceration repair in a standardized approach. The patients were evaluated at 4 months by a plastic surgeon blinded to the suture material used for wound repair. The wounds were assessed using the visual analog scale (VAS) of cosmesis (0–100 mm) and the wound evaluation score (WES) composed of 6 items: a score of 6/6 was considered optimal. In addition, the need for any surgical revision was noted. To detect a 12 mm difference on the VAS (alpha = .05, beta = .10), 43 patients per group were needed. RESULTS: 137 patients were eligible of which 49 patients declined to participate. Of the 88 patients enrolled, 45 were randomized to group A and 43 to group NA. Both groups had similar demographics (sex, age), wound size (length, width), wound location and mechanism of injury. No significant differences were found in the mean of VAS (±1 SD) between group A and group NA (82 ± 13 mm vs 73 ± 22 mm, $P = 0.19$). No significant differences were found in the proportion of optimal WES between group A and group NA (45% vs 50%, RR; 95% CI = 0.91; 0.44, 1.88). None of the wounds required surgical revision. CONCLUSIONS: The use of absorbable sutures in the repair of traumatic lacerations in children appears to be an acceptable alternative to non-absorbable sutures as long-term cosmetic outcomes and complication rates are similar.

034 Utilization and the Aging of Emergency Department Patients in Ontario: a Tale of Two Trends.
Chan B, Schull M, Schultz S. Institute for Clinical Evaluative Sciences, Sunnybrook & Women's College Health Sciences Centre, University of Toronto. Toronto, ON.

OBJECTIVE: To determine trends in emergency departments (ED) utilization in Ontario. METHODS: Over the study period (1993 to 2000), most emergency physician services in Ontario were remunerated on a fee-for-service (FFS) basis. We obtained data all FFS physician billing records for ED patient visits. We excluded scheduled visits and those where patients left without being seen, were not assessed, lacked a health insurance number, were workplace accidents, or direct referrals to non-EM specialists. Utilization was analysed by age-sex groups, and rates were calculated using direct standardization techniques and the 1996 census. Statistical tests were not conducted since we included virtually the entire ED patient population. RESULTS: In 2000, there were 3.27 million visits to Ontario EDs. Out of approximately 11.5 million people in the province, 2.25 million, or almost 1 in 20, made at least 1 visit to an ED. Children <5 years and the elderly had the highest rates of use: 34% of children <5 years and 29% of patients >75 years visited an ED at least once, compared to 18% for patients 5–74 years. From 1993 to 2000, utilization rates among all age-sex groups <55 years decreased, but they increased in all groups >55 years. Age-sex specific utilization rate changes ranged from a decline of 24.7% for males 14–19 years of age to an increase of 15.5% for males >90 years. Overall, per capita ED use declined by 10.3%. The average age of ED patients rose by 4.1 years during the study period, as compared to a 1.3 year increase for all Ontarians. CONCLUSION: The overall rate of ED utilization has decreased by 10% since 1993, due to substantially lower rates among individuals <55 years. However, utilization has increased among individuals >55 years. The average ED patient is now older than the average citizen of Ontario.

035 Construct Validity of a Prehospital Acuity Scale: Case Severity Rating Scale.

Morrison LJ, Vermeulen MJ. Sunnybrook & Women's College Health Sciences Centre. Toronto, ON.

OBJECTIVE: To evaluate the construct validity of a 5-point acuity scale (1 = minor [Mi], 2 = moderate [Mo], 3 = severe [S], 4 = life-threatening [LT], 5 = vital signs absent [VSA]) using operational and clinical benchmarks. This scale has inter- and intra-rater reliabilities of 0.98 and 0.99, respectively, and generalizeability of 0.97 for EMS credentials. METHODS: An EMS database of 106,552 (74% of total) emergency ambulance calls in 2000 was used; accuracy of recorded data was 84% and data entry reliability was 0.57. A valid case severity code was entered in 94,299 calls (89%) of which 92,705 (98%) had a value of 1–5 (codes 6 and 7 define death as pronounced in field or obviously dead). The scale was evaluated using dispatch and return priority, patient status change scale, selected drugs or procedures and time intervals. RESULTS: High priority dispatch was associated with a higher severity code (%, 95% CI): severe = 75.0 (74.3, 75.7), life-threatening = 91.0 (89.0, 90.9). A high return priority was found in 58.7% Mi calls, (58.2, 59.2) and increased in all categories to 90.7% in LT (89.7, 91.6). In the status change scale, the majority of patients remained unchanged; improvement rates were 19.2% in Mi (18.7, 19.6), 26.1% in Mo (25.6, 26.6), 30.8% in S (30.0, 31.5), 33.3% in LT (31.7, 34.9), 17.9% in VSA (15.7, 20.2). Severe and LT ranked patients were more likely than Mi and Mo to worsen (10.7 versus 1.7%) or become VSA (2.1 versus 0.13%). The use of drugs and procedures increased incrementally from Mi to LT. Scene interval (90th percentile) increased from Mi = 25.2 to Mo = 27.2, S = 28.1, LT = 32.1, VSA = 41.2; among patients pronounced in field (code 6) it was 46.1. Transport interval (90th percentile) decreased from Mi = 24.1, Mo = 23.9, S = 21.9, LT = 17.9, VSA = 17.3. CONCLUSION: The 5-point case severity scale has validity with respect to operational constructs (dispatch and return priority, scene and transport intervals) and clinical constructs (use of drugs and procedures, patient status change scale).

036 Probability of Acute Coronary Syndrome Stratified by Presentation ECG and Serum Markers.

Christenson J, Innes G, McKnight D, Boychuk B, Grafstein E, Thompson C, Rosenberg F, Gin K, Anis A, Tilley J, Singer J. St. Paul's Hospital, UBC. Vancouver, BC.

The probability of acute coronary syndrome (ACS) in individual patients presenting with chest pain is best estimated using information from subgroups with similar clinical features. OBJECTIVE: To estimate the probability of ACS in patients with chest discomfort and no clear alternate cause prior to and after initial ECG and marker testing. METHODS: Consecutive, consenting patients >24 years old who presented with chest discomfort to 2 urban, tertiary care EDs from May 2000 to April 2001 were enrolled prospectively. Exclusion criteria were inability to communicate or contact, terminal illness, or an obvious traumatic or radiographic cause. Of 1831 patients, 1332 had ECG and serum markers. Patients were assigned explicitly defined, adjudicated 30-day outcomes of AMI, definite unstable angina (UA) or no ACS. Pretest probability of AMI or UA (ACS) was calculated for the whole cohort prior to testing, then recalculated after initial ECG, and after initial ECG plus first marker evaluation. Values are reported for clinically relevant subgroups. RESULTS: ACS proportions (95% CI) in subgroups follow: overall cohort, 27.0% (24.6, 29.4); normal ECG, 13.8% (11.3, 16.7); T-wave flattening only, 20.8% (13.4, 30.6); LBBB, 30.8% (17.5, 47.7); T-wave inversion, 31.1% (22.0, 41.9); ST depression without LBBB, pacing or LVH, 42.8% (34.5, 51.5); ST elevation without LBBB, pacing or LVH, 80.3% (69.2, 88.2); normal ECG + negative marker, 10.1% (7.8, 12.8); T-wave flattening + negative marker, 16.5% (9.8, 26.1); normal ECG + positive marker, 60.0% (45.2, 73.3). CONCLUSION: In this sample of patients with chest pain and a clinical suspicion warranting an ECG and serum markers, the pretest likelihood of ACS was 24.5%. Different initial ECG findings modify likelihood substantially. These tests are strong predictors but imperfect: 11% of patients with a normal initial ECG and normal initial markers had ACS and only 60% of those with an elevated initial marker and a normal initial ECG had ACS.

037 Are Chest Pain Units Cost-Effective Relative to Unstructured Emergency Department Evaluation?

Innes G, Christenson J, Anis A, McKnight D, Boychuk B, Grafstein E, Thompson C, Rosenberg F, Gin K, Tilley J, Singer J. St. Paul's Hospital, UBC, Providence Health Care. Vancouver, BC.

OBJECTIVES: Chest pain units (CPU) are a cost-effective alternative to coronary care units for the evaluation of low risk patients. No studies have compared CPUs to unstructured ED assessment (EDA). Our objective was to compare outcomes and resource utilization for a CPU vs. EDA approach. METHODS: We compared data from a systematic literature review to data from a prospective EDA cohort. Articles eligible for review were those that described their CPU protocol, patient risk factors, index AMI rate, admission rate, length of stay (LOS) and death + AMI rate during a follow-up period. In the EDA cohort, physicians applied an initial diagnosis of AMI, definite unstable angina, possible acute coronary syndrome (ACS) or no ACS. Resource utilization and blinded explicit outcomes were ascertained at 30-day follow-up. Aggregate data from the possible ACS/no ACS groups (low/intermediate risk) were compared to CPU review data. Primary outcomes were admission rate, hospital LOS and 30-day death + AMI rate after discharge. RESULTS: Six CPU studies published after 1994 met review criteria. Over a 12-month period, 1831 consecutive patients were enrolled in the EDA cohort and had 30-day follow-up. EDA patients (n = 1562) were a comparable or higher risk group than historical CPU patients and had similar rates of death + AMI within 30-days of discharge (see Table).

The EDA cohort had similar or lower admission rates, shorter hospital LOS and fewer diagnostic tests. CONCLUSION: Unstructured EDA may provide similar outcomes and lower resource utilization for low/intermediate risk patients. The cost effectiveness of CPU vs. EDA for low/intermediate risk patients is unclear.

	CPU	EDA
Index AMI rate (%)	1.2–5	4.7
Median LOS (hr)	9.2–33	4.8
Stress testing (%)*	>90	15.5
% admitted	13–45	26.3
% AMI within 30 d	0–0.2	0.7
% death within 30 d	0–0.5	0.1

*exercise treadmill, echocardiogram or nuclear scan

038 Antidote Availability in British Columbia Hospitals.
Gorman SK, Zed PJ, Purssell RA, Brubacher J. CSU Pharmaceutical Sciences and CSU Emergency Medicine, Vancouver General Hospital; Faculty of Pharmaceutical Sciences and Faculty of Surgery, UBC. Vancouver, BC.

INTRODUCTION: Timely administration of the correct antidote is often essential to prevent or minimize morbidity and mortality following a toxic exposure. We sought to determine the availability of 14 important antidotes in acute care hospitals in British Columbia (BC). METHODS: A four-part survey, consisting of hospital demographics, community demographics, hospital laboratory capabilities, and antidote stocking information was distributed to BC hospital pharmacy directors in 1997. The antidotes examined in this survey were chosen based on published guidelines and included atropine, calcium gluconate, cyanide kit, deferoxamine, dimercaprol, digoxin Fab fragments, ethanol, glucagon, methylene blue, N-acetylcysteine, naloxone, pyridoxine, rattlesnake antivenin and sodium bicarbonate. RESULTS: Antidote stocking surveys were completed by 107 of 114 (94%) hospitals. Complete antidote stocking surveys were obtained from 96 of 107 (90%) responding hospitals and partial replies were obtained from the remaining 11 centres (10%). The number of antidotes sufficiently stocked ranged from 0/14 to 13/14 (93%), with an average of 3.2. Teaching hospitals stocked 64% of the antidotes versus 20% for non-teaching facilities ($p < 0.001$), urban hospitals stocked 45% versus 13% for rural hospitals ($p < 0.001$), and trauma centres stocked 63% versus 21% for non-trauma centres ($p < 0.001$). Adequate stocking rates increased with hospital size. Small hospitals (<50 beds) adequately stocked 12%, medium hospitals (50–250 beds) 41%, and large hospitals (>250 beds) 55% of the recommended antidotes. Sodium bicarbonate, N-acetylcysteine, ethanol, and naloxone were the best-stocked antidotes with adequate stocking rates of 64%, 50%, 41%, and 38%, respectively. Digoxin Fab fragments, glucagon, pyridoxine, and rattlesnake antivenin were very poorly stocked with respective rates of 3.7%, 4.9%, 6.6%, and 11.2%. CONCLUSIONS: British Columbia hospitals adequately stock less than 1 quarter of the recommended antidotes. This is concerning because BC encompasses a vast geographic area, with many hospitals being located more than a 2-hour drive from another health care centre.

039 An Emergency Department-Based Outpatient Treatment Program for Deep Vein Thrombosis: a Prospective Evaluation of Safety, Patient Satisfaction and Knowledge.
Lang E, Kahn SR, Josephson T, Tselios C, Colacone A, Pike J, Robitaille C, Goulet M, Afilalo M. Sir Mortimer B. Davis Jewish General Hospital. McGill University. Montreal, QC.

OBJECTIVE: To examine the safety, tolerability and educational aspects of an emergency department (ED)-based outpatient treatment program for deep vein thrombosis (DVT). METHODS: *Design:* Prospective cohort study and structured chart review. *Setting:* Tertiary-care academic centre. *Participants:* From April 2000 to March 2001, consecutive patients diagnosed with DVT and eligible for outpatient treatment with a low molecular weight heparin (dalteparin) and warfarin were approached. *Interventions/Observations:* Management consisted of an evaluation/education session with an ED-based Discharge Planning Nurse and an ED-based pharmacist. Patients or their caregivers were surveyed by telephone within 10 days of the initiation of treatment and again at 3 months. The primary outcome measures were recurrent venous thromboembolism (VTE), death and bleeding complications. Secondary outcomes were measures of patient satisfaction and knowledge. RESULTS: 62 patients were recruited and completed the 10 day survey; mean age 59 years; IQR: 47–83 years; 51 patients (82%) were reached for the 3-month evaluation. 4 patients developed complications of illness or treatment (8%; 95% CI 0.4 to 15%); there were no unexpected or VTE-related deaths (95% CI 0 to 7%). One patient (2%; 95% CI; 0 to 10%) was diagnosed with a pulmonary embolism (PE) and 3 (6%; 95% CI 2 to 16%) patients experienced complications likely related to treatment (hematuria, vaginal bleeding and thrombocytopenia); 2 required hospitalization. Overall, 54 (89%) patients were either satisfied or very satisfied with home treatment. In terms of education provided in the ED, 22 patients (36%) were unaware of bleeding complications of therapy and 35 patients (57%) did not know that their condition could be complicated by symptoms of PE. CONCLUSIONS: ED-based outpatient treatment of DVT is safe, well tolerated, and patient satisfaction is high. Educational programs directed at knowledge of illness and side effects of treatment can be improved.

040 Comparison of Point-of-Care Cardiac Markers vs. Standard Laboratory Assays in Emergency Department Patients with Chest Pain.
Innes G, Christenson J, Rosenberg F, Boychuk B, Grafstein E, Thompson C, Tilley J, Singer J. St. Paul's Hospital, UBC, Providence Health Care. Vancouver, BC.

OBJECTIVE: To determine the sensitivity and specificity of a quantitative point-of-care (POC) cardiac marker panel and a standard lab troponin I (TnI) assay relative to 30-day clinical outcomes. METHODS: A prospective cohort study in ED patients with chest pain. Markers were drawn at T = 0 and 2 hours. Standard TnI levels were done on a Beckman Access immunoassay system; triple marker POC assays (TnI, myoglobin, CKMB) were done using a Biosite Cardiac Panel. Tests were considered positive if any marker was positive at 0 or 2 hours, based on recommended cut-offs. At 30-days, blinded investigators assigned explicit outcome diagnoses of AMI, definite unstable angina (objective criteria), possible unstable angina (clinical suspicion only) or no ACS. Sensitivity and specificity for AMI and ACS (AMI or definite UA) were determined. TnI values for all paired (standard-POC) 0 and 2-hour assays were correlated, and area under the ROC curve for the 2-hour TnI assays (standard vs. POC) was compared using AMI and ACS as the outcomes. RESULTS: Of 204 patients studied, 22 had a final diagnosis of AMI and 57 had ACS. Pearson's correlation coefficient for 401 paired (standard/POC) assays was 0.80. AUC (95% CI) for the 2-hour standard TnI assay were 0.87 (.77–.97) and 0.66 (.57–.74) for AMI and ACS respectively. Corresponding values for the 2-hour POC TnI assay were 0.81 (.70–.93) and 0.62 (.53–.71). CONCLUSION: The standard TnI assay was more sensitive for AMI; the POC triple marker was more sensitive for ACS (see Table). Specificity was better using a single vs. a triple marker approach. For the 2 TnI assays, correlation was high and AUC were similar.

	Standard		Point of care	
	AMI	ACS	AMI	ACS
Sens	.77 (.54–.91)	.37 (.25–.51)	.68 (.46–.83)	.46 (.33–.60)
Spec	.95 (.91–.98)	.97 (.92–.99)	.81 (.74–.86)	.84 (.77–.89)

041 Distinguishing Missed Patients with Acute Coronary Syndrome from Those Without Disease.

Christenson J, Innes G, McKnight D, Boychuk B, Grafstein E, Thompson C, Rosenberg F, Gin K, Tilley J, Anis A, Singer J. St. Paul's Hospital. Vancouver, UBC.

