CAEP/ACMU 2000 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, nor *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 noted.)

These abstracts were presented at CAEP's Annual Scientific Meeting, June 11–14, 2000, in Saint John, NB.

001 Tissue Plasminogen Activator in Cardiac Arrest with Pulseless Electrical Activity: A Randomized Placebo-Controlled Trial.
Abu-Laban RB, Christenson JM, Innes GD, van Beek CA, Wanger KP, McKnight RD, MacPhail IA, Puskaric J, Sadowski RP, Singer J, Schechter MT, Wood VM. University of British Columbia, Vancouver, BC.

OBJECTIVES: Acute coronary or pulmonary thrombosis causes numerous cardiac arrests, and survival after thrombolysis during CPR has been reported. We sought to determine if a rapid infusion of tissue plasminogen activator (tPA) would benefit selected pulseless electrical activity (PEA) cardiac arrest patients. METHODS: Prehospital or ED adult cardiac arrest patients with at least one minute of PEA (rate >20/min) who remained pulseless after intubation, 500 cc IV saline, and 1 mg IV epinephrine were eligible. Patients with reversible causes of PEA or contraindications to thrombolysis were excluded. Subjects were randomized to receive tPA (100 mg IV over 15 minutes) or an equal volume of placebo in a double-blind fashion. Standard resuscitation measures were then continued for a minimum of 15 minutes. RESULTS: From February 1998 to September 1999, 1583 cardiac arrests were treated and 233 patients enrolled (117 tPA, 116 placebo). Baseline characteristics and survival predictors were similar in the two treatment groups. There was one survivor to hospital discharge in the tPA group (0.9%, 95% CI 0.0% to 4.7%) and none in the placebo group (0%, 95% CI 0.0% to 3.1%), p = NS. The survivor had a fully functional recovery. The proportion of return of spontaneous circulation (ROSC) was 21.4% in the tPA group and 23.3% in the placebo group (difference –1.9%, 95% CI –12.6% to +8.8%), p = NS. CONCLUSIONS: This study was designed with 80% power to detect an increase in survival to hospital discharge from a 1% estimated baseline to 10.3% with treatment. We found no evidence for a treatment effect of this magnitude. It remains undetermined whether selected subgroups may benefit from thrombolysis during CPR.
Key words: pulseless electrical activity, cardiac arrest, resuscitation, tissue plasminogen activator

002 Fibrinolytic Therapy in Acute Myocardial Infarction: Time to Treatment in Canada.
Davies C, Christenson J, Matheson S, Campbell A, Cox J. Vancouver General Hospital, Vancouver, BC.

OBJECTIVES: To provide a current description of the time components in the treatment of acute myocardial infarction in Canada. METHODS: Data from the FASTRAK™ II observational database was analyzed. The database has documented time intervals in 4,749 patients treated in 111 contributing institutions across Canada in 1998. RESULTS: The mean time from onset of symptoms to admission to hospital was 153 minutes (2.55 hours). Only 8.2% of patients received fibrinolysis in less than one hour after onset of symptoms. Time from arrival at hospital to acquisition of first 12-lead ECG was 14 min. Mean time from diagnostic ECG to decision to treat was 31 min, and time from decision to treat to administration of fibrinolytic therapy was 14 min. The overall average time from arrival at hospital to administration of fibrinolysis was 56 min. Analysis of time intervals showed that 31.6% of patients had therapy in less than 30 min, 16.6% had therapy within 30–40 min, 22.5% of patients had received therapy by 40–60 min and 29.3% of patients did not have therapy for more than 60 minutes. CONCLUSIONS: In Canada in 1998, time from onset of symptoms to hospital presentation precludes early fibrinolytic administration in many cases. Time intervals from arrival in the emergency department to administration of fibrinolytic therapy is longer than published and accepted standards. Strategies to alter health seeking behaviour and to minimize in-hospital delays are needed.
Key words: myocardial infarction, thrombolysis

003 Locations of Cardiac Arrest in a Large Urban Centre.
Millard W, De Maio VJ, Gant PT, Yahn S. City of Calgary Emergency Medical Services Department, Calgary Fire Department and University of Calgary, Calgary, Alta.