OBJECTIVE: It is unclear whether patients discharged inadvertently with acute coronary syndrome (missed ACS) are different from those with ACS. Our objective was to determine whether specific risk criteria distinguish patients with missed ACS from those without disease. METHODS: Consecutive, consenting patients >24 years old who presented with chest discomfort to 2 urban, tertiary care EDs were enrolled prospectively. Age, gender, risk factors (smoking, diabetes, dyslipidemia, hypertension and family history), previous MI or angina, initial vitals signs, initial ECG and initial troponin (TnI) levels were documented. After 30-day follow-up, each patient was assigned an explicitly defined outcome diagnosis of definite ACS or no ACS. Patients discharged with a non-ACS diagnosis and no cardiac investigations arranged but whose outcome diagnosis was definite ACS were classified as missed ACS. We determined the prevalence of predefined risk criteria in patients with missed ACS and in patients with no ACS as well as the relevant odds ratios. RESULTS: There were 383 patients with detected ACS, 22 with missed ACS (AMI or unstable angina), and 1426 without ACS. Odds ratios (95% CI) for the occurrence of specific risk criteria in the missed ACS / no ACS groups follow. Male, 1.03 (0.44, 2.39); >3 risk factors, 2.10 (0.81, 5.43); ECG not normal, 2.48 (1.05, 5.85); previous MI or angina, 3.06 (1.28, 7.35); age > 65, 5.97 (2.32, 15.35); any initial TnI elevation, 9.05 (3.10, 26.42). Of the 22 missed patients, 18 met 1 or more, 16 met 2 or more and 12 met 3 or more of the following criteria: >3 risk factors, ECG not normal, previous AMI/angina, age >65, or elevation of TnI. CONCLUSION: An abnormal ECG, previous MI or angina, age >65 and any elevation in TnI distinguish missed ACS patients from those without disease. Practical decision aids to guide individual diagnosis and disposition of patients with undifferentiated chest pain are likely possible and urgently needed.

042 Multicentre Controlled Clinical Trial to Evaluate the Impact of Advanced Life Support on Out-of-Hospital Respiratory Distress Patients.

Stiell IG, Wells GA, Spaite DW, Nichol G, Nesbitt L, De Maio VJ, Lyver MB, Brisson D, Martin MT, Doherty J, Beaudoin T, Cousineau D, for the OPALS Study Group. Division of Emergency Medicine, University of Ottawa. Ottawa, ON.

OBJECTIVES: There is little published evidence regarding the optimal EMS management of respiratory distress. Our study evaluated the impact of advanced life support (ALS) EMS programs on respiratory patient outcomes. METHODS: This multicentre before–after controlled clinical trial was conducted in 20 communities (population 15,000 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 nebulized and 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 7,716 patients enrolled during the two 6-month BLS and ALS phases were well matched for clinical and demographic features and had these characteristics: mean age 74.0 (16–107), female 53.6%, EMS status 'severe/life threatening' 51.8%, mean RR 28, final hospital diagnoses: CHF 16.9%, COPD 16.3%, pneumonia 9.8%, asthma 5.7%, other cardiac 4.8%, CHF/COPD 3.4%, cancer 2.9%. During the ALS phase, patients received these EMS interventions: nebulized salbutomol 55.3%, IV furosemide 15.2%, SL NTG 9.6%, IV morphine 1.5%, intubation 1.2%. There was a 23.4% relative reduction in the primary outcome, overall mortality, from the BLS to the ALS phase (15.4% vs 11.8%; P < .001). This Table compares other outcomes.

Measurement	BLS	ALS	P-value
EMS-judged "improved"	24.6%	46.7%	.0001
ED mortality	1.2%	0.9%	.0001
ED intubation	4.9%	3.5%	.001
CXR aspiration	4.4%	1.8%	.001
Length of stay, days	10.2	9.3	.05
Best CPC at discharge	42.6%	58.7%	.0001

CONCLUSIONS: This is the largest controlled trial of out-of-hospital respiratory distress patients and clearly shows important benefit from ALS programs for mortality and other outcomes.

043 The Use of Magnesium Sulfate in the Treatment of Acute Asthma.

Rowe BH, Roberts J, Camargo CA Jr, for the MARC Investigators. University of Alberta. Edmonton, AB.

OBJECTIVE: Recent systematic review evidence supports the use of magnesium sulfate (MgSO4) in the treatment of severe acute asthma. However, little is known about the clinical application of these results. We surveyed emergency department-based airway researchers to determine their use of MgSO4 in the treatment of asthma. METHODS: We contacted site investigators in the Multicentre Airway Research Collaboration (MARC) in February 2001 by e-mail. Reminders were sent 1 week later, and respondents were requested to complete an 11-question internet-based survey. The main outcomes were the percentage of sites using MgSO4, and the most common modifying patient factors in the use of this agent. RESULTS: Of 119 different sites approached, 58 sites (49%) responded to the first mailing and 32 sites (27%) responded to the second mailing, for a total of 90 (76%) site responses. There were a total of 93 different respondents from the 90 responding sites. Overall, 84 (90%) respondents stated their EDs have MgSO4 available and its use has occurred; 63 (68%) have personally used MgSO4 in the preceding 6 months. Fewer sites (36, 39%) reported their ICUs using this agent in acute asthma. More respondents listed severity (87%) and failure to respond to initial beta-agonists (80%) as factors that prompt their use of MgSO4. Other factors such as age, gender and duration of exacerbation were less commonly sited as factors in MgSO4 use. Using a 1 to 5 scale (mean ± SD), with 1 = strongly agree and 5 = strongly disagree, respondents disagree (3.9 ± 0.9) with the general use of MgSO4 in all patients presenting to the ED with asthma. Conversely, 72% of respondents agreed or strongly agreed with the statement that MgSO4 is beneficial in severe acute asthma (2.1 ± 0.8). Most (97%) respondents were interested in learning more about MgSO4 or being involved in future MgSO4 research. CONCLUSION: Most asthma researchers seem to accept the efficacy of MgSO4 in acute asthma, and appropriately restrict its use to patients with severe asthma. Interest in future educational and re-

search activities involving MgSO4 appears of to be high within this research group.

044 Clinical Decision Rule for Emergency Department Patients with Acute Headache.

Perry JJ, Stiell IG, Wells GA, Mortensen M, Lesiuk H, Wallace G, Sivilotti M, Kapur A. Division of Emergency Medicine, University of Ottawa, Ottawa, ON.

OBJECTIVE: Currently it is unclear which patients with an acute headache require investigation with lumbar puncture (LP) and computed tomography (CT) for subarachnoid hemorrhage (SAH). This study derived a preliminary decision rule for the investigation of acute headache patients with normal neurological exam. METHODS: This prospective cohort study was conducted at 2 university tertiary care EDs. Patients >15 years of age, with normal neurological examination, GCS 15, and a complaint of a non-traumatic acute headache were enrolled over a 1-year period. Exclusion criteria included: history of recurrent headaches, referral of confirmed SAH, papilledema, previous SAH or known brain neoplasm. Emergency physicians completed data forms prior to investigation with LP and CT. The outcome criterion was SAH on CT, xanthochromia in the cerebral spinal fluid (CSF), or the presence of red blood cells in the final tube of CSF with positive cerebral angiography. Analysis included univariate association, odds ratios with logistic regression and recursive partitioning. RESULTS: The 222 enrolled patients had the following characteristics: mean age 43.4 years, 58.1% female, 9.0% SAH, onset to peak 13.2 minutes, worst headache of life 78.4%, 83.2% underwent CT, 41.9% underwent LP. This Table shows % of SAH and no-SAH patients with findings, p-value, adjusted odds ratio. The recursive partitioning model with 'age >50 years' and 'neck stiffness with flexion/extension' was found to have 100% (95% CI 83–100) sensitivity, 62% (95% CI 55–68) specificity, and would require only 41% patients to undergo investigation. CONCLUSIONS: We have derived a highly sensitive, preliminary decision rule for the investigation of acute headache. Future studies will evaluate the robustness of this rule in a larger patient sample.

Assessment	SAH	No SAH	P-value	O.R.
Age over 50	90.0%	38.3%	0.001	25.0
Transient LOC	20.0%	3.0%	0.01	5.8
Flex/extend neck	61.1%	88.9%	0.01	16.3

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

Perry JJ, Stiell IG, Wells GA, Spacek A. Division of Emergency Medicine, University of Ottawa. Ottawa, ON.

OBJECTIVES: 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 CT and LP for SAH in ED patients with possible SAH. METHODS: This health records review enrolled patients presenting to a tertiary care university teaching hospital ED if they were >15 years, alert with GCS 15, had no new neurological deficits, and had a complaint of headache, syncope or possible SAH. Outcome measures included: CT use and yield, LP use and yield and length of stay prior to discharge/referral to neurosurgery. Exclusion criteria included: maximal intensity in >1 hour, referrals with SAH, recurrent headaches, head trauma, pain for >14 days, focal neurological deficits, papilledema or decreased level of consciousness. Analysis included: descriptive statistics including 95% CI and ANOVA for length of stay. RESULTS: The 891 patients seen over a 10-month period had these characteristics: mean age 41.9, 66.4% female, 1.1% SAH, 2.6% admitted, 42.2% vomiting, 40.8% transient loss of consciousness, 35.1% CT, and 6.8% LP. Only 9 (2.6%) CT and 2 (2.4%) LPs were positive for SAH. There were no missed cases with CT. There was 1 positive LP without a prior CT and another with a positive CT. There were 144 (11.5%) patients who underwent a normal CT without subsequent LP. The mean length-of-stay for patients without SAH was as follows: 4.0 hours (3.8–4.1) without testing, 5.0 hours (4.7–5.4) with only CT, 7.1 hours (6.3–7.9) with LP (p = 0.001). CONCLUSIONS: This study demonstrated that patients who underwent testing spent much more time in the ED. CT and LP had very low yield suggesting the need for a clinical decision rule to guide physicians in the investigation of acute headache to rule out SAH.

046 Is There Still a Role for Physical Examination of Patients with Minor Head Injury?

Stiell IG, Clement C, Cass D, Rowe BH, Eisenhauer M, Schull M, McKnight RD, MacPhail I, Brison R, Reardon M, Greenberg G, Battram E, for the CCC Study Group. Division of Emergency Medicine, University of Ottawa, Ottawa, ON.

OBJECTIVES: In an era of ubiquitous CT scanning, is there still a role for physical examination of minor head injury patients? This study evaluated the accuracy and reliability of common physical signs. METHODS: This prospective cohort study was conducted in 10 tertiary care EDs and involved adults with loss of consciousness, amnesia, or confusion and a GCS score of 13–15. MDs performed a standardized exam for: pupillary size and reaction, lateralizing motor weakness, suspected open skull fracture, basal skull fracture signs, and unreliability due to suspected ethanol/drug intoxication. Where feasible, 2nd physicians performed interobserver assessments. Patients had CT to determine the outcome, clinically important brain injury. Analyses included univariate association, kappa, sensitivity, specificity, adjusted odds ratio by stepwise logistic regression. RESULTS: The 3,121 patients enrolled over 36 months had these characteristics: mean age 38.7, GCS score – 15 79.8%, important brain injury 8.1%, required neurological intervention 1.4%. The Table shows % of brain injury (N = 254) and non-injury (N = 2867) patients with the findings, p-value, kappa, sensitivity, specificity, adjusted odds ratio.

Assessment	Injury	No injury	P-Value	Kappa	Sens	Spec	O.R.
Abnormal pupils	2.8%	1.1%	0.05	0.66	3%	99%	NS
Lateralizing weakness	0.8%	1.1%	NS	0.66	1%	99%	NS
Suspected open skull #	11.8%	2.6%	0.001	0.85	12%	97%	3.2
Signs of basal skull #	30.4%	4.7%	0.001	0.76	30%	95%	5.0
Unreliable 2nd Etoh/Drug	18.1%	11.8%	0.01	0.54	18%	88%	NS

CONCLUSIONS: Assessment of pupils and motor weakness is not useful in minor head injury patients. The most reliable and accurate physical findings for identifying the risk for brain injury are 'suspected open skull fracture' and 'signs of basal skull fracture' and these should be incorporated into decision rules for the management of minor head injury.

047 What can be Gained from the General Physical Examination of Alert Patients with Potential Cervical Spine Injury?

Stiell IG, Clement C, Worthington JR, Schull M, Eisenhauer M, MacPhail I, Cass D, Rowe BH, Battram E, Bandiera G, Brison R, McKnight RD, for the CCC Study Group. Division of Emergency Medicine, University of Ottawa. Ottawa, ON.

OBJECTIVES: In the assessment of potential C-spine injury patients, what can be gained from the general physical examination? This study evaluated the accuracy and reliability of common physical signs. METHODS: This prospective cohort study was conducted in 10 tertiary care EDs and involved alert (GCS 15) and stable adult trauma patients. MDs performed a standardized exam for: patient position, distracting painful injuries, unreliability due to ethanol/drug intoxication, visible facial injury, visible head injury, motor deficit in extremities, sensory deficit in extremities. 2nd physicians performed interobserver assessments in 150 cases. Patients underwent radiography to determine the outcome, clinically important C-spine injury. Analyses included univariate association, kappa, sensitivity, specificity, odds ratio by multivariate logistic regression. RESULTS: The 8,924 patients enrolled over 36 months had mean age 36.8 and 1.7% had important C-spine injury. The Table shows % of C-spine injury (N = 151) and non-injury (N = 8773) patients with the findings, p-value, kappa, sensitivity, specificity, adjusted odds ratio.

Physical findings	Injury	No injury	P-Value	Kappa	Sens	Spec	O.R.
Upright position	6%	39%	0.001	0.74	6%	62%	NS
Distracting injuries	15%	8%	0.001	0.41	15%	92%	NS
Unreliable 2nd Etoh/Drug	8%	4%	0.05	0.22	8%	96%	NS
Facial injury	43%	19%	0.001	0.75	43%	81%	1.8
Head injury	48%	20%	0.001	0.76	48%	80%	1.6
Motor deficit	5%	1%	0.001	0.93	5%	99%	NS
Sensory deficit	6%	2%	0.001	0.60	6%	98%	NS

CONCLUSIONS: The findings 'distracting painful injuries' and 'unreliable due to etoh/drug' show poor interobserver agreement. The other 5 findings are reliable but only 'facial injury' and 'head injury' independently predict a higher risk of C-spine injury in alert trauma patients.

048 Success and Complications of Individual Treatment Methods for Paroxysmal Atrial Fibrillation.
Kapur AK, Stiell IG, Wells GA, Brison RJ, Mortensen M. Division of Emergency Medicine, University of Ottawa. Ottawa, ON.

OBJECTIVES: To compare the proportion of paroxysmal atrial fibrillation (PAF) patients who convert to sinus rhythm in the ED with rate control agents (RC), pharmacologic agents (PHARM) or electrical cardioversion (ELEC). To determine the proportion of patients in each group who suffer complications in the ED. METHODS: This 6-month prospective cohort study, conducted at 3 university-affiliated hospital EDs, enrolled all adult patients who presented to the ED with <48 hours of clinically stable PAF. Success was determined by the ED physician's interpretation of the ECG. Complications were determined by review of the patient's ED chart and vital signs. Proportions, with 95% confidence intervals (CI), were compared using chi-square. RESULTS: We enrolled 169 patients; 81 in the RC group, 127 PHARM, 57 ELEC, and 12 received no treatment (some patients received more than 1 treatment). 7 of the untreated patients (58.3%, CI: 32.0%–80.7%) and 4 RC patients (4.9%, CI: 1.9%–12.0%) spontaneously converted. 65 PHARM patients (51.2%, CI: 42.6%–59.7%) and 50 ELEC patients cardioverted (87.7%, CI: 76.8%–93.9%). None of the untreated patients had complications (0.0%, CI: 0.0%–24.3%). 2 RC patients had complications (2.5%, CI: 0.7%–8.6%). 4 PHARM patients had complications (3.1%, CI: 1.2%–7.8%) and 1 of them was admitted (0.8%, CI: 0.1%–4.3%). 9 ELEC patients had complications (15.8%, CI: 8.5%–27.4%) and 1 of them was admitted (1.8%, CI: 0.3%–9.3%). Electrical cardioversion was less successful if preceded by rate control (73.9% vs 97.1%, p = 0.01). Pharmacologic conversion was also less successful if preceded by rate control (73.7% vs 88.1%) but this was not significant (p = 0.10). CONCLUSIONS: Electrical cardioversion was the most successful treatment method. Administration of rate control agents decreased the success of the other treatment methods. Most complications were minor and did not lead to admission. This suggests that primary electrical cardioversion is the optimal ED treatment for PAF.

049 Closed Reduction of Distal Radius Fractures in the Emergency Room: Factors Associated with Orthopedic Intervention.
Skoretz TG, Eisenhauer M, Amir H. London Health Sciences Centre, University of Western Ontario. London, ON.

OBJECTIVE: To describe patient and radiographic characteristics associated with Orthopedic intervention in patients that received closed reduction of a distal radius fracture in the Emergency Room. INTRODUCTION: Closed reduction of a distal radius fracture is a time consuming and laborious procedure. Despite closed reduction in the ER, many patients will go on to further manipulation and/or operative repair by the Orthopedic Surgery service. Discovering factors that predict future Orthopedic intervention may be helpful in the management of this common injury. METHODS: The Emergency Room logbook and billing records were reviewed for all adult patients that underwent a closed reduction of a distal radius fracture by the Emergency Medicine service at London Health Sciences Centre–South Street, a tertiary care centre, in 2000. Hospital charts and presenting wrist radiographs were reviewed. Multivariate analysis was used to calculate predictors of Orthopedic intervention (repeat closed reduction or operative repair). In addition, multiple reviewers assessed initial radiographs to calculate inter-rater reliability in extracting 5 different x-ray variables. RESULTS: A total of 71 distal radius fractures underwent closed reduction by the Emergency Room medical staff at LHSC–South Street. Seventy charts were available for review. Initial radiographs of the injured wrist were available in 56 patients. Analyses showed that patient age (OR = 0.952) and initial dorsal angulation (OR = 0.964) were associated with Orthopedic intervention. Analyses of inter-rater reliability demonstrated fair to excellent reliability in extraction of radiographic variables. CONCLUSION: In the sample of patients reviewed, patient age and initial dorsal angulation were predictive of future Orthopedic intervention. In addition, inter-rater reliability in extracting x-ray data was considered good overall, but variability existed.

050 Isocapnic Hyperpnea Accelerates Ethanol Elimination: a Model.
Preiss D, Sasano H, Vesely A, Petroianu G, Fisher JA. Department of Anesthesia, University Health Network. Toronto, ON.

BACKGROUND: Using the lungs to accelerate ethanol elimination has been limited by concerns about the adverse effects of the hypocapnia accompanying hyperventilation. Based on a simple method to produce isocapnic hyperpnea1 (IH), we re-examined the potential contribution alcohol elimination through the lungs to enhance total body ethanol clearance. We hypothesized that at high ethanol concentrations, isocapnic hyperpnea significantly accelerates elimination, compared to that due to hepatic metabolism alone.

METHODS: Using a commercial spreadsheet program, we simulated the elimination of ethanol, based on its distribution over total body water, a blood–air partition coefficient of 2000, and a constant hepatic elimination rate of 15 mg/dL/h. We used the model to predict rates of ethanol elimination for ventilations of 5 and 25 L/min at blood ethanol concentrations of 100 mg/dL (just above the legal driving limit) and 600 mg/dL (near lethal limit for non-tolerant adults). RESULTS: Increasing minute ventilation from 5 to 25 L/min increased the elimination rate of ethanol by 9% at an ethanol concentration of 100 mg/dL, and by 50% at a concentration of 600 mg/dL. CONCLUSION: Our model predicts that IH will contribute significantly to the rate of ethanol elimination at high initial concentrations and may provide a useful adjunct to standard treatment in highly intoxicated patients. We predict that IH will be even more effective in tolerant subjects who present with even higher blood alcohol concentrations.

051 Does Urine Screening for Drugs of Abuse Change the Management of ED Patients?

Eisen JS, Sivilotti MLA, Collier C. Department of Emergency Medicine, Queen's University. Kingston, ON.

BACKGROUND: It is estimated that substance use is a frequent factor in Emergency Department (ED) visits. Qualitative urine testing for drugs of abuse (U-DOA) is frequently ordered, but is limited in its ability to establish the identity, timing or dose of substances used. Although previous retrospective studies have demonstrated these limitations, their study design cannot be used to determine whether U-DOA provides useful information to the ED physician when making patient care decisions. Objective: To isolate and measure the impact of U-DOA on ED patient care. METHODS: All U-DOA ordered in adult patients seen in 2 teaching EDs were eligible; screens that were ordered for victims of trauma or sexual assault were excluded. Prior to reporting the test results to the ED, ordering physicians were phoned by the investigators and queried about their patient care plans before, and then immediately after the results were disclosed. This design isolated the impact of the U-DOA screen on ED patient care decisions. Any changes in plan reported by the physician were compared to a pre-determined set of changes that were considered to be clinically important. RESULTS: To date, 81 U-DOA have been enrolled during a period with approximately 42,000 ED visits. One ED physician reported a change in plan (CT head deferred), but this change was not considered significant according to pre-specified criteria. U-DOA thus led to a clinically important change in management in 0/81 cases (95% CI 0–3.7%). CONCLUSIONS: U-DOA is rarely helpful in guiding patient care decisions in the ED. These results call into question the need for the test in the ED setting.

052 Economic Evaluation of the Potential Impact of the Canadian C-Spine Rule.

Coyle D, Stiell IG, Wells GA, Clement C, for the CCC Study Group. Division of Emergency Medicine, University of Ottawa, Ottawa, ON.

INTRODUCTION: The Canadian C-Spine Rule (CCR) is designed to improve the efficiency of ED management of potential cervical spine injury patients. This economic analysis estimated the potential cost savings to the Canadian health care system with widespread use of the CCR. METHODS: This economic analysis used a probabilistic-based decision analytic model comparing current clinical practice to that assuming 100% uptake of the CCR. 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 = 8,924) and validation (N = 7,017) studies. For our base analysis, current radiography rates were estimated to be 71.6%. Sensitivity analyses assumed rates of 90% and 100%. Cost data were obtained from provincial health care fee schedules, hospital cost accounting systems and, if required, the literature. The probabilistic model employed Monte Carlo simulation that was based on 3,000 replications. We estimated the expected values for potential cost savings and reduction in radiography rates. Results are in Canadian dollars. RESULTS: In our base analysis, the expected value of cost savings with the CCR was $8.54 (95% credibility interval $5.61–$11.91) per alert stable trauma patient. The rule is forecasted to lead to an absolute reduction in radiography of 12.8% (95% CI 8.9–16.9) compared to current rates of 71.6%. The total annual cost savings, assuming a Canadian adult trauma patient population of either 185,000 or 400,000 patients, would be $1.6 million and $3.4 million respectively. Assuming radiography rates of 90% and 100%, the expected annual cost savings were $8.8 million and $11.5 million respectively, based on 400,000 patients per year. CONCLUSIONS: Widespread use of the CCR is expected to lead to cost savings as low as $1.6 million per year or as high as $11.5 million. Future studies should evaluate the potential economic impact of the CCR in other countries.

053 Transient Ischemic Attacks in the Emergency Department: Description and Outcome.

Rowe BH, Yiannakoulias N, Bullard M, Spooner CH, Holroyd BR, Svenson L, Rosychuk R, Schopflocher D. University of Alberta, Edmonton, AB.

OBJECTIVES: Defining the short-term prognosis and risk factors for stroke after transient ischemic attacks (TIA) may provide guidance in determining which patients need rapid ED evaluation. Recent US data suggest the 90-day risk of recurrent TIA (13%) or stroke (11%) are high. This study examines ED presentations of TIA and links data to health care use in the subsequent year. 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 (98/99) with a diagnostic code of TIA (434.x). 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 and crude presentation rates are reported. RESULTS: Overall, 1.49 million ED visits were recorded in the year; the number of patients with a diagnosis of TIA was 2543 (1.7/1000 ED visits). Overall, 75% of patients were over the age of 65 years; males and females were equally represented. Limited daily or seasonal variation exists; Monday (15.6%) and December (10.7%) numbers were highest. Most patients are discharged (1810; 71%); admission (770; 28%) is higher than the ED average and few leave prior to seeing a physician (<1%). The rate of TIA varies between regions, with the average of 7.5/1000 population. Representation to the ED is common (833; 37%); however, representation with a TIA (236; 10%) or stroke 24 (1%) in the subsequent year was less frequently observed. CONCLUSIONS: These results indicate that TIA is a relatively common presentation to the ED, but that development of recurrent TIA or stroke was lower than expected based on recent US figures. Further evaluation of TIA patients in the ED is urgently required to understand the observed variation and determine predictors of recurrence.

054 Defining 'Irrelevant' CT Findings in Blunt Head Injury Patients.

Atzema C, Mower WR, Hoffman JR, Holmes JF, Killain AJ, Greenwood SD, Shen A. University of California. Los Angeles, CA, USA.

INTRODUCTION: Researchers developing a clinical decision instrument (CDI) for the use of computed tomography (CT) in patients with minor head injury (MHI) must classify certain injuries seen on

CT as 'clinically unimportant'. This is necessary to identify which patients actually needed a head CT. This study aims to evaluate the importance of various minor CT findings, based on need for neurosurgical intervention and Glasgow Outcome Scale (GOS) scores. METHODS: NEXUS II is a prospective observational study involving patients at 18 sites who received an emergent head CT scan between April 1999 and December 2000. In this substudy of NEXUS II we prospectively defined a number of CT findings generally considered clinically unimportant, and identified patients at 6 sites for whom the official radiology report included 1 of these findings. Two trained independent abstractors reviewed patient charts to determine presence of neurosurgical intervention or a poor outcome (GOS 3–5). RESULTS: Prevalence of minor CT findings was 1.86% (n 156) among the first 8374 trauma patients in the NEXUS II cohort. Eighty-two patients at the 6 sites met the inclusion criteria, and 11 (13%) patients fared poorly and/or had neurosurgical intervention. Adequate follow-up information was available on 10 of these patients, all of whom had an abnormal GCS at the time of the CT scan. Five of the 7 neurosurgical patients had abnormal coagulation studies. CONCLUSIONS: Clinically unimportant findings are diagnosed in less than 2% of head trauma patients undergoing CT scanning. While an important minority of these patients do have neurosurgery or a poor outcome, this appears to be extremely rare in patients who do not present with an abnormal mental status and/or a coagulopathy. With certain qualifiers, clinicians and developers of a CDI for the use of head CT in MHI patients may safely classify minor CT findings as insignificant.

055 Attitudes and Judgement of Emergency Physicians in the Management of Patients with Acute Headache.
Perry JJ, Stiell IG, Wells GA, Mortensen M, Lesiuk H, Wallace G, Sivilotti M, Kapur A. Division of Emergency Medicine, University of Ottawa, Ottawa, ON.

OBJECTIVE: Currently there is little objective evidence guiding physicians in the investigation acute headache to rule out subarachnoid hemorrhage (SAH). This study assessed emergency physicians (EP) in: 1) their attitudes to not ordering head CT before performing LP, this demonstrates if EPs are willing to use Schull's model, which suggests a LP directly for patients with normal neurological examination, and 2) the accuracy of their judgment for predicting SAH without a decision rule. METHODS: This 1-year prospective cohort study was conducted in 2 tertiary care university EDs. Data was collected for consecutive alert patients with an acute headache and a normal neurological examination. Prior to investigation, MDs recorded the pre-test probability for SAH to the closest decile and comfort in 'performing an LP without obtaining a CT with a 3-point Likert scale. The criterion outcome was SAH as diagnosed by SAH on CT, xanthochromia in the cerebral spinal fluid (CSF), or the presence of red blood cells in the final tube of CSF with positive cerebral angiography. Descriptive statistics and a receiver operating characteristic (ROC) curve with a 95% CI were generated. RESULTS: The 222 enrolled patients had a mean age 43.4 years, 58.1% were female, 9.0% had SAH, 83.2% underwent CT, and 41.9% underwent LP. EPs reported being 'uncomfortable' in performing an LP without first ordering a CT in 54.6% of cases. They were 'very comfortable' in performing an LP without CT in 7.7% of the cases. The area under the ROC curve for the pre-test probability of SAH was 0.85 (95% CI, 0.76, 0.93). There were 3 positive cases with a pre-test probability of <5% and 4 patients with SAH with a pre-test probability of 10%. The remainder had a pre-test probability of over 20%. CONCLUSIONS: EPs were uncomfortable in performing an LP without obtaining a CT. Physicians showed only fair accuracy in predicting SAH and a clinical decision rule may improve the accuracy and efficiency of SAH diagnosis.

056 The Influence of the Emergency Medicine Clinical Teachers' National Certification Level on their Evaluation by Residents.
Steiner IP, Yoon PW, Kelly KD, Donoff MG, Diner BM, Mackey DS, Rowe BH. University of Alberta. Edmonton, AB.

INTRODUCTION: The evaluation of clinical teaching faculty is necessary and using accepted tools it can be valid and reliable. Currently there are no data from the medical education literature concerning specific faculty-related factors relating to teaching performance. This study examines the influence of EM certification status of clinical faculty on the teaching performance scores provided by residents. METHODS: A retrospective analysis of data accumulated between 07/1994–07/2000 on 1st, 2nd and 3rd year Family Medicine residents' evaluations of EM clinical teaching faculty at the University of Alberta was conducted. Resident and teaching faculty related variables were entered anonymously using the ED Scale (Acad Emerg Med 2000;7[9]:1015–21). Credentialing and demographic information on EM teaching faculty was supplemented by data obtained through a 9-question survey; public information resources provided data on some teachers. Descriptive and ANOVA analyses are presented. RESULTS: 562 Family Medicine residents completed EM clinical rotations during the study period and 777/831 (94%) had voluntarily returned anonymous completed evaluation forms. 705/831 (85%) had valid data. 115 clinical teaching faculty members had been evaluated in 4 dispositional domains: Didactic teaching, Clinical teaching, Approachability and Helpfulness for a total of 12,816 individual evaluations. Complete information on 109/115 (95%) EM teaching faculty members was obtained. Univariate analysis on the scores by EM certification level indicated that EM specialists rated statistically highest in the didactic teaching category ($p < 0.001$), whereas EM certified family physicians rated higher in the approachable and helpful categories ($p < 0.001$). Physicians without any national certification were rated lowest on all 4 categories. Subgroup analysis revealed superior teaching performance by formally trained teachers in certain evaluation domains. CONCLUSIONS: EM national certification is a positive moderator of teaching performance. The statistically significant differences found between specialist and family physician teaching groups probably have no practical implications.

057 Medical Undergraduate Curriculum International Health Enrichment Project.
Felix J, Bullard M, Hoyano D, Sowa B, Laing L, Baydala L, Fanning A. University of Alberta. Edmonton, AB.

INTRODUCTION: Many recent applicants to Emergency Medicine training programs cite international health (IH) opportunities as 1 reason for their specialty selection. A CAEP International Emergency Medicine Committee has recently been formed. This study attempted to identify the extent of international health (IH) content in a typical medical curriculum, in concert with a proposal to enhance it. METHODS: A manual search of the first 2 years of undergraduate course materials at the University of Alberta was completed by trained research assistants. IH content was coded as: any material consistent with the previously established IH Core Content. IH mentions were not weighted and any written IH content in handouts was included. In parallel, the content of each educational block was surveyed to identify topic areas best suited to IH enrichment. These results were reported to each block Coordinator. Finally 2 of the authors met face-to-face with the major Block Coordinators to discuss implementation. RESULTS: In 2001, Year 1 and 2 contained 11 distinct educational blocks. The number of IH mentions ranged from 2 (Cardiology) to 69 (Infection/Immunity/Inflammation) with a median of 22 (IQR: 11, 29). All (100%) Block Coordinators supported the IH initiative; however, 80% requested assistance in developing

teaching materials and concepts. Our presentation to the Undergraduate Curriculum Committee led to the incorporation of IH enrichments into the curriculum beginning in September 2001. CONCLUSIONS: Prior to this survey, IH was not a large component of most medical student block training at this University. There are presently 7 hours of dedicated IH time in the first 2 years of the curriculum with several enrichment areas being developed. Optimizing the amount and type of IH undergraduate enrichment is an ongoing project. Educators in other universities need to repeat this study, and motivated EM educators need to participate in areas of IH teaching.

058 The Development and Evaluation of a Public Access Defibrillation (PAD) Training Program.
Irwin K, Travers A, McDonald S. Division of Emergency Medicine, University of Alberta. Edmonton, AB.

INTRODUCTION: Sudden out of hospital cardiac arrest remains a significant cause of morbidity and mortality. Automatic external defibrillators (AEDs) are safe and effective when used by emergency response personnel, but it is unclear whether this benefit extends to lay responders. The Public Access Defibrillation (PAD) Trial is a multicentre, randomized trial designed to compare the effectiveness of cardiopulmonary resuscitation (CPR) alone, to CPR and AED use by volunteer lay responders. The purpose of this study is to evaluate student satisfaction with the CPR and AED training program developed for the trial in a major Canadian urban centre. METHODS: We developed a training program to teach CPR in 2 hours and AED use in an additional 2 hours. The instructor to student ratio was between 1:4 and 1:6. At the conclusion of each training session, volunteers were asked to complete an evaluation survey. RESULTS: To date, 771 volunteers have been trained, 647 of whom completed surveys, a response rate of 83.9%. On a scale of 1–5, CPR only students rated their confidence level with rescue breathing, CPR, and foreign body airway obstruction at a mean of 4.07 (SD 0.77) and CPR plus AED students at a mean of 4.29 (SD 0.74). Confidence with AED use was rated at a mean of 4.44 (SD 0.66). When asked for general comments, 7.7% of participants felt the program was rushed and 18.9% felt the practice scenarios were the best component. Overall, 75.5% of lay responders felt the program was useful for someone at their level. CONCLUSIONS: Efficient and effective training programs will be needed if AED use in the community becomes widespread. The authors believe that this training program can form the basis for future programs designed to teach lay rescuers the skills necessary to respond appropriately in a cardiac arrest, including defibrillation.

059 Internet Access to Computer-Based CME in Southeastern Ontario: Are Physicians and Hospitals Ready?
Sampsel K. Queen's University. Kingston, ON.

BACKGROUND: The use of computer-based technology in medical teaching has increased exponentially. One area that has potential for the application of these technologies is the provision of online Continuing Medical Education (CME) programs to rural and remote areas. However, access to programs that involve interactive graphics and video may be limited by the local computer hardware or speed of internet connection. Prior to implementing a series of computer-based CME learning modules we wanted to assess the computer resources available to hospitals and physicians in rural and remote areas of southeastern Ontario. METHODS: A series of hospital site visits and surveys were conducted within the Queen's University CME catchment area. During site visits, the investigators used the local hospital computer facilities to access learning modules from the Queen's University server. The ease of access and practical performance of the modules were assessed. Further, physicians at 2 sites were asked to complete a survey about their use of home computers for educational purposes. RESULTS: All of the learning modules tested from the sites could be operated by some means (over the internet, downloaded from the internet or via a CD-ROM) at all of the locations evaluated. Current use of computers for educational purposes by physicians either at home or at the local hospital varied by location and physician. The majority of survey respondents reported current use and interest in future online CME-accredited applications. CONCLUSIONS: Internet access to multimedia learning modules by physicians in southeastern Ontario is currently feasible and has potential for widespread use with minimal upgrades to existing infrastructure. Additionally, a majority of physicians are currently using computers and the internet for educational purposes and show interest in online CME initiatives.