OBJECTIVES: Identification of the location of out-of-hospital cardiac arrest is necessary to optimize the placement of automated external defibrillators (AEDs) within the community. This study determined the locations of cardiac arrest, and developed a placement strategy for Public Access Defibrillation (PAD) to maximize future AED accessibility. METHODS: This retrospective cohort study included all adult, nontraumatic, out-of-hospital cardiac arrests within an advanced life support (ALS) system. The city population was over 750,000 with a land area amongst the largest of any city in North America. Chart review revealed the location of arrest, which was then categorized by location type. RESULTS: From 1992 to 1996, there were 1,410 consecutive cardiac arrests. Of these, 82% occurred in private residences or outside as follows: 58% occurred in private homes, 10% in apartment buildings, and 14% in the street or within a vehicle. There was no apparent tendency for these arrests to cluster in particular locations (e.g., older neighbourhoods) or high population areas. The remaining 18% of cardiac arrests occurred in public venues: 5% in nursing homes, 5% in large (>250 people) public buildings, most often hotels, airport and fitness facilities, and 8% in smaller (<250 people) public buildings, most commonly golf courses, doctor/dentist offices and restaurants or bars. CONCLUSIONS: Although relatively few cardiac arrests occur in public locations, current PAD programs have focussed on these higher density areas as a strategy for providing greater coverage with fewer AED placements. The visible placement of AEDs where people work, shop and recreate will likely increase public awareness of the recognition and management of cardiac arrest. However, the vast majority of cardiac

arrests occur in private locations and responsible PAD programs must continue to explore other feasible methods of optimizing rapid access to defibrillation.
Key words: public access defibrillation, cardiac arrest, resuscitation

004 Predictors of Good Quality of Life in Prehospital Cardiac Arrest Survivors.
Stiell IG, De Maio VJ, Nichol G, Spaite DW, Ward RE, Martin M, Blackburn J, O'Brien J-A, for the OPALS Study Group. Clinical Epidemiology Unit, University of Ottawa, Ottawa.

OBJECTIVES: To evaluate the prehospital factors associated with optimal quality of life for survivors of out-of-hospital cardiac arrest, within the Ontario Prehospital Advanced Life Support (OPALS) Study. METHODS: The OPALS Study is a large EMS trial that evaluates BLS-D and ALS interventions for cardiac arrest, trauma, and respiratory distress in 20 communities. This prospective cohort substudy included all adult out-of-hospital cardiac arrest patients during the rapid defibrillation or ALS phases of the OPALS Study (1995–99) and who survived to one year. Patients were evaluated for the Health Utilities Index (HUI) Mark 3, which describes health as a utility score on a scale from 0 (dead) to 1.0 (perfect health). Analyses included appropriate univariate tests and stepwise logistic regression to model HUI scores >0.80. RESULTS: The 5,022 consecutive cardiac arrest patients had overall survival rates of 5.1% to hospital discharge and 4.0% to one year. This sub-study included 189 (93.6%) of 1-year survivors: mean age 64.0 (range 16–94), bystander-witnessed 60.0%, EMS-witnessed 24.6%, citizen-initiated CPR 34.4%, initial rhythm VF/VT 89.1%, response with defibrillator <8 minutes 98.9%, and best CPC category 86.9%. The overall median HUI score was 0.88 (IQR 0.74–0.95) which compares well to age adjusted values for the general population (0.85). Logistic regression identified 3 factors independently associated with good quality of life and their odds ratios (95% CIs): male gender 2.3 (1.1–5.2), EMS-witnessed arrest 3.1 (1.4–7.2), and citizen-initiated CPR 2.6 (1.3–5.4) (Hosmer–Lemeshow goodness-of-fit statistic 0.57). CONCLUSIONS: This represents the largest known study of 1-year survivors and is the first to demonstrate that citizen-initiated CPR is strongly and independently associated with better quality of life for out-of-hospital cardiac arrest survivors.
Key words: cardiac arrest, resuscitation, health related quality of life

005 Feasibility Evaluation of Chest Pain Patients in the OPALS Study.
Easo J, Stiell I, Wells G, Spaite D, O'Brien J-A, Martin M, Kennedy D, for the OPALS Study Group. Clinical Epidemiology Unit, University of Ottawa, Ottawa.