060 The Influence of the Residents' Training Level on their Evaluation of Emergency Medicine Clinical Teaching Faculty.
Steiner IP, Yoon PW, Kelly KD, Donoff MG, Diner BM, Rowe BH. University of Alberta. Edmonton, AB.

INTRODUCTION: The evaluation of clinical teaching faculty is necessary, and using accepted tools it can be valid and reliable. The medical education literature has a paucity of studies that examine resident-related factors that influence the evaluation of teaching faculty members. This study explores the influence of the training level of Family Medicine residents (postgraduate years {PGY} 1, 2 and 3) on the evaluation of Emergency Medicine (EM) clinical teaching faculty. METHODS: A retrospective analysis of data accumulated between 07/1994–07/2000 from 1st, 2nd and 3rd year Family Medicine residents' evaluations of EM clinical teachers at the University of Alberta was conducted. Resident and teaching faculty-related variables were entered anonymously using the ED Scale (Acad Emerg Med 2000;7[9]:1015–21). Descriptive statistics are presented. Univariate analysis of mean scores, standard deviation values, and significance levels were calculated, and groups were compared using ANOVA. RESULTS: 562 Family Medicine residents completed EM clinical rotations over the study period, for a total of 831 possible faculty evaluation forms. 777 (94%) had voluntarily returned anonymous completed evaluation forms. Of these, 705 (85%) had valid data. 115 clinical teaching faculty members were evaluated in 4 dispositional domains: Didactic teaching, Clinical teaching, Approachability and Helpfulness for a total of 12,816 individual evaluations. Scores by year of starting EM training, seasonal variations in the academic year, and trends over time were also analyzed. In all 4 categories the mean score differences (MSD) between resident evaluations were statistically and practically insignificant (MSD ≤ 0.1, [$p > 0.05$]). Seasonal variations were also not significant (MSD in each category ≤ 0.1 [$p > 0.05$]). Scores demonstrated a linear upward trend (MSD) in each category ≥ 0.36 ($p < 0.05$). CONCLUSION: The training level of Family Medicine residents does not appear to be a significant moderator of teaching performance scores of EM clinical faculty.

061 Training BLS Paramedics in the use of the Laryngeal Mask Airway in Cardiac Arrest using a Classroom Manikin Model.
Murray MJ, Morrison L, Vermeulen M. Royal Victoria Hospital. Barrie, ON.

INTRODUCTION: The purpose of this study was to determine if a classroom mannequin training method for teaching Laryngeal Mask Airway insertion translated into successful use in adult out of hospital cardiac arrest patients by basic level paramedics. Methods. All pre hospital adult non traumatic cardiac arrest patients greater than twelve years of age or 40 kg, attended to by the Paramedics and transferred to hospital were included in the study. Eight ambulance services, 209 paramedics, and 8 hospital emergency departments were involved. All paramedics were trained during a 4 hour classroom and manikin

course and certified to use the LMA in the field. RESULTS: Two hundred and eight paramedics completed the training and certification. During the training, of the 193 paramedics in which the number of attempts was recorded, the mean number of attempts was 1 and only 4 (2.1%) paramedics required a second attempt. During the subsequent study period a total of 291 cardiac arrests were observed. Insertion of the LMA was attempted in 283 (97.3%) of these arrests. Insertion was successful after 1 or more attempts in 199 (70%) patients. However, the LMA became dislodged in 5 (2.5%) of these patients and 12 patients (6.0%) required its removal due to inability to clear vomit in the airway. Thus, the number of successful insertions as defined by the study criteria was 182 (64%). CONCLUSIONS: This study shows that paramedics can be trained in the use of the LMA on manikins in the classroom and this translates into successful insertion and ventilation in the field in about 64% of adult cardiac arrest patients. Therefore it is our conclusion that the LMA would be a useful BLS adjunct and a useful alternative to the oral airway and BVM for ventilation in adult out of hospital cardiac arrest.

062 Evaluation of Medic Electronic Data and Information Capture (e-MEDIC) Phase I: A Reliability and Validity Assessment Comparing Electronic Data Entry by Data Clerk with Paramedic.

Morrison LJ, Vermeulen MJ, on behalf of e-MEDIC Study Group. Sunnybrook & Women's College Health Sciences Centre, University of Toronto. Toronto, ON.

OBJECTIVE: To evaluate the reliability and validity of data entry by data clerk (DC) compared with paramedic (P) on a representative retrospective cohort of ambulance call reports (ACR). METHODS: 28 fields on the ACR were defined by a focus group as critical to the data needs of Emergency Medical Services (EMS). 250 ACRs (EMT-D and EMT-P) representing 5 sentinel cases (hypoglycemia treated with glucagon [EMT-D] and dextrose [EMT-P], supraventricular tachycardia, chest pain and seizure) were randomly selected from 1999 records of an EMS system, of which 242 were evaluable. All ACRs were entered twice by DC and P. Inter- and intra-rater reliability were evaluated using intraclass correlation (ICC) and kappa (K), and overall accuracy by total number of correctly entered fields. Selected fields were grouped for evaluation as clerical (e.g., call date, call times), patient history, and vital signs. RESULTS: Mean (95% CI) number of correct entries: DC = 25.9 (25.7, 26.0); P = 27.5 (27.4, 27.6). Inter-rater reliability (ICC or K, 95% CI) was 0.23 overall; patient history = 0.19; vital signs = 0.14; clerical = 0.22; primary problem code = 0.30 (0.14, 0.46); procedure codes = 0.19 (0.06, 0.32). Intra-rater reliability (ICC or K, 95% CI) for DC was 0.57 overall; patient history = 0.87; vital signs = 0.26; clerical = 0.21; primary problem code = 0.60 (0.48, 0.73); procedure codes = 0.48 (0.38, 0.59). Intra-rater reliability (ICC or K, 95% CI) for P was 0.38 overall; patient history = 0.39; vital signs = 0.46; clerical = 0.36; primary problem code = 0.76 (0.60, 0.92); procedure codes = 0.29 (0.14, 0.44). CONCLUSIONS: Paramedic data entry is more accurate than data clerk entry. Agreement between data clerk and paramedic is poor to moderate overall and in sub-categories. Data clerks are more reliable on re-entry overall and in history and procedure codes. Paramedics are more reliable in vital signs, clerical and primary problem code fields.

063 Evaluation of Medic Electronic Data and Informaltion Capture (e-MEDIC): An Assessment of Accuracy of the Data Recorded on the Ambulance Call Report Compared with a Gold Standard.

Morrison LJ, Vermeulen MJ, on behalf of e-MEDIC Study Group. Sunnybrook & Women's College Health Sciences Centre, University of Toronto. Toronto, ON.

OBJECTIVE: To evaluate the accuracy of data recorded on the ambulance call report (ACR) by the paramedic as compared with a gold standard on a representative retrospective cohort of ambulance calls. METHODS: A focus group of EMS stakeholders defined 28 fields in the ACR as critical to the data needs of Emergency Medical Services (EMS). 250 ACRs (EMT-D and EMT-P) representing 5 sentinel cases (hypoglycemia treated with glucagon (EMT-D) and dextrose (EMT-P), supraventricular tachycardia, chest pain and seizure) were randomly selected from 1999 records of an EMS system. Accuracy of data recorded by the paramedic on each ACR was evaluated by 2 independent reviewers (gold standards) and evaluated as % (95% CI) correctly recorded or coded in each critical field. RESULTS: See Table.

Field	% Correct (95% CI)
Call number	100.0 (98.9, 100)
Call date	99.2 (97.1, 99.9)
Driver name	98.4 (95.8, 99.6)
Attendant name	99.6 (97.7, 100)
Birthdate	85.2 (80.1, 89.4)
Age	91.4 (87.1, 94.6)
Health insurance no.	3.3 (1.4, 6.3)
Call received time	2.5 (0.9, 5.3)
Arrived hospital time	93.4 (89.5, 96.2)
Primary problem code	79.4 (73.8, 84.3)
History fields (10 fields)	98.4 (95.8, 99.6)
Procedure codes (all correct)	36.2 (30.2, 42.6)
Initial GCS	95.9 (92.6, 98.0)
Initial heart rate	99.6 (97.7, 100)
Initial systolic BP	97.5 (94.7, 99.1)

CONCLUSIONS: Overall accuracy of data recorded on ACRs is 84%. Most fields are correctly recorded. Procedure and primary problem codes and call received times were the fields most commonly recorded incorrectly. Recording of health insurance number, an important unique identifier for outcome data linkage, was poor.

064 Longitudinal Analysis of Effect of Resuscitation on Health-Related Quality of Life After Sudden Cardiac Arrest.

Huszti E, Nichol G, Wells GA, Stiell IG, Nesbitt L, Blackburn J. Division of Emergency Medicine, University of Ottawa, Ottawa, ON.

OBJECTIVES: The Ontario Prehospital Advanced Life Support (OPALS) Study is a large EMS trial that evaluates ALS interventions for out-of-hospital patients and conducts detailed measurements of cardiac arrest survivor outcomes. This study assessed novel methods of analyzing incomplete or missing longitudinal data related to health-related quality of life (HRQL). METHODS: This prospective cohort study included all adult out-of-hospital cardiac arrest patients treated in 20 cities with a mixed BLS-D/ALS EMS system. Patients were evaluated for the Health Utilities Index (HUI) Mark 3, which describes health on a scale from 0 (dead) to 1.0 (perfect health). Subjects were interviewed at 3, 6, 9 and 12 months after discharge and were subject to dropout and truncation. The Propensity Score Multiple Imputation (MI) method was used to estimate the propensity that a data element is missing. Imputed values are then generated from those observed values that haves similar propensity scores. Finally, generalized linear models are applied to the complete data set to test for independent associations between response intervals and longitudinal HRQL. Secondary analysis considered the Predictive Mean MI method. RESULTS: Of 8105 cardiac arrest patients (1995–2000), 418 (5.2%) survived to discharge and 342 (81%) com-

pleted at least 1 HRQL interview. The median HUI Score was 0.87 (IQR 0.71–0.95) and the majority of cases had a score exceeding 0.8. Bystander CPR (odds ratio 1.9; 95% CI 1.1–3.3) and age >80 (OR 0.3; 0.1–0.97) were associated with very good HRQL. Generalized linear regression found time to defibrillation was associated with better HUI scores (p value = 0.0465). CONCLUSIONS: This is the first study to apply MI methods to the analysis of longitudinal HRQL data and to demonstrate that shorter response intervals are associated with better HRQL in cardiac arrest. This increase in sample size due to imputation significantly improves the accuracy of the results in EMS research.

065 The Effect of ALS interventions on Scene Times in Patients with Non-Traumatic Chest Pain : A Retrospective Review.
Jones AE, Lewell M. Division of Emergency Medicine, University of Western Ontario. London, ON.

INTRODUCTION: Advanced life support (ALS) interventions are a recent addition to the skill set of basic paramedics. We wanted to determine what effect interventions by ALS paramedics had on scene times in patients with non-traumatic chest pain. METHODS: A retrospective case control study was carried out using ambulance call reports (ACRs) from the base hospital program, London, Ontario. Scene time and treatment data from 300 consecutive ACRs with the final diagnosis of "chest pain" was collected for both ALS and BLS calls. Charts were excluded if essential data was missing or if the etiology of the chest pain was traumatic. Mean scene times were then calculated and compared using a t-test. RESULTS: Mean scene time for BLS and ALS calls were 13:28 (95% CI, 13:04–13:52) and 14:07 (95% CI, 13:31–14:42) respectively. These did not differ significantly (t = 3.32, p = 0.196). In addition, more patients received nitroglycerin as treatment in the ALS group (81.6%) compared with the BLS group (69.3%). CONCLUSION: ALS interventions do not significantly increase scene time in patients with non-traumatic chest pain.

066 Epidemiology of Prehospital Care in a Large Urban EMS System.
Morrison LJ, Vermeulen MJ, Burgess R. Sunnybrook & Women's College Health Sciences Centre, University of Toronto. Toronto, ON.

OBJECTIVE: To describe the population served by a large urban EMS system according to prehospital conditions (Maio, 1999). METHODS: An EMS system providing service to a population of 2.5 million people in the year 2000 entered 106,552 emergency calls (74%) in its database. Paramedic data recording accuracy was 84% and data entry reliability was 0.57. RESULTS: See Table. Priority Conditions (PC) were: Trauma, RD = Respiratory Distress, AO = Airway Obstruction, CA = Cardiac Arrest, Seizure, CP = Chest Pain.

PC	All calls n = 106 552	Male n = 50 514	Female n = 52 835	Age <20 n = 8 160	Age >70 n = 39 215
Trauma n (%)	17 981 (16.9)	9 141 (18.0)	8 581 (16.0)	2 387 (29.3)	4 764 (12.2)
RD n (%)	9 394 (8.8)	4 288 (16.0)	5 053 (10.0)	501 (6.1)	5 778 (14.7)
AO n (%)	290 (0.1)	143 (0.3)	145 (0.3)	50 (0.6)	101 (0.3)
CA n (%)	2 858 (2.7)	1 080 (2.0)	1 741 (3.4)	20 (0.3)	1 556 (4.0)
Seizure n (%)	6 881 (6.5)	1 453 (3.5)	2 529 (5.0)	1 031 (12.6)	401 (1.0)
CP n (%)	7 979 (7.5)	4 008 (7.6)	3 930 (7.8)	54 (0.7)	4 023 (10.3)

Abdominal pain (61%), allergic reaction (60%) and fractures (61%) occurred more frequently in women. Cardiac arrest (61%), environmental emergency (63%), near drowning (88%), penetrating trauma (80%) were more common in men. Allergic reaction (22%), burns (25%), head injury (20%), near drowning (25%), seizure (25%) were most frequent in children. In the homeless (n = 1274), the most common conditions were trauma (13%), seizure (10%), overdose (8%), behavior disorder (8%). 90th percentile scene interval was 27.3 minutes, 28.5 for EMT-P (n = 54,321) and 25.5 for EMT-D (n = 49,790) calls. Scene intervals were longest in cardiac arrest (41.8), diabetic emergencies (35.3), major trauma (37.0) and shock (40.8). CONCLUSION: Frequencies of EMS conditions in an urban EMS system are described according to gender, age, homelessness and scene and transport intervals.

067 Can the Ontario Universal Influenza Immunization Program Reduce Emergency Department Overcrowding?
Groll D. Kingston General Hospital. Kingston, ON.

OBJECTIVES: In 2000 the Ontario Minister of Health and Long-Term Care announced a universal influenza immunization program for Ontario, Canada. The 2 stated objectives of this $38 million program were to decrease seasonal impact of influenza on emergency department (ED) visits and to decrease the number of cases and severity of influenza. This paper examines the impact of influenza and influenza-like illness on ED volume, and describes changes in ED volume over a 5 year period. METHODS: This is a retrospective, observational population study reporting on ED volume and influenza rates in over a five-year time period (1996/97–2000/01). A count of all adult ED admissions were gathered for 5 tertiary care hospitals in 3 Ontario cities from November 1, 1996–March 31, 2001. The number of people admitted with diagnoses of influenza and upper respiratory illness (influenza-like illness) as a proportion of all admissions were examined in 2 hospitals. RESULTS: ED volume has increased annually, peaks in the summer months (May–August), and is lowest in the influenza season (November–April). Acute upper respiratory (AUR) diagnosis accounted for less than 10% of all ED admissions, and a diagnosis of influenza accounted less than 10% of AUR. There was no significant correlation between population influenza rates, AUR, and ED volume (p = 0.901, and p = 0.449). CONCLUSION: Based on this study, a Universal Influenza Immunization Campaign is not likely to have a significant impact on emergency department volume.

068 Evaluation of a New 3-Valve Non-Rebreathing Mask (Hi-Ox) for the Delivery of High FIO2 at Low Flows — Comparison with the Hudson Type Non-Rebreathing Mask.
Somogyi R, Vesely A, Sasano H, Prisman E, Fisher JA. Department of Anesthesia, University Health Network. Toronto, ON.

INTRODUCTION: The non-rebreathing mask (NRM) (Hudson RCI, Temecula, CA) is the familiar mask used to deliver high concentrations of O2. The Hi-Ox (Hi-Ox, Bird Medical Products, Palm Springs, CA) is a new compact 3-valve mask designed to function like the 5-valve self-inflating bag in providing FiO2 approaching 1.0 when O2 flow is greater than or equal to minute ventilation. We compared the performance of the Hi-Ox to a standard NRM. METHODS: A single trained subject was used to evaluate the performance of the masks. The seal of each mask to the face was assured by tape. O2 flows were set at 8 and 15 L/min. The subject breathed at his resting level and at levels resulting in end-tidal PCO2s of 35 and 30 mm Hg in response to visual feedback from the capnograph tracing. Gas was sampled from a catheter with the opening in the nasopharynx. Net FiO2 was calculated from expired FO2 using the alveolar gas equation.

RESULTS: See Table. FIO2 (mean ± SD) for all conditions.

	Rest	PCO_2 = 35	PCO_2 = 30
8 L/min			
NRM	0.63 ± 0.02	0.65 ± 0.01	0.53 ± 0.01
Hi-Ox	0.96 ± 0.01	0.73 ± 0.02	0.54 ± 0.01
15 L/min			
NRM	0.82 ± 0.03	0.72 ± 0.01	0.72 ± 0.01
Hi-Ox	0.96 ± 0.01	0.98 ± 0.01	0.89 ± 0.01

CONCLUSION: We conclude the Hi-Ox provides FiO2 near 1.0 when O2 flow is equal to or greater than minute ventilation in a method analogous to a self-inflating bag. Like the self-inflating bag, when minute ventilation exceeded O2 flow, outside air was entrained, resulting in a fall in FiO2. The lower FiO2 observed with the NRM resulted from obligatory air entrainment throughout inspiration at both O2 flows.

069 Predicted Impact of Citizen CPR Training on Cardiac Arrest Survival, Based on Location of Cardiac Arrest.
Vaillancourt C, Stiell IG, Wells GA, De Maio VJ, Nesbitt L, Martin MT, Cousineau D, for the OPALS Study Group. Division of Emergency Medicine, University of Ottawa. Ottawa, ON.

INTRODUCTION: Bystander CPR rates are generally better in public places than residential locations. We sought to determine the potential impact of citizen CPR training on cardiac arrest survival, based on specific location of cardiac arrest. METHODS: We reviewed data prospectively collected within the Ontario Prehospital Advanced Life Support (OPALS) Study. The OPALS database includes a 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 Municipal Property Assessment Corporation databases to obtain precise description of cardiac arrest location. Data was analysed using descriptive statistics with 95% CI and sensitivity analysis. RESULTS: From 1995 to 2000, there were 6,816 consecutive cardiac arrest cases. Cardiac arrest occurred most often in residential locations 85.8% (House 57.4%, Apartment 22.5%, Nursing Home 6.0%) as opposed to public places 14.2% (Store 3.4%, Recreation Facility 2.1%, Street 1.4%, Office Building 1.3%, Shopping Mall 1.1%). Overall survival rate was 3.8% (95% CI 3.4–4.3) and varied between 0.68% (0.38–0.98) and 18.5% (14.0–23.0) depending on location, witnessed status and bystander CPR rate. Assuming that better CPR technique could increase survival by 3%, increasing bystander CPR rates to 35% and 50% would result in overall survival rates and additional number of lives saved per year in residential locations and public places in the OPALS communities, respectively, of 5.38% (18, 3) and 6.19% (28, 24). Similarly, relative increase and absolute number of lives saved in specific residential locations would be, respectively: House 63.4% (12) and 63.3% (18), Apartment 30.1% (5) and 29.5% (8), Nursing Home 6.5% (1) and 7.2% (2). CONCLUSION: Citizen CPR training could significantly increase survival to cardiac arrest, especially in private houses and apartment buildings. An intervention focussed at improving bystander CPR rates and quality in those locations should be developed.

070 A New Highly Efficient Breathing Circuit for Oxygen Therapy.
Vesely A, Somogyi R, Sasano H, Preiss D, Prisman E, Adams T, Volgyesi G, Stenzler A, Azami T, Iscoe S, Fisher JA. University of Toronto Faculty of Medicine. Toronto, ON.

INTRODUCTION: In treating mass casualties in the field, 1 of the first medications to be depleted, and among the most difficult to replenish, is O2. Even so, at 8 L/min O2 Venturi masks provide only 32 L/min of 40% O2, a flow insufficient to maintain the inhaled fraction of inspired O2 (FiO2) in hyperventilating patients. Our goal was to design a breathing circuit that both increases the efficiency of oxygen use and maintains a high FiO2 in the face of hyperventilation. METHODS: We designed and constructed from tubing, plastic valves, and a rubber ventilator bellows, a breathing circuit that, at an O2 flow of 2 L/min, provides an FiO2 of 0.4 independent of minute ventilation. It does this by, first, ensuring that all of the O2 reaches the lungs (i.e., none is lost during exhalation or in ventilating the anatomical dead space) and, second, by allowing rebreathing only when minute ventilation (and thus expired PO2) increases. RESULTS: In 6 volunteers, FiO2 (calculated from PO2 of expired gas) averaged 0.41 ± 0.03 (SD) at rest. At a minute ventilation of 20 L/min, FiO2 was 0.37 ± 0.04 (N.S.) and PCO2 was 37 ± 3 mm Hg ($p < 0.05$). CONCLUSIONS: This new breathing circuit provides an FiO2 of 0.4 with 1 quarter of the O2 flow required for the Venturi mask and maintains the FiO2 despite marked increases in minute ventilation. The efficiency of the circuit may make it useful for field, military and third world use while the independence of FiO2 from minute ventilation should permit precise O2 dosing in the emergency department.

071 Computerized Physician Order Entry as a Cost-Effective Method of Capturing Emergency Department Quality and Utilization Data.
Innes G, Grafstein E, Christenson J, Epstein J. St. Paul's Hospital, UBC, Providence Health Care. Vancouver, BC.

OBJECTIVE: To compare the accuracy and cost of acquiring important quality and utilization data from a computerized physician order entry (POE) system vs. a standard chart review. METHODS: We developed a POE system by modifying order transmission processes and adding ED-specific order sets to an existing clinical information system. POE links physicians to their patients, populates a utilization database and captures time of MD exam, order entry and consult request. Linking to the POE and other existing databases provides electronic access to patient demographics, case-mix, waiting time, LOS, disposition and diagnostic utilization, stratified by physician. To assess data accuracy, we generated a report looking at all patients with CTAS level 3 abdominal pain (AP3) who presented between June 1–Oct 30, 2001. POE data were compared to manual chart review data from a random sample of 200 AP3 patients studied between June 1–Oct 30, 2000 (control data). Personnel time for data acquisition was also compared. RESULTS: Data from 864 POE and 200 control patients were analyzed. Age (40.8 vs 40.3 years) and gender (49.3% vs 49.5% male) were similar in the 2 cohorts, and diagnostic spectrum was identical. Other quality and utilization measures, including physician variability (in the POE set), are reported below. Chart review and data entry for the control cohort consumed 120 hours of staff time and 6 hours of physician time; POE report generation consumed 16 hours of physician time. Physician satisfaction with POE was high. CONCLUSION: POE can provide accurate utilization and quality data with more detail and lower cost than manual chart review.

	Control	POE	MD range
LOS (min)*	222	192	132–249
Admit rate	19.5%	22.8%	15–35%
CBC	62.0%	55.0%	32–64%
XR (3– views)	32.5%	31.8%	15–42%
Ultrasound	9.0%	9.9%	4–29%
CT scan	5.5%	5.1%	0–12%

*Median for discharged patients (min)

072 Does Computerized Physician Order Entry Reduce Emergency Department Length of Stay?
Innes G, Grafstein E, Christenson J, Epstein J. St. Paul's Hospital, UBC, Providence Health Care. Vancouver, BC.

OBJECTIVE: In November 2000, we introduced ED computerized physician order entry (POE). Before this, unit clerks transcribed writ10 orders into the hospital's clinical information system. Our objective was to determine the impact of POE on ED length of stay (LOS) in a group of patients with abdominal pain. METHODS: The POE cohort included all patients triaged with CTAS level 3 abdominal pain (AP3) between June 1 and Oct 31, 2001. The control cohort was a random sample of AP3 patients seen between June 1 and Oct 31, 2000. POE data were gathered electronically from the POE and linked databases; control data were gathered by manual chart review. Confounding variables were analyzed. The primary outcome was ED LOS (registration to discharge) for discharged patients. RESULTS: See Table. Data from 864 POE and 200 control patients were studied. Age (40.8 vs. 40.3 years), gender (49.3 vs. 49.5% male) and disease spectrum were similar in the POE and control groups. Admission rates were 22.8% and 19.5% respectively. ED overcrowding increased during the POE period: More patients were treated in hallways, the mean number of admitted patients held (at 24:00) rose from 16 to 18.4, and median ED LOS for admitted AP3 patients (waiting for inpatient beds) rose from 600 to 693 minutes. Critical time outcomes (median/IQR) are summarized below. CONCLUSIONS: Despite confounding factors that would tend to slow ED processes, LOS fell by 30 minutes (14%) after POE implementation — a potential saving of 432 hours of ED stretcher time in this cohort. If similar benefits are apparent in other case-mix groups, POE may be a valuable tool to gather important data and improve ED efficiency.

Time to	Control	POE
MD exam	50 (34–82)	45 (28–74)
Lab order	83 (61–128)	68 (45–101)
1st result	124 (76–171)	112 (84–129)
Discharge	222 (150–342)	92 (120–288)

073 The Ethics of Emergency Research: Feasibility and Application of Canadian Guidelines.
McRae AD, Weijer C. Dalhousie University Faculty of Medicine; Department of Bioethics, Dalhousie University. Halifax, NS.

INTRODUCTION: The past 2 decades have seen extensive ethical debate over clinical research on critically ill patients in emergency settings. Though Canadian guidelines and US regulations have changed in recent years, it remains unclear how these are best applied, or whether they sufficiently protect vulnerable patients. One problem with these rules is that they were devised using an ethical framework that analyses the risk of whole research protocols. This approach fails to recognize the morally relevant differences between the therapeutic interventions in a clinical trial and the non-therapeutic procedures used solely to answer the scientific question of the same trial. METHODS: We reviewed 70 studies that used a waiver of consent published between 1996–2000. We employed an ethical framework that analyzes the risk of therapeutic procedures and non-therapeutic procedures separately, and is essential for the proper ethical review of protocols. Studies were classified as posing minimal risk, probably minimal risk, or probably more than minimal risk. This data was combined with a conceptual analysis of current Canadian emergency research guidelines to suggest how these could be better applied, or altered, in order to adequately protect patients while permitting important research to proceed. RESULTS: 98.6% of published studies using a waiver of informed consent were either minimal risk or probably minimal risk. CONCLUSIONS: The vast majority of emergency research poses only minimal risk to patients, even in dire clinical situations. Current Canadian guidelines rely on an outdated approach to the ethical review of research protocols. Canadian guidelines do not sufficiently restrict the risks of non-therapeutic interventions in emergency clinical trials. However, we present empirical data showing a more stringent risk threshold still permits important emergency research to be completed. We offer suggestions for facilitating ethics review of emergency research in a way that both protects patients and advances emergency research.

074 Safety and Efficiency of an Individualized Approach to Patients with Chest Pain.
Christenson J, Innes G, McKnight D, Boychuk B, Grafstein E, Thompson C, Rosenberg F, Gin K, Tilley J, Anis A, Singer J. St. Paul's Hospital. Vancouver, BC.

INTRODUCTION: Many US emergency departments (ED) have developed diagnostic pathways for chest pain evaluation. Canadian EDs tend to use an unstructured/individualized approach to each patient. Data are unavailable regarding the safety and efficiency of this practice. OBJECTIVE: To determine the proportion of patients with acute coronary syndrome (ACS) inappropriately discharged from the ED and the proportion of those without ACS (or an adverse event) held for prolonged investigation. METHODS: Consecutive, consenting patients >24 years old who presented with chest discomfort to 2 urban, tertiary care EDs between May 1, 2000 and April 25, 2001 were prospectively enrolled. Exclusion criteria were inability to communicate or contact, terminal illness, or obvious traumatic or radiographic cause. Disposition and ED length of stay (LOS) were documented, and LOS >3 hours was considered prolonged investigation. At 30 days, investigators used pre-defined explicit criteria to assign an outcome diagnoses: definite ACS (AMI or objective unstable angina) or non ACS. Patients who were discharged from the ED without planned urgent outpatient investigations and with a non-ACS diagnosis were categorized as ACS Not Suspected. RESULTS: Of 1831 patients, 244 (13.3%) had AMI, 161 (8.8%) definite unstable angina, and 1426 (77.9%) no ACS. 22/405 patients with ACS were discharged with ACS unsuspected. 373/1426 patients without ACS were admitted or had ED diagnoses suspecting ACS. Current clinical sensitivity is 94.6% (95% CI: 91.8, 96.5) with specificity of 73.8% (95% CI: 71.5, 76.1). 69.9% of patients without ACS or adverse event were admitted or held in the ED for >3 hours. CONCLUSION: The current individualized ED evaluation and disposition of patients with chest discomfort in 2 Canadian hospitals "misses" 5.4% of definite ACS. Only 50% of those suspected or admitted prove to have ACS. Opportunities exist to reduce numbers of missed ACS and to reduce the cost of investigation of patients without ACS.

075 Emergency Department Treatment of Stable Acute Paroxysmal Atrial Fibrillation.
Kapur AK, Stiell IG, Wells GA, Brison RJ, Mortensen M. Division of Emergency Medicine, University of Ottawa. Ottawa, ON.

OBJECTIVES: The optimal management of acute paroxysmal atrial fibrillation (PAF), a common ED presenting complaint, remains undetermined. This study's purpose was to compare immediate and short-term outcomes of aggressive (AGG) and conservative (CON) ED treatment of clinically stable PAF. METHODS: This 6-month prospective cohort study, conducted at 3 university-affiliated hospital EDs, enrolled all adult patients with <48 hours of clinically stable PAF. CON patients received no treatment or only rate control agents. AGG patients had pharmacologic and/or electrical cardiover-

sion attempted. Patients were telephoned at 4 weeks to determine PAF recurrence, complications, and quality of life using the SF-36 scale. Proportions of the AGG and CON groups in sinus rhythm at ED discharge and at follow-up, as well as complications in the ED and at 4 weeks, were compared using chi-square. Quality of life was compared using t-test. RESULTS: We enrolled 169 patients, 32 in the CON group and 137 in the AGG group. The CON group was slightly older (mean 70.3 vs 61.9 yrs, $p = 0.001$) and more had coronary artery disease (78.9% vs 42.6%, $p < 0.01$). More AGG patients cardioverted to sinus rhythm in the ED (82.5% vs 34.4%, $p < 0.001$) and fewer were admitted (8.0% vs 37.5%, $p < 0.001$). Fifteen (8.9%) patients, all AGG, had complications in the ED; 2 (1.2%) required admission. 97.0% of patients were followed up. More AGG patients cardioverted and stayed in sinus rhythm for 4 weeks (52.3% vs 30.0%, $p = 0.03$). AGG patients had higher physical summary scores on the SF-36 at 4 weeks (47.1 vs 41.2, $p = 0.01$). No thromboembolisms occurred by four-week follow-up. CONCLUSIONS: This is the first study to prospectively follow PAF patients treated in the ED. Aggressive treatment for PAF is as safe as conservative and more successful for restoring sinus rhythm in the ED and should be considered the optimal ED management of PAF.

076 A Descriptive Review of a Canadian Chest Pain Evaluation Unit.
Martin D, Sinclair D. Dalhousie University. Halifax, NS.

INTRODUCTION: Many North American centres have addressed the problem of evaluating non-diagnostic chest pain by developing dedicated units for rapid assessment and risk-stratification. The QEII Health Sciences Centre opened its Chest Pain Evaluation Unit (CPEU) in 1999. In order to present some initial data on the operation of such a unit in the Canadian setting, we conducted a review of its operation over a 6 month period. METHODS: The sample consisted of all 136 patients observed in the CPEU from April to October, 2000. Data were collected retrospectively from an admissions log and patient charts. RESULTS: There was 21% utilization of theoretically available patient-hours in the CPEU. Mean length-of-stay in the CPEU was 13.6 hours. 68.2% of patients underwent exercise stress testing (EST), 2.3% underwent coronary angiography, and 0.8% underwent perfusion scintigraphy, while 28.0% underwent no other investigation while in the unit. Of those undergoing EST, 16.7% had positive tests, 44.4% had negative tests, and 38.9% had non-diagnostic tests. 5% of patients with negative EST results were admitted to the Cardiology service. 33.3% of patients with positive EST results were discharged home. Of all CPEU patients, 75.7% were discharged home, and 24.3% were admitted to the Cardiology service. No deaths occurred in the CPEU. Rationale for admission was based on a positive EST result in 31.2%, EKG and cardiac marker evidence in 18.8%, isolated cardiac marker evidence in 18.8%, and isolated EKG evidence in 12.5%, while 15.9% of admissions involved subjective rationale. 9.8% of patients observed in the CPEU ultimately received an acute coronary diagnosis. CONCLUSIONS: These results identify a number of topics requiring further investigation. The effect of Canadian CPEUs on admission rate and length-of-stay, and the role of specific technologies in the admit/discharge decision are among those areas in which important questions remain.

077 Institutional Variation in the Emergency Department Management of Paroxysmal Atrial Fibrillation: A Comparison of Two Canadian Centres.
Ip J, Cadieu T, McKnight D, Abu-Laban RB, Zed JP. Vancouver General Hospital. Vancouver, BC.