OBJECTIVES: The Ontario Prehospital Advanced Life Support (OPALS) Study will be the largest prehospital study yet conducted and will evaluate the impact of prehospital ALS programs on the outcomes of cardiac arrest, trauma, and other patients. The purpose of this study was to assess feasibility and methodological issues required for a clinical trial of chest pain patients within the OPALS Study. METHODS: This cohort study was conducted over a 6-month period in a city of 750,000 and included all adults transported to one of 5 hospitals with a primary complaint of chest pain. Data were collected from ambulance, dispatch, ED, and hospital records. Analyses included descriptive statistics with 95% CIs and univariate associations. RESULTS: 905 consecutive patients were enrolled: mean age 65.8, female 52.7%, NTG prior to EMS arrival 48.1%. Hospital survival was 95.2% and the immediate adverse outcome rate 16.0% (ED MI 13.7%, ED lethal arrhythmia 2.6%, ED pulmonary edema 1.7%, ED hypotension 1.5%, EMS- witnessed cardiac arrest 0.3%). Lengths of stay, in days, were: hospital 8.6, special care unit 2.8, telemetry unit 3.7. Cardiac procedures performed: angiography 18.6%, angioplasty 4.8%, CABG 3.9%, pacemaker 1.2%. The overall survival rate was 95.2%; 71.9% rated "good" at discharge on the CPC scale. The ICD-9 based final diagnoses were: chest pain NYD 17.6%, MI 17.1%, unstable angina 14.6%, stable angina 9.5%, G.I. 8.8%, cardiac dysrhythmias 6.0%, respiratory 5.9%, cardiac other 5.2%. For the proposed clinical trial, a sample size of 13,000 would afford 80% power to detect a 1% difference in hospital survival and a 2% difference in the immediate adverse outcome rate. CONCLUSIONS: This comprehensive in-hospital review provides an in-depth profile of prehospital chest pain patients and was vital for the design and funding of the chest pain component of the OPALS study, which will evaluate the benefits of prehospital ALS.
Key words: chest pain, emergency medical services

006 Emergency Physicians' Attitudes Towards an Early Discharge Clinical Prediction Rule for Patients with Chest Discomfort.
MacGougan CK, Christenson JM. St. Paul's Hospital, Vancouver, BC.

OBJECTIVE: To assess Canadian emergency physicians' (EPs') attitudes to a potential early discharge clinical prediction rule for patients with chest discomfort. METHODS: An anonymous, cross-sectional mail survey of a random sample of 300 members of the Canadian Association of Emergency Physicians (CAEP). RESULTS: 82% of the eligible CAEP members surveyed (235/288) responded. 193/216 (89%) estimated a mean LOS of >2 hours for those with acute coronary disease ruled out. Only 11/235 (5%) indicated any follow-up assessment of chest pain patients. Estimates of rates of missed AMIs ranged from 0.1%–10%. 70% of the EPs responding to the survey felt that a clinical prediction rule which identified patients with chest discomfort who are safe to discharge after a brief (~2 hour) assessment would be very useful, 18% felt it would be useful. 94% of the respondents felt that a rule which could identify more patients who are safe for discharge, while not increasing the current percentage of missed acute myocardial infarction (estimated ~2%), would be useful. 59% of respondents prefer a clinical prediction rule to convey a suggested course of action, while 30% prefer a rule to convey a probability of disease. CONCLUSIONS: Canadian EPs are generally supportive of an early discharge clinical prediction rule for patients with chest discomfort. Most Canadian EPs believe that a clinical prediction rule which could improve efficiency of clinical decision-making for patients with chest discomfort, while maintaining current levels of safety, would be clinically useful.
Key words: chest pain, emergency department, clinical prediction rule

007 Obtaining Consensus for the Definition of "Clinically Important" Brain Injury in the CCC Study.
Stiell I, Lesiuk H, Vandemheen K, Clement C, Reardon M, Eisenhauer M, Wells G, Worthington J, Schull M, Morrison L, McKnight D, MacPhail I, Greenberg G, Dreyer J, Cass D, Brison R. Clinical Epidemiology Unit, University of Ottawa, Ottawa.

OBJECTIVES: The Canadian C-Spine/CT Head (CCC) Study is designed to develop clinical decision rules for imaging in head and neck trauma. This methodological sub-study was essential in order to define and obtain consensus for an outcome measure: "clinically important brain injury." METHODS: This prospective cohort study/survey involved the CT film review of 273 brain injury cases from minor head injury patients (GCS 13–15) at 8 Canadian EDs. CT brain injuries were considered "clinically unimportant" if the patient was neurologically intact and required neither admission nor neurosurgical follow-up. A formal survey was then sent to 164 academic emergency physicians, neurosurgeons, and neuroradiologists at the 8 Canadian university study sites. Descriptive statistics with 95% CIs

were calculated. RESULTS: 57 of 2,536 CCC Study cases reviewed were considered to have "clinically unimportant" injuries: i) solitary contusion <5 mm in diameter (28 cases), ii) localized subarachnoid blood <1 mm thick (22), iii) smear subdural hematoma <4 mm thick (8), iv) isolated pneumocephaly (3), and v) closed depressed skull fracture not through the inner table (1). Surveys returned by 129 of 164 physicians (79.0%) showed the following % agreement with the proposed criteria.

Physician type, no.	Contusion <5 mm	SA blood <1 mm	Subdural <4 mm	Isolated pneumo	Closed depressed
Emergency (n = 93)	56.8%	43.9%	37.0%	41.5%	66.7%
Neuro (n = 36)	69.4%	80.6%	55.6%	50.0%	75.0%
Total (n = 129)	60.5%	55.1%	42.7%	44.1%	70.3%
95% CI (n = 129)	51%–68%	46%–63%	34%–51%	35%–53%	61%–77%

CONCLUSIONS: Most neurosurgeons and neuroradiologists supported the proposed criteria. Emergency physicians were less supportive but often indicated that they would defer to the opinion of the "neuro" specialists. The secondary outcome measure for the CCC Study CT Head rule will be "clinically important brain injury," as developed by this sub-study. "Need for neurological intervention" remains the primary outcome.
Key words: brain injury, computed tomography, clinical prediction rule

008 Pain as a Predictor of Complications of Renal Colic.
Papa L, Stiell I, Lee J, Wells G, Mahoney J. Clinical Epidemiology Unit, University of Ottawa, Ottawa.

OBJECTIVES: To prospectively assess pain as a predictor of 4-week complications from delayed passage of urinary calculi. METHODS: Consecutive patients with suspected renal colic were assessed prospectively at 2 teaching hospital EDs based on acute flank pain and hematuria. A 10-cm visual analogue scale (VAS) was used to assess patients' pain on arrival and at discharge from the ED. Patients were then followed via telephone until stone passage. Complications were defined by i) persistent or recurrent pain at 4 weeks, or ii) development of temperature >38°C, or iii) elevation of creatinine >150 mmol/L by 4 weeks. Appropriate univariate analysis with 95% CIs were performed. RESULTS: From July to September 1998, a cohort of 70 patients with suspected renal colic were assessed prospectively. Seventy-nine (79%) of the patients were found to have renal calculi and 28.6% of these developed complications. Of those patients with complications the average number of hours of pain prior to presenting to the ED was significantly higher 6.7 hours (±SD 2.2) than those without complications 1.9 hours (±SD 12.1) (p = 0.009). In addition, mean VAS pain scores at discharge from the ED in those patients with complications from their stone were significantly higher than those without complications 19.3 mm (±SD 11.3) vs. 7.3 mm (±SD 23.9) (p = 0.018). Emergency physicians correctly estimated the likelihood of complications in these patients in only 38% of cases. CONCLUSION: Physicians are unable to predict 4-week complications from calculi at initial ED visit. Duration of pain prior to presentation to the ED and severity of pain at discharge from the ED are significant indicators of complications. If we could derive a clinical decision rule, using tools such as pain scales, to identify those patients who will develop complications from their renal calculi, we could refer patients to a urologist for earlier intervention.
Key words: renal colic, complications

009 The Revised Canadian CT Head Rule for Patients with Minor Head Injury.
Stiell I, Lesiuk H, Vandemheen K, Wells G, Clement C, De Maio V, Brison R, Cass D, Dreyer J, Eisenhauer M, Greenberg G, MacPhail I, McKnight D, Morrison L, Reardon M, Schull M, Worthington J. Clinical Epidemiology Unit, University of Ottawa, Ottawa.