INTRODUCTION: Paroxysmal atrial fibrillation (PAF) is the most common ED dysrhythmia. A recent paper described the ED management of 289 PAF patient encounters at Ottawa Civic Hospital (OCH) (Ann Emerg Med 1999:04). Our suspicion was the ED management and disposition of PAF at Vancouver General Hospital (VGH) varies significantly from OCH. The purpose of this study was to evaluate this hypothesis. METHODS: PAF patients presenting between Jan/01/1999 and Jun/01/2000 were retrospectively identified from the VGH ED database and their records reviewed. Inclusion/exclusion criteria identical to the OCH study were employed. Institutional variance was evaluated using appropriate comparative two-tailed statistics. RESULTS: 88 patient encounters of stable PAF were identified: 74 (84%) were treated in the ED and 14 (16%) received no ED interventions. Demographic and baseline characteristics were similar between VGH and OCH patients, with the exception of previous PAF (42% vs 72% respectively). Twenty-six encounters (30%) were treated only with rate controlling medications. The majority of cardioversion attempts were chemical (43/88: 49%), 53% with prior rate control. Of those in whom chemical cardioversion was attempted, 16 (37%) went on to electrical cardioversion. Only 5 encounters (6%) were treated with primary electrical cardioversion. Comparison between VGH and OCH respectively, showed no statistically significant difference in overall and primary electrical cardioversion proportions (24% vs 28% and 5.7% vs 4.5%), or success rate (91% vs 89%), but significant variation in chemical cardioversion proportion (49% vs 62%, $p = 0.025$); chemical cardioversion success rate (26% vs 50%, $p = 0.004$); mean ED length of stay (5.9 vs 5.0 hr, $p = 0.040$); consultation proportion (59% vs 13%, $p < 0.001$); admission proportion (34% vs 3%, $p < 0.001$); and ED return within 7 days proportion (7% vs 14%, $p = 0.006$). CONCLUSIONS: There is significant variation in the ED management of PAF between VGH and OCH. We suspect this finding is reflective of a general wide variability in the ED management of PAF. Development of a practice guideline may improve management of PAF and resource utilization.

078 A Survey of Emergency Physicians' Attitudes Towards Primary Electrical Cardioversion for Stable Paroxysmal Atrial Fibrillation of Less Than 48 Hours Duration.
Ip J, Sandhu M, McKnight D, Abu-Laban R, Zed PU, Pharm D. Vancouver General Hospital. Vancouver, BC.

INTRODUCTION: Recent studies of the emergency department management of stable paroxysmal atrial fibrillation (sPAF) at Vancouver General Hospital and Ottawa Civic Hospital demonstrate that electrical cardioversion (EC) for sPAF of <48 h duration (sPAF <48 h) is safe and effective (conversion proportion 89–91%). Approximately 5% of patients in these studies underwent primary EC. Primary EC of sPAF <48 h is neither common nor well studied; however, there are reasons to believe it may be preferable to primary chemical cardioversion. Further research would be useful to define the role of primary EC for sPAF <48 h. The purpose of this study was to determine emergency physicians' (EPs) current usage of and attitudes towards primary EC for treatment of sPAF <48 h, and their hypothetical willingness to participate in a future clinical trial of this modality. METHODS: A 12-question survey was distributed to all board-certified EPs and emergency residents in 4 British Columbia university-affiliated hospitals between Aug/01/2001 and Oct/15/2001. Reminder follow-ups were utilized to encourage responses and anonymity was maintained. RESULTS: Seventy-six percent (51/67) of surveys were completed. Seventy-eight percent of respondents (range by institution: 67%–92%) use EC for sPAF <48 h and 67% felt it was safe and effective. No respondents felt EC was unethical or dangerous and 75% deemed EC as safe or safer than chemical cardioversion. Approximately 70% of respondents felt primary EC could improve patient comfort and/or expedite ED disposition. Forty-three percent felt EC was easy to use, could reduce consultation frequency, and prevent

confusion in choice of chemical cardioversion agents. Ninety percent of respondents (range by institution: 83%–93%) indicated a willingness to participate in a clinical trial on primary EC for treatment of sPAF <48 h (46/51, 95% CI: 79%–97%). CONCLUSIONS: The results of this study indicate that a clinical trial of primary EC for the treatment of sPAF <48 h would be supported by most emergency physicians and appears warranted.

079 Development of a Tool for Predicting Length of Stay (LOS) for the Emergency Department Clientele.
Afilalo M, Unger B, Colacone A, Giguère C, Boivin JF, Vandal A, Léger R, Stiell I, Xue X. Sir Mortimer B. Davis–Jewish General Hospital, McGill University. Montreal, QC.

OBJECTIVE: To develop a tool that will quantify the predicted length of stay (LOS) of ED patients. The "LOURDEUR TOOL" will be based on patients' intrinsic characteristics (PICs) and not factors related to the organization or functioning of EDs. METHODS: An in depth review of the literature and numerous discussions with emergency physicians (EPs) permitted the development of a conceptual model of factors which affect ED LOS. This model was subsequently used in an expert consultative process with other EPs and nurses from across Quebec. The goal of the consultative process, in the form of focus groups, was to produce a list of PICs, measurable early on arrival to the ED, that could potentially be associated with LOS. The list produced was the source for the development of a questionnaire focusing on the PICs. The next phase of the study included a prospective sampling of visits (n = 2841) in 6 EDs (Quebec n = 5; Ontario n = 1). Using a sample size of 2146 patients and 110 variables from the questionnaire, a multivariable logistic regression analysis and mixed linear modeling methods were employed to identify the most important PICs associated to the LOS. RESULTS: Through a backward and stepwise model selection, the following variables were found to have an impact on LOS: Age, reason for ED visit, number of hospital admissions in the last 3 years, triage code, perception of severity of illness, autonomy, mode of transport, presence of endocrine or memory problems, ED referral, having a family physician and employment status. CONCLUSIONS: The "LOURDEUR TOOL" permits the estimation in LOS that is based on the PICs. It will bring new insights on ED congestion and will enable comparisons both within and between EDs irrespective of their functioning. It can also be used to evaluate the impact of the various health system transformations on specific patient populations and thus adjustments can be made more efficaciously.

080 Recent Increases in Left Without Being Seen in the Emergency Department.
Bullard M, Rowe BH, Yiannakoulias N, Spooner CA, Holroyd B, Craig W, Klassen T, Johnson D, Rosychuk R, Svenson L, Schopflocher D. University of Alberta, Edmonton, AB.

OBJECTIVES: Patients who leave emergency departments (EDs) without being seen (LWBS) constitute have the potential for increased morbidity and dissatisfaction. This study examines LWBS trends over a three-year period. METHODS: All patients presenting to provincial EDs were eligible for inclusion. Data were derived from a sample of ED patients treated in 17 health regions over 3 years (98/99, 99/00, 00/01) with a disposition code of LWBS or a disposition code of left against medical advice in conjunction with a refusal of service (V642). Data were extracted from the Ambulatory Care Classification System (ACCS) database, computerized abstracts coded similarly by medical record nosologists across all regions. Descriptive statistics and crude presentation rates are reported. RESULTS: Overall, approximately 1.5 million ED visits were recorded per year across the province. The number of patients LWBS has risen every year; 98/99: 21,195, 99/00: 25,865; and 00/01: 32,375. Young children (ages <5; 14%) and adults (ages: 20–29; 23%) represent the largest percentage of cases overall. The elderly (>64 years) represent <5% of the overall LWBS sample. Wide seasonal variation (34%) was observed and December rates were highest (9.7%). The rate of LWBS is increasing in all areas of the province, but rates increased most in rural EDs over the time period (59% increase). For the 2 major urban centres, rates per 1000 ED visits were higher in Calgary than in Edmonton for all 3 years; increases over time were greater in Calgary (39%) than Edmonton (25%). CONCLUSIONS: Despite the most rapid population growth of any province in Canada, in-patient capacity was not increased over the study period. These results indicate that LWBS cases across a large population are increasing steadily and can be considered a proxy marker for ED overcrowding. Further detailed evaluation of LWBS should identify other reasons for premature departure.

081 Adventure and Adversity: Injury Patterns in an Extreme Sport.
Denny CJ, Schull MJ. Division of Emergency Medicine, University of Toronto. Toronto, ON.

INTRODUCTION: Adventure racing is a wilderness multisport endurance activity. These events challenge teams with days of continuous travel through environmental extremes of temperature and terrain. Despite increasing popularity, there is a paucity of literature examining patterns and predictors of injury in this sport. Our purpose was to estimate the prevalence of adverse incidents in adventure racing. METHODS: Prospective, cross-sectional survey of all athletes at the Canadian Adventure Racing Championships. During a three-day race in September 2001, 15 teams of 4 athletes trekked, mountain biked, and canoed a 234 kilometre course in northern Ontario. Trained interviewers administered a questionnaire to consenting team captains at the finish line, or at basecamp if teams did not finish. An incident was defined as any injury or illness of sufficient severity to impede team progress. Analyses included descriptive statistics with 95% confidence intervals, and logistic regression to determine the association of adverse incidents with age, gender, team, and level of adventure racing experience. RESULTS: All 15 team captains agreed to participate. Of 60 athletes, 44 (73%) were male, with an a mean age of 31.5 years. Nine teams (60%; 95% CI 32–84) failed to finish the race; 7 due to an incident (47%; 95% CI 21–73). Of the 60 athletes, 29 (48%; 95% CI 35–62) suffered an incident. Fifteen incidents occurred while trekking, 10 while biking and 4 while canoeing. The most common adverse incident was musculoskeletal injury (52%; 95% CI 32–71). There were no deaths and only 1 incident required hospital care. In multivariate analysis, least experienced athletes (<1 year of adventure racing) were more likely to have an adverse incident (OR 7.6 p = .02). CONCLUSIONS: Incidents affect nearly half of adventure racers. Less than half of teams finish the race. Injury prevention initiatives may be more effective if focused on least experienced athletes.

082 Treatment Strategies for Early Presenting Acetaminophen Overdose – A Survey of Medical Directors of Poison Centres in North America and Europe.
Kozer E, McGuigan M. Division of Clinical Pharmacology and Toxicology, The Hospital for Sick Children, and the Ontario Regional Poison Control Centre. Toronto, ON.

BACKGROUND: Acetaminophen is frequently used in self-poisoning in Western countries. Although treatment with N-acetylcysteine (NAC) reduces liver injury, no consensus exists on the preferred management of acetaminophen toxicity. OBJECTIVES: To describe the approach taken by toxicologists in North America and Europe toward the management of acetaminophen toxicity. METHODS: Med-

ical directors of poison centres in the United States, Canada, and Europe were surveyed by means of a questionnaire presenting 2 clinical scenarios of acetaminophen overdose: a healthy adolescent with no risk factors who had an acute ingestion of acetaminophen, and an adult with both acute ingestion and possible risk factors. For each case several questions about the management of these patients were asked. RESULTS: Questionnaires were sent to medical directors of 76 poison centres in North America and 48 in Europe, with response rates of 62% and 44% respectively. Forty percent of responders suggested using charcoal 4 hours after ingestion of a potential toxic dose of acetaminophen, and 90% recommended treatment with NAC when levels were above 150 mg/mL but below 200 mg/mL 4 hours after ingestion. Duration of treatment with oral NAC ranged from 24 to 96 hours; 38 responders suggested a duration of 72 hours. Of 49 centres recommending oral NAC, 18 (36.7%) said they might consider treatment for less than 72 hours. Eleven of 29 (37.9%) responders suggested treatment with intravenous NAC for more than 20 hours as their usual protocol or a protocol for specific circumstances. CONCLUSIONS: Our study showed large variability in the management of acetaminophen overdose. Variations in treatment protocols should be addressed in clinical trials to optimize the treatment for this common problem.

083 Shiftwork and Emergency Medical Practice: Systematic Narrative Review.

Frank JR, Ovens H. University of Toronto Division of Emergency Medicine, Toronto, ON.

INTRODUCTION: Shiftwork is an essential component of the demanding 24/7 practice of emergency medicine. Unfortunately, shiftwork schedules are also known to have numerous negative effects on shiftworkers. To our knowledge, no systematic narrative overview of the shiftwork literature exists. METHODS: We sought to answer the question, "What are the effects of shiftwork on emergency medical practice?" We conducted a systematic literature search using multiple databases, including Ovid Medline (1966–2000), Psyc Info (1984–2000), and Emergency Medical Abstracts (1995–2001) using a defined search strategy. We also searched the Web sites of the American College of Emergency Physicians (www.acep.org), the American Academy of Emergency Medicine (www.aaem.org), and the Canadian Association of Emergency Physicians (www.caep.ca) for documents containing "shiftwork". We searched the internet for shiftwork information using the Google (www.google.com) meta-engine. We also searched the University of Toronto electronic library resources site for relevant journals and references (www.utoronto.ca). Bibliographies were handsearched for further references. Finally, we consulted experts in the fields of chronobiology and emergency physician wellness. RESULTS: Thirty-two initial references met all of our database inclusion criteria and 15 Web sites were incorporated. Additional sources added a further 65 relevant references. Shiftwork has negative effects on sleep, performance, mental, social, and physical health. Strategies for ameliorating these effects exist in 5 categories. CONCLUSIONS: Shiftwork is essential to EM practice, but has numerous negative effects on EM physicians. Our review identified 5 strategies for minimizing the impact of shiftwork on EM practice.

084 First Aid Kit Availability and Content Among Trekkers in Nepal.

Fedder S, Abu-Laban RB, Fefer J. Department of Emergency Medicine, Langley Memorial Hospital. Langley, BC.

OBJECTIVES: Adventure travel has increased the incidence of medical problems in isolated areas. We sought to determine the preparedness of trekkers in Nepal as manifested by whether they carried a first aid kit and, if carried, by the kits contents. Our primary objectives were to determine the proportions of trekkers who: (1) carried first aid kits; (2) carried antibiotics from each of 3 a priori-defined categories; and (3) carried prophylactic medications for altitude illness. METHODS: A convenience sample of trekkers who attended free daily information lectures on altitude illness from 01/October/1998 to 05/December/1998 in Manang, a village midway along a 3 week trek (altitude 3540 m, maximum trek altitude 5416 m) were invited to participate. Subjects were asked a series of standardized questions during a brief interview by 1 of 2 researchers with multilingual abilities. RESULTS: 121 trekkers were enrolled, the majority of whom were from Europe (44%), the USA (23%), Australia/New Zealand (20%) or Canada (7%). The mean age of those studied was 32 years and 63% were male. 97% of subjects carried a first aid kit (117/121, 95% CI: 91.8%–99.1%), 73% carried at least 1 antibiotic (88/121, 95% CI: 63.9%–80.4%), and 40% carried prophylactic medication for altitude illness (48/121, 95% CI: 30.9%–50.0%). Thirty percent of subjects carried an antibiotic agent from 1 category only; 33% from 2 categories; and 10% from all 3 categories. Logistic regression models, fit for secondary purposes, indicated that carrying a complete or near-complete selection of antibiotic categories and carrying prophylactic medications for altitude illness were both independent of trekker age, sex, region of origin, days trekking and total days travelling. CONCLUSIONS: Although the majority of trekkers in the Nepalese Himalayan carry first aid kits, a significant proportion of these kits lack agents from important antibiotic categories and/or lack prophylactic medications for high altitude illness. Measures to improve the preparedness of trekkers for medical problems appear warranted.

085 A Surveillance of Soccer Injury in Canadian Children: A Five Year Canadian Hospitals Injury Report and Prevention Program (CHIRPP) Perspective.

Shore BJ, Joubert GI. Department of Pediatrics – Emergency Medicine, Children's Hospital of Western Ontario, London, ON.

INTRODUCTION: In 2000, the Canadian Soccer Association reported that there are 644,028 children under the age of 19 playing organized soccer. The objective of this study was to examine the relative frequency of soccer injury in children using the CHIRPP. METHODS: A retrospective study was conducted using the CHIRPP database, incorporating data from 10 pediatric hospitals and 6 general hospitals since 1990. Soccer injury reports between September 1, 1994 and August 31, 1999 were analyzed. Age ranged from >1 to <19 years of age. Over the five-year period injuries were analyzed to describe age, gender, context of the injury, body part injured, and severity of injury. RESULTS: Total data pool consisted of 10,647 records. The greatest number of inuries was in the 10–14 age group (n = 6281, 62% male, 38% female). The rank order of injuries were sprains (31.5%), fractures (29.4%) and superficial lacerations (25.5%). Significantly more injuries resulted from non-competitive (64%) versus (36%) for competitive play ($p > 0.01$). 97.3% of all injuries were minor. Using hospital admissions as an indicator for injury severity, only 2.7% required admission. Fractures (73%) and head injuries (11%) were the 2 most common diagnoses requiring hospital admission. Males had an overall higher admission rate (Odds Ratio = 1.37). Male competitive play resulted in higher rates of severe head injuries (Odds Ratio = 7.47) compared to male non-competitive play (Odds Ratio = 1.21). CONCLUSIONS: Using the CHIRPP surveillance tool, soccer injuries in Canadian children occur at a greater rate in non competitive compared to competitive play. The majority of soccer injuries in children are minor in severity. Males are at an increased risk for soccer injuries in general, in particular for those requiring hospitalizations, and especially head injuries.

086 Patterns of Injury of Canadian Children in Non-Competitive Soccer: A Five Year Canadian Hospitals Injury and Report Prevention Program (CHIRPP) Perspective.
Shore BJ, Joubert GI. Pediatric Emergency Medicine, Children's Hospital of Western Ontario, London, ON.

INTRODUCTION: The Canadian Soccer Association reports that in 2000 there were 644,028 children under the age of 19 playing competitive (C) soccer. The objective was to examine the relative frequency of injury in non-competitive (NC) soccer play using CHIRPP. METHODS: A retrospective study was conducted using the CHIRPP database, incorporating data from 10 pediatric hospitals and 6 general hospitals. Soccer injury reports between September 1, 1994 and August 31, 1999 were analyzed. Age ranged from >1 to <19 years of age. Over the five-year period injuries were analyzed to describe age, gender, the context of the injury, the mechanism of injury, and the severity of injury. RESULTS: Analysis was done on 8,424 completed records. A significantly larger proportion of soccer injuries were as a result of NC 64% (n = 5361) play versus 36% for C play ($p > 0.01$). Males were twice as likely to be injured in NC group (67.4%) versus females (32.6%). The 10–14 age group had the greatest number of injuries (3084). Contact accounted for 84% of all NC injuries. Majority of injuries were minor (96.3%). Using hospital admission as an indicator of injury severity, only 3.3% required admission. Fractures (71.9%) and head injuries (10.7%) were the 2 most common diagnoses requiring hospital admission. Males had an overall higher admission rate (OR = 1.16) and more frequent severe head injuries (OR = 1.21). CONCLUSIONS: Using the CHIRPP surveillance tool, soccer injuries in Canadian children occur at a greater rate in non-competitive play. This data shows that the majority of soccer injuries in children are minor in severity and associated with contact. Males are at an increased risk for soccer injuries in general, and in particular for those requiring hospitalizations, especially head injuries.

087 Practice Variation Among Pediatric Emergentologists and Pediatric Orthopaedic Surgeons in the Management of Wrist Buckle Fractures.
Plint A, Clifford T, Perry J, Bulloch B, Nguyen BH, Miller K, Pusic M, Joubert G, Lalani A, Ali S. Division of Emergency Medicine, University of Ottawa. Ottawa, ON.

OBJECTIVES: Buckle fractures are the most common wrist fractures in children and frequent cause of ED visits but there is few studies regarding their management. The purpose of this study was to examine practice patterns and attitudes of pediatric emergency physicians (EP) and pediatric orthopedic surgeons. METHODS: A standardized survey assessing management of wrist buckle fractures and attitudes for immobilization was mailed to all pediatric orthopedic surgeons and EPs at 9 children hospitals. A modified Dillman's method was used for follow-up. RESULTS: 82% of physicians surveyed responded (31/39 orthopedic surgeons and 79/96 EPs). 63% of EPs and 68% of orthopedic surgeons believed wrist buckle fractures need to be immobilized ($p = 0.28$). There was variation among orthopedic surgeons on the length of immobilization recommended, 71% recommended 2 to 3 weeks and 10% treated only until pain free. EPs showed great diversity on length of immobilization needed (until pain free [17%], 2 to 3 weeks [35%], and 1–2 weeks [13%]). 52% of orthopedic surgeons preferred a below elbow cast, 30% preferred a combination of splint and cast (30%), and 10% preferred a splint. EPs "usually or always" used a cast (60%) or splint (31%). Among physicians who believed all fractures should be immobilized, pain control was the most frequently cited reason (95% orthopedic surgeons, 90% EPs, p NS). Orthopedic surgeons were more concerned about refracture than EPs (76% vs 55%, $p = 0.10$). The remaining physicians did not believe all buckle fractures needed immobilization, cited buckle fractures are stable (67% orthopedic surgeons, 79% EPs, $p = 0.46$) and have a low risk of refracture (33% orthopedic surgeons, 67% EPs, $p = 0.09$). CONCLUSIONS: Although many physicians believe wrist buckle fractures need immobilization, a significant number disagree. There is variation in the type and length of immobilization used. Given this practice variation, the optimal management of wrist buckle fractures needs further study.

088 Croup Presentations to the Emergency Department: Description and Outcome.
Rowe BH, Yiannakoulias N, Johnson D, Klassen TP, Bullard M, Spooner CH, Holroyd BR, Svenson L, Rosychuk R, Schopflocher D. University of Alberta, Edmonton, AB.

OBJECTIVES: This study examines ED presentations of croup and subsequent visits for the same problem within the year using a large administrative database. METHODS: All patients <20 years of age 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 (1998/99) with a diagnostic code of croup (464.4). 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 and crude presentation rates are reported. RESULTS: During the year, there were 4706 unique croup-related visits to the emergency department by 3933 individuals under 20 years of age. These visits made up roughly 0.3% of the 1.5 million total visits to the emergency department. Overall, 2702 (66%) of patients were between 1–4 years of age; males presented more commonly than females. Impressive daily and seasonal variation exists; weekends (35%) and December–February (38%) numbers were highest. Most visits resulted in discharges from the emergency department (4209; 90%). There were 464 admissions (9.9%), including 10 to critical care areas. The 2 urban health regions had lower or significantly lower than average rates of croup presentation. Repeat visits to the ED for croup were not uncommon; 16.5% of the cases made at least 1 additional visit to the ED for croup within a year of the first visit. CONCLUSIONS: These results indicate that croup is a relatively common presentation to the ED. Repeat presentations and variation in rates of presentation suggest that further evaluation of croup patients is required to determine the treatment variation for this ED problem.

089 Patients with Community-Acquired Pneumonia Discharged from the Emergency Department According to a Clinical Practice Guideline – A 2 Year Observational Study.
Campbell SG, Patrick W, Varley-Doyle S, Els M, Murray D, Urquhart D, Maxwell D, Hawass A, McIvor RA, Hernandez P, McParland C, Haase D. Dalhousie University Department of Emergency Medicine. Halifax, NS.

INTRODUCTION: Clinical practice guidelines (CPG) decrease admission rates for CAP, although the safety of decreased admissions in a non-study setting remains unclear. According to the CPG at our institution, patients with a pneumonia severity score (PSS) of <90, (Fine groups I to III) and who met each of 4 additional discharge criteria, are discharged, with referral for telephone follow-up in 24–48 hours. OBJECTIVES: Primary objective: To assess the safety of discharging patients with CAP according to a CPG based on a pneumonia severity scoring system. Secondary objective: To assess the utility of a 24–48 hour follow-up call. METHODS: A retrospective chart audit of all patients identified in the ED database as having been discharged with a diagnosis of pneumonia during the period 3

Jan 1999–3 Jan 2001. Readmission or death rates within 2 weeks of the emergency visit were evaluated, using data from all local hospitals and from the provincial coroner. RESULTS: 867 patients were identified. The average age was 55.5 years. (range 16–98), and the mean PSI score was 69.2 (range 6–187). 26 (3%) were readmitted within 2 weeks, 15 (1.7%) died within 2 weeks. Of 148 (17.1%) patients referred for follow-up, average age (58.8 vs. 54.9) and PSI scores (67.2 vs. 69.6) were similar to patients not referred. Referred patients were twice as likely to be readmitted within 2 weeks (4.7% vs. 2.5%). There was no difference in deaths within 2 weeks between the groups (1.4% vs. 1.8%). CONCLUSION: The use of a CPG to guide the discharge of patients from the ED appears to be safe. Patient follow up referrals are infrequently made, and the chance a referral does not appear to be linked to the PSI or age of the patient, but does appear to be associated with a higher subsequent admission rate.

090 Concordance between Radiologist Reports and Emergency Physician Diagnosis of Community-Acquired Pneumonia in Patients Discharged from an Emergency Department.

Campbell SG, Patrick W, Varley-Doyle S, Els M, Murray D, Urquhart D, Maxwell D, Hawass A, McIvor RA, Hernandez P, McParland C, Haase D. Dalhousie University Department of Emergency Medicine. Halifax, NS.

INTRODUCTION: Chest x-ray (CXR) has long been considered the 'gold standard' for the diagnosis of community-acquired pneumonia (CAP), however CXR may miss up to 30% of pneumonias seen on chest CT. Recent suggestions that acute bronchitis not be treated with antibiotics have highlighted the importance of differentiating the 2 conditions. Radiologists rarely have the benefit of direct patient contact when deciding on the clinical relevance of seemingly unimportant x-ray features. Although numerous studies (using CXR as the standard) have described 'miss' rates in CAP, very little work has been done on cases where the treating physician 'overcalls' the diagnosis. OBJECTIVES: To evaluate the level of concordance between radiologist reports, (received after discharge of patients), with the diagnosis of CAP in patients discharged from an emergency department. METHODS: Three investigators conducted a retrospective chart audit of all patients identified in the ED database as having been discharged with a diagnosis of 'pneumonia' or 'possible pneumonia' during the period 3 Jan 1999–3 Jan 2001. Emergency physician (EP) and radiology report (RR) diagnoses were categorized as 'pneumonia', 'possible pneumonia', 'non-pneumonia' and 'normal', and reports for each patient were compared. RESULTS: 867 patients were identified for audit. Of these, x-rays were performed in 844 (97.3%). RR were not found in 31 cases (3.67%). Of 669 EP diagnoses of 'pneumonia', 304 (37.4%) RR's were in agreement, although in 82 (10%), the RR diagnosis was of 'possible pneumonia) of 813 EP diagnoses of 'pneumonia' or 'possible pneumonia', 426 (52.4%) of RR's were in agreement. 214 (26.3%) of RR's in the combined group were of diagnoses other than pneumonia, while 173 (21.3%) were read as 'normal'. CONCLUSION: EP's and radiologists frequently disagree on whether a patient has pneumonia or not. Perhaps it is time too revisit the 'gold standard' status of plain chest x-ray.

091 Maintaining Normocapnia Prevents Cerebral Vasoconstriction during Oxygen Therapy.

Tesler J, Rucker J, Volgyesi G, Fedorko L, Fisher J. Department of Anesthesia, University Health Network. Toronto, ON.

INTRODUCTION: O2 treatment is accompanied by cerebral vasoconstriction which offsets, or even reduces, O2 delivery to the brain. Hyperoxia also causes hypocapnia which constricts CO2-responsive vascular beds. We hypothesized that preventing hypocapnia during O2 treatment would prevent oxygen-induced cerebovascular vasoconstriction. METHODS: We exposed 5 normal subjects to >97% O2 for 3 consecutive 20 minute test periods. Normocapnia was maintained only during the second test period but subjects were unaware when normocapnia was maintained. We monitored tidal volume, respiratory rate, and middle cerebral artery blood velocity (MCABV) as an index of cerebral blood flow. RESULTS: On the initial exposure to hyperoxia, minute ventilation increased by 21% ($P < 0.05$), end-tidal PCO2 decreased by 3.7 mm Hg ($p < 0.01$, paired t test) and MCABV decreased by 11.5% ($p < 0.02$, paired t test). During the second test period when normocapnia was maintained, minute ventilation increased by 77% and MCABV remained at control values. During the third test period, responses were not significantly different from those during the first test period. CONCLUSIONS: Maintaining normocapnia prevents the fall in cerebral blood flow associated with O2 inhalation. Maintaining isocapnia during O2 treatment should improve O2 delivery to organs with CO2 responsive vascular beds, such as the brain, heart and kidney.

092 Factors Associated with Activation of the Pediatric Trauma Team for Severely Injured Children.

Au BL, Shephard AL, Brennan-Barnes M, Osmond MH. McMaster University. Hamilton, ON.

INTRODUCTION: Activation of the pediatric trauma team (PTT) in our tertiary-care pediatric centre is based on specific criteria (physiologic, anatomic, and mechanism). However, there are instances in which the PTT is not activated for severely injured children. OBJECTIVES: The primary objective of the study was to determine factors associated with activation of the PTT for severely injured patients. The secondary objective was to determine whether care by the PTT would decrease length of stay in the emergency department (ED). METHODS: All patients seen from July 4, 2000 to June 1, 2001 with an Injury Severity Score (ISS) >11 were included. Data were collected from a trauma registry database. Data collected included: age, gender, ISS, mechanism of injury, need for surgery, length of stay in the ED, and final disposition (ward vs PICU). RESULTS: 69 patients with an ISS >11 were seen during the study period. The PTT was activated for 20 patients, and not activated (NTT) for 49. There were no significant differences between the PTT and NTT groups (PTT vs NTT) in: mean age (years) (9.35 ± 5.21 vs 9.16 ± 5.19; $p = 0.893$), proportion male (13/20 vs 34/49; $p = 0.466$), mean ISS (23.10 ± 10.99 vs 17.88 ± 4.64; $p = 0.052$), or fall as mechanism of injury (3/20 vs 14/49; $p = 0.358$). The PTT was more likely to be activated for MVA mechanism (15/20 vs 13/49; $p = 0.0003$). Proportion of patients admitted to the PICU was significantly greater in the PTT group (14/20 vs 21/49; $p = 0.037$). Proportion of patients going to surgery was similar in both groups (3/20 vs 3/49; $p = 0.346$). ED length of stay (min) was significantly lower in the PTT group (177.70 ± 74.36 vs 255.96 ± 203.84; $p = 0.026$). CONCLUSIONS: Severely injured patients managed by the pediatric trauma team had shorter lengths of stay in the ED, were more likely have MVA mechanism, and were more likely to be admitted to the PICU.

093 Major Injury Associated with All-Terrain Vehicle use in Nova Scotia: A Five Year Review.

Sibley AK, Tallon JM. Dalhousie University. Halifax, NS.

BACKGROUND: All-terrain vehicle (ATV) riding is a popular recreational sport with approximately 1.5 million users in Canada. Despite legislation to lower ATV injury rates, ATV related incidents are still a major cause of trauma and death. This paper reviews the epidemiology of major injury associated with ATV use in Nova Scotia. METHODS: Using the Nova Scotia Provincial Trauma Registry, all adult (age >15) trauma (ISS Δ 12) related to ATV incidents over

a 5 year period were evaluated. Data were analyzed for demographic variables, temporal statistics, alcohol use, helmet use, injury characteristics and as well injury outcome variables including Injury Severity Score (ISS), Length of Stay (LOS), Glasgow Coma Score and discharge status. RESULTS: 25 patients met the inclusion criteria. The majority of trauma was incurred by males (92.0%) and by persons between the ages of 15–34 (64.0%), average age 34.4. 71.4% of all trauma occurred between 13:00 hr and 19:00 hr, 52.0% occurred on the weekend and 40.0% of all injuries occurred during the spring season. Injuries to the central nervous system comprised 39.1% of all major injuries. The average ISS was 22.1 and the average LOS 21.6 days. Alcohol was involved in up to 56.0% of all incidents and only 5 patients (20.0%) were known to be wearing a helmet at the time of injury. INTERPRETATION: ATV related incidents are a continuing source of major injury. This paper describes the epidemiology of ATV related trauma presenting to the sole tertiary care referral centre in 1 province. Information gained from this study should be used to influence ATV public education programs.

094 Prospective Evaluation of a Guideline for the Selective Elimination of Pre-Reduction Radiographs in Clinically-Obvious Anterior Shoulder Dislocation.

Shuster M, Abu-Laban RB, Boyd J, Gauthier C, Shepherd L, Turner C. Department of Emergency Medicine, Mineral Springs Hospital. Banff, AB.

INTRODUCTION: Previous research by our group demonstrated that experienced Emergency Physicians (EPs) can identify a subgroup of patients with shoulder dislocation for whom pre-reduction radiographs do not alter management. This led us to develop a treatment guideline for the selective elimination of pre-reduction radiographs in clinically-evident anterior shoulder dislocation. Our primary objective was to prospectively evaluate this guideline and determine whether it was effective in safely eliminating unnecessary radiographs. METHODS: We enrolled a convenience sample of 98 patients presenting to Mineral Springs Hospital (Banff, Canada) with possible shoulder dislocation between November/2000 and April/2001. EPs scored their clinical certainty of the diagnosis of dislocation on a 10cm visual analog scale after patient assessment and prior to pre-reduction radiographs (if obtained). EPs were aware of our treatment guideline however following it was optional. Data was collected on clinical scoring and evaluation, compliance with the guideline, and outcomes. RESULTS: EPs were certain of shoulder dislocation in 93.7% of patients with possible anterior shoulder dislocation (59/63, 95% CI: 84.5%–98.2%). Compliance with the treatment guideline was 82.5% (52/63, 95% CI: 70.9%–90.9%) and most deviations involved the elimination of post-reduction radiographs (which the guideline advises on all patients). Compared to a practice of obtaining pre-reduction radiographs for all cases of suspected shoulder dislocation, the use of our treatment guideline resulted in a statistically significant 88.9% (56/63, $p < 0.0001$, 95% CI: 78.4–95.4%) elimination of pre-reduction radiographs. CONCLUSIONS: Experienced EPs are frequently certain of the diagnosis of anterior shoulder dislocation on clinical grounds and can comfortably and safely manage these cases using our guideline for the selective elimination of pre-reduction radiographs in clinically-obvious shoulder dislocation. Validation of our guideline in other settings is warranted. If adopted generally, this guideline will result in both improved patient care and significant cost-savings.

095 Does CT at a Primary Hospital Delay the Transfer of Trauma Patients to a Tertiary Centre?

Onzuka J, Worster A. McMaster University. Hamilton, ON.

INTRODUCTION: We feel that delays in transfer of patients to the level 1 trauma centre are due to imaging procedures done at the primary hospital, namely the CT scan. For this reason, we set out to identify whether doing CT scans in the primary hospital would delay the transfer of trauma patients to a level 1 trauma centre and whether this affected mortality rate. METHODS: We undertook a retrospective chart review of all patients that were transferred to the Hamilton General Hospital (HGH), which services 2.2 million people and 24 hospitals over an area of 13,434 km^2, for management of traumatic injuries from primary hospitals in the period including April 1, 1999 to March 4, 2001. Assessments were made to whether doing a CT scan at these primary hospitals delayed the transfer of patients to the HGH and to assess whether this contributed to a higher mortality rate. RESULTS: Patients were transferred to the Hamilton General Hospital 85 mins. (95% CI – 65–108) ($p < 0.00001$) faster if they had not received a CT scan at the primary hopital (power = 1.00, alpha = 0.05 and n = 72). The 2 groups of patients (those that had CT and those that did not) were matched for ISS, age, gender and mode of transport to the Hamilton General Hospital. Analysis of the mortality data comparing the group who received CTs at the primary hospital vs the group that did not, revealed an OR = 0.87 (95% CI 0.37–2.05) CONCLUSIONS: Our data clearly identifies a statistically significant delay in the transport of multisystem trauma patients to a level 1 trauma centre if CT scans were performed on patients in a primary hospital. At this point, however, we have not significantly correlated this with an increase in mortality since the OR = 0.87 (95% CI 0.37–2.05) for having a CT at a primary hospital.

096 Using Electronic Clinical Practice Guidelines in Emergency Medicine.

Meurer DP, Rowe BH, Bullard MJ, Holroyd BR. Emergency Medicine Research Group, Division of Emergency Medicine, University of Alberta. Edmonton, AB.

OBJECTIVES: Previous efforts to incorporate clinical practice guideliens (CPG) into practice have met with failure, especially in the emergency department (ED). This study examines the use of an innovative CPG project as well as the characteristics of resource use recorded by a computer-based health information system. METHODS: The EM CPG is a single sign-on, intranet, desktop application for emergency department clinical decision making. This product consists of decision tools, in- and out-patient order sets, patient information and important links; all EM physician staff at 1 major teaching hospital affiliated with the University of Alberta had access. The data for the usage characteristics were derived anonymously from user logs and spanned the first 8 months this resource was available. Whenever possible, clinicians completed brief questionnaires using a 7-point Likert scale at the conclusion of their encounter. RESULTS: 24 (96%) of 26 EM physicians accessed the site and there were 322 recorded uses to the CPG program over the study period. The "helpfulness" (median = 6.0; IQR: 5, 7) and "ease of use" (median = 6.0; IQR: 5, 7) was rated as "high" by 130 users. Also, "increasing confidence with treatment" (median = 5.0; IQR: 4, 6) and "improving quality of care" (median = 5; IQR: 4, 6) received "moderately high" ratings. Most (80%) EM physicians used 1 product during an interaction. Frequently used resources were community acquired pneumonia decision rules (n = 55), swollen limb assessment sets with Well's criteria (n = 94), the IV out-patient treatment order form (n = 25), and the head injury patient information form (n = 27); specific clinic consult forms were also popular (n = 32). For 3 of the most commonly used resources, forms with preformatted "no" responses were used 66% of the time. Use of the CPG resources increased 43% in the second 4-month period of the study. CONCLUSIONS: An intranet CPG dedicated to the management of common emergency department problems has been well received by most staff and rated very highly for ease of use and help-

fulness. Further implementation and evaluation of interventions designed to improve the use of EBM resources, such as CPGs, appear warranted.

097 Using Clinical Practice Guidelines in Emergency Medicine.
Rowe BH, Meurer DP, Bullard M, Holroyd BR. Division of Emergency Medicine, University of Alberta, Edmonton, AB.

OBJECTIVES: Previous efforts to incorporate clinical practice guidelines (CPG) into practice have met with failure, especially in the emergency department (ED). This study examines the use of an innovative CPG project as well as the characteristics of resource use recorded by a computerized system. METHODS: The EM CPG is an intranet-based desktop application for ED clinical decision making. This product consists of decision tools, order sets, patient information and important links; access was provided to all 26 EM physicians at 1 teaching hospital. The data for the usage characteristics were derived anonymously from user logs and spanned the first 8 months of use. Whenever possible, clinicians completed brief questionnaires using a 7-point Likert scale at the conclusion of their encounter. RESULTS: 24 (96%) of staff physicians accessed the site and there were 322 recorded uses to the CPG program over the study period. The overall helpfulness (median = 6.0; IQR: 5, 7) and ease of use (median = 6.0; IQR: 5, 7) were rated as high by 130 users. Most (80%) EM physicians used only 1 product during an interaction. The most highly used resources were community acquired pneumonia decision rules (n = 55), swollen limb assessment sets (n = 94), IV out-patient treatment order form (n = 25), and the head injury patient information form (n = 27); specific clinic consult forms were also popular (n = 15). For 3 of the most commonly used resources, defaulted forms (with pre-formatted The overall "helpfulness" (median = 6.0; IQR: 5, 7) and "ease of use" (median = 6.0; IQR: 5, 7) was rated as "high" by 130 users. Most (80%) EM physicians used only 1 product during an interaction. The most highly used resources were community acquired pneumonia decision rules (n = 55), swollen limb assessment sets with Well's criteria (n = 94), the IV out-patient treatment order form (n = 25), and the head injury patient information form (n = 27); specific clinic consult forms were also popular (n = 15). For 3 of the most commonly used resources, defaulted forms (with pre-formatted 'no' responses) were used 66% of the time. Use of the CPG resources increased 43% in the second 4-month period of the study. CONCLUSIONS: An intranet CPG dedicated to the management of common emergency department problems has been well-received by most staff and rated very highly for ease of use and helpfulness. Further implementation and evaluation of interventions designed to improve the use of EBM resources, such as CPGs, appear warranted.

098 Cellulitis in the ED: Factors Associated with Treatment Failure.
Murray HE, Stiell IG, Wells GA. Kingston General Hospital, Kingston, ON, and the Ottawa Hospital, Civic Campus, Ottawa, ON.

OBJECTIVE: This preliminary study identified both the expected rate of treatment failure and the historical features and clinical characteristics that are associated with treatment failure in ED patients with cellulitis. METHODS: This prospective observational cohort study was performed in a tertiary care centre with ~50,000 annual visits. Adult patients with cellulitis had a standardized physician assessment performed prior to the initiation of treatment. The primary outcomes were clinical response or treatment failure, which was defined as any 1 of the following poor outcomes: I&D of abscess, change in antibiotics (not due to allergy/intolerance) specialist consultation or admission to hospital. Comparison of the means and proportions between the 2 groups was performed with univariate associations, using parametric or non-parametric tests where appropriate. RESULTS: 80 patients with 78 episodes of infection were entered. The patients were 60% male, mean age 49 (SD 19) with 76 (95%) extremity cellulitis and 11 (14%) abscess with cellulitis. 14 episodes (17.5%) were classified as treatment failures. This can be further broken down into an oral antibiotic failure rate (6.8%) and an ED-based IV antibiotic failure rate (26.1%). Patients with treatment failure were older (mean age 59 vs. 46, $p = 0.02$) and more likely to have already taken oral antibiotics (50% vs. 17%, $p = 0.01$). Patients with olecranon bursitis were also more likely to fail treatment (29% vs. 9%, $p = 0.05$). CONCLUSIONS: The treatment of cellulitis with daily ED-based IV antibiotics is a relatively new phenomenon. A clinical trial of this practice is needed to determine which patients require IV therapy or admission. Patients with previous (failed) oral therapy and those with olecranon bursitis are more likely to fail ED treatment for cellulitis and should not be randomized in a clinical trial of oral vs. ED based IV antibiotics.

099 Cellulitis in the ED: Factors Affecting Treatment Decisions.
Murray HE, Stiell IG, Wells GA. Kingston General Hospital, Queen's University. Kingston, ON.

OBJECTIVES: The correct ED treatment of cellulitis is not clear. This study examined the historical and clinical characteristics that determine the severity of a cellulitis episode. METHODS: This was a prospective cohort study from a tertiary care centre with ~50,000 annual visits. Adult patients with cellulitis had a standardized MD assessment prior to initiating treatment. Relevant historical features and objective measurements including infection size were recorded on the data form. The primary outcome was a treatment-based severity classification: those treated with ED-based IV antibiotics were considered 'severe'and those with oral antibiotics 'mild.' Means and proportions were compared between the 2 groups with univariate associations (using parametric or non-parametric tests where appropriate). ROC curves were constructed for significant continuous data. RESULTS: The 64 study patients had a mean age of 45 years, 61 (95%) had extremity infections and 8 (12.5%) had abscesses with cellulitis. 27 episodes were 'mild' and 37 'severe.' Patients with severe cellulitis were more likely to report a previous history of cellulitis (32.4% vs. 7.4%, $p = 0.02$), fever (31.4% vs. 11.1%, $p = 0.05$) or systemic symptoms (38.9% vs. 3.7%, $p < 0.01$). There were no differences in demographics or the presence of co-morbidities. The size of infection was larger in severe infections (637.7 cm^2 vs. 219.9 cm^2, $p < 0.01$). The area under an ROC curve of size vs. severity was 0.78 (95% CI 0.67, 0.90). There was no size cut point with 100% sensitivity for severe infections. CONCLUSIONS:This is the first prospective study to evaluate the characteristics determining cellulitis severity. Patients with previous cellulitis, larger size of infection and systemic symptoms were more likely to be treated with IV antibiotics. However, the absence of a clear division between the groups allows ethical randomization of patients with all size infections into a proposed clinical trial comparing oral vs. IV antibiotics in cellulitis.

100 A Survey of Influenza Vaccination Rates Amongst Emergency Department Personnel.
Saluja IS, Theakston K. London Health Sciences Centre, Emergency Department. London, ON.

INTRODUCTION: During the influenza season of 1999–2000, emergency department (ED) health care workers at UWO teaching hospitals were surveyed to investigate their influenza vaccination rates, motivating factors and attitudes toward vaccination. METHODS: An anonymous 28-item survey was distributed to emergency physicians and residents, nurses, respiratory therapists (RTs), and other allied healthcare workers. Statistical analysis was done using

SPSS v.10. RESULTS: 343 surveys were returned for an overall response rate of 81%. The respondents were 75% female, 87% nonsmokers, with a mean age of 38. The overall vaccination rate was 37%. The RTs had the highest vaccination rate of 46%, the allied healthcare workers the lowest at 27%, and the physician's rate was 35%. Logistic regression analysis revealed that respondents with a chronic medical condition were almost twice as likely to receive vaccination (OR 1.96, p = 0.018). With regards to perceptions and attitudes, 28% felt adverse affects were common, 51% felt vaccination was effective, 52% would support a program to improve vaccination rates, and 41% would support mandatory vaccination. Only 27% felt that patients are at an increased risk of getting influenza from ED staff, but 58% perceive that ED staff are at an increased risk of getting ill from patients. CONCLUSIONS: While there is a perception of increased risk of influenza transmission in the ED, the immunization rate amongst ED personnel was only 37%, and the majority (59%) did not support mandatory immunization. When controlled for baseline characteristics, the only significant motivator to get vaccinated that was identified was the presence of a chronic medical condition. There is good evidence that influenza immunization of the elderly and nursing home workers decreases mortality, however more work needs to be done regarding the efficacy of ED personnel influenza vaccination.

101 Pneumonia Presentations in the Emergency Department: Description and Outcome.

Spooner CH, Rowe BH, Yiannakoulias N, Bullard M, Holroyd B, Craig W, Klassen T, Johnson D, Svenson L, Rosychuk R, Schopflocher D. Division of Emergency Medicine, University of Alberta. Edmonton, AB.

OBJECTIVES: Pneumonia is a common condition that presents to the emergency department (ED) but the epidemiology of this problem is understudied. This study examines all ED pneumonia visits within a large, standardized health care region for 1 fiscal year. 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 (98/99) with a diagnostic code of pneumonia (486.x; but not influenza). 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 and crude presentation rates are reported. RESULTS: Overall, 1.49 million ED visits were recorded in the year; the number of patients with a diagnosis of pneumonia was 17,162 (1.2% ED visits). Overall, 70% were under the age of 65 years with a peak at 1–4 yrs (15.2%); male / female representation 52%/48%. Limited daily variation existed; Saturday–Monday (~15.5%), Thursday (12.8%). However, seasonal variation was noted: December–February (11.5–13.5%) numbers were highest, June–September lowest (6.2–6.5%). Most patients were discharged (63.8%); however, admission (5924; 34.5%) was higher than the ED average (9%). Few patients left prior to seeing a physician (9, <1%). The rate of pneumonia varied between regions, with an average of 3.8/1000 population across the province; urban areas had the lowest rate of presentation. More than 1 presentation for pneumonia was recorded for 16% of visits (2 or more visits: 10.3%). CONCLUSIONS: These results indicate that pneumonia is a relatively common presentation to the ED, and admission rates are high. Further evaluation of pneumonia patients in the ED is required to understand the observed variation and to evaluate interventions to improve outcome.

102 Salty Broth for Salicylate Poisoning? Misleading Overdose Management Advice in the 2001 *Compendium of Pharmaceuticals and Specialties* (*CPS*).

J Brubacher, R Purssell, D Kent. Vancouver Hospital and Health Sciences Centre, UBC, British Columbia Drug and Poison Information Centre. Vancouver, BC.

INTRODUCTION: The *CPS* contains monographs on medications sold in Canada and is similar to the American *Physician's Desk Reference* (*PDR*). Poison management advice in the PDR was shown to be erroneous; therefore we examined advice found in the *CPS*. METHODS: Using American Association of Poison Control Centers (AAPCC) data, we choose 10 classes of medications consistently responsible for fatalities. A panel of 3 toxicologists reviewed Poisindex and 3 leading toxicology textbooks and arrived at a consensus on indicated, contraindicated, and futile interventions for each of these classes of drugs. Corresponding *CPS* monographs were then ranked from poor to excellent on their inclusion of key interventions and exclusion of contraindicated interventions. We also considered whether the monograph would allow a reasonable clinician to manage an overdose, whether it served to refresh one's memory, or whether it was simply misleading or dangerous. RESULTS: A total of 119 monographs were reviewed. Of these 25 (21%) were adequate to allow a clinician to manage an overdose, 48 (40%) would serve to refresh the memory regarding the key management points but 62 (52%) were dangerous or misleading. In terms of listing key interventions, 63 (53%) monographs were poor, 33 (28%) were fair, 22 (18%) were good and 1 (1%) was excellent. For excluding contraindicated therapies, 57 (48%) were poor, 9 (8%) were fair, 51 (43%) were good, and 2 (2%) were excellent. CONCLUSIONS: Poison management advice in the *CPS* is usually inadequate and often misleading or dangerous. These sections should either be omitted or rewritten to reflect current standards of care.

103 Treatment Choices and Frequency of Emergency Visits Among Migraine Sufferers.

Epstein N. Credit Valley Hospital. Thornhill, ON.

INTRODUCTION: Patients suffering recurrent migraines, analgesic-induced migraines (rebound headaches), and narcotic seekers feigning migraines constitutes frequenct visits to emergency. Although, abortive medicines such as dopamine antagonists are considered the standard of care, a number of patients still continue to receive opiates. It is intuitively thought that giving opiates may alleviate headaches suboptimally and may precipitate more visits to the emergency. This study will look at treatment modalities of migraine headaches and compare opiates, dopamine antagonists and serotonergic receptor agonists used in the emergency and determine time intervals (frequency)between visits. METHOD: The study will be a retrospective audit of emergency charts. Entry in the study will include patients with a documented history of migraines and at least 2 visits to emergency over a 6 month period. Any patients with a known history of narcotic abuse will be excluded.The parameter measured will be time from treatment in emergency to subsequent visit for a migraine headache. RESULTS: As of writing over 200 charts will be reviewed consisting of 52 patients. The median age is 33 years old and a female ratio of 3:1. CONCLUSIONS: Audits can be effective tools illustrating aberrant practices. This audit should indicate whether using opiates for treatment of migraines is conducive to more frequent visits for emergency, and ths may be deemed unacceptable therapy.

104 A Retrospective Chart Review of Potential Organ Donors Treated in the Emergency Department.

Tenn-Lyn NA, Cass DE. St. Michael's Hospital, University of Toronto. Toronto, ON.

INTRODUCTION: Ten hospitals in Ontario provide an active Neu-

rosurgery service. Patients from community hospitals are transferred to these neurosurgical centres for assessment. Patients who are assessed by a neurosurgeon to have non-survivable intracranial pathology are often returned to the sending facility for end-of-life care, thus depriving families of the opportunity to consider organ donation as part of the end-of-life process. PURPOSE: To determine the number of patients transferred from community hospitals to tertiary care neurosurgical centres in Ontario who fulfill criteria for potential organ donation. METHODS: At centres across Ontario, ED databases were used to identify all ED patients between April 1st, 1998 and March 31st, 1999 inclusive registered as 'Direct to Neurosurgery'. Charts were reviewed to determine the number of patients meeting inclusion criteria for evidence of (imminent) brain death in the ED, their disposition from the ED, and whether organ donation was discussed with their families. RESULTS: Of 2717 ED patients direct to Neurosurgery at 5 centres, 99 patients met the established criteria for potential organ donors. Nine patients (9.1%) were pronounced dead in the ED. Nine patients (9.1%) became organ donors with their families' consent. Charts from the remaining 81 potential organ donors (81.8%) did not have any documented evidence to suggest that the option of organ donation was offered or discussed. Twenty-one (25.9%) of these patients were transferred back to their referring institution, also representing missed potential organ donors. CONCLUSIONS: A significant number of families were denied the opportunity to consider donation as part of their end-of-life decisions for their loved ones. Further review is needed to fully quantify the extent of this deficit across Ontario. These results emphasize the need to examine ways to improve the overall quality of the organ donation process at tertiary care hospitals in Ontario.

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