OBJECTIVES: To revise a recently developed draft decision rule for CT head in patients with minor head injury, as part of the Canadian C-Spine/CT Head (CCC) Study. METHODS: This prospective cohort study enrolled adults with loss of consciousness, amnesia, or confusion and a GCS score of 13–15. Physicians in 10 Canadian EDs completed a 22-item form prior to CT scan and in some cases 2nd physicians performed interobserver assessments. The outcome standards were "need for neurological intervention" and "clinically important brain injury." Analyses included kappa coefficient, appropriate univariate tests, and chi-square recursive partitioning. RESULTS: The final study population of 2,536 patients included an additional 817 (47.5%) cases and 80 (60.6%) new cases with brain injury. Characteristics were: mean age 38.6 (range 16–96); male 68.1%; GCS scores: 13- 3.5%, 14- 15.7%, 15- 80.8%; admitted 26.7%; important brain injury 8.4%; neurological intervention 1.5%. A rule with 3 "high-risk" factors has 100% sensitivity (95% CI 91%–100%) and 80.9% specificity (95% CI 47%–51%) for predicting neurological intervention: a) failure to reach GCS of 15 within 2 hours of injury, b) suspected depressed skull fracture, or c) repeated vomiting. Adding 4 "medium-risk" factors gives 97.7% sensitivity (94%–99%) and 49.0% specificity (47%–51%) for predicting important brain injury: d) signs of basilar skull fracture, e) age ≥55, f) high-risk mechanism, or g) amnesia before injury ≥30 min. Additional factors could raise sensitivity but with an unacceptable loss in specificity. Potential CT rates for the "high-risk" and "medium-risk" models would be 21.9% and 51.3%. CONCLUSIONS: This revised Canadian CT Head Rule is a highly sensitive decision rule for use of CT head in minor head injury. Prospective validation of accuracy, reliability, and acceptability is required before clinical use.
Key words: brain injury, computed tomography, clinical prediction rule

010 Evaluating Clinical Clerks in Emergency Medicine: Does the Knowledge Subdomain Predict Examination Marks?
Bandiera GW, Regehr G, Morrison LJ. University of Toronto, Toronto, Ont.

OBJECTIVES: To determine if knowledge marks predict examination marks better than overall clinical marks. METHODS: The marks from clinical Global Assessment Forms (GAFs) and written examinations for clinical clerks in emergency medicine were collected prospectively for the academic years 1997–98 and 1998–99. Marks for each of ten clinical subdomains as well as the separate overall clinical marks were retrieved from original GAFs. Written examination marks were obtained from the original datasheet for written examinations. Correlations between marks for each subdomain and the written examination were determined, as was the correlation between overall clinical mark and written examination mark. Olkin's Z score was used to check for significance between correlations. RESULTS: Marks were reviewed for 347 clerks. Nine clerks were excluded (incomplete evaluations); 338 clerks were analyzed. Data entry error was 0.058%. Mean marks out of 5 on each of ten subdomains on the GAF ranged from 3.86 to 4.34 (SD 0.62–0.71). Mean overall clinical mark was 80.11(SD = 4.375) percent. The mean examination mark was 81 (SD = 7.66) percent. The knowledge subdomain had the highest correlation with the examination mark (0.19). The overall clinical marks had lower correlation with the examination marks (0.169). The difference was not significant (Olkin z = 0.40, p = 0.35). The correlation of the average marks of all subdomains excluding knowledge with written

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examination marks was even lower (0.12). The ten-item alpha for the GAF was 0.92. CONCLUSIONS: Marks were generally high with low standard deviations. Knowledge marks correlated with examination marks better than overall clinical marks, but the difference was not significant. There is a large amount of redundancy in the data, suggesting a significant halo effect.
Key words: medical education

011 Is the Lateral Chest Radiograph Required in the Diagnosis and Management of Children with Suspected Pneumonia? A Randomized Clinical Trial.
Lynch T, Gouin S, Larson C, Patenaude Y. McGill and Montreal Universities, Montreal, Que.

OBJECTIVE: To determine if the addition of the lateral chest radiograph (CXR) to the frontal CXR influences the diagnosis and management of children with suspected pneumonia in a pediatric emergency department (ED). DESIGN: Randomized clinical trial. SETTING: Montreal Children's Hospital ED. POPULATION: Patients 1–16 years of age in whom a CXR was ordered for the clinical suspicion of pneumonia, were eligible for enrollment from May 1998 to December 1999. Exclusion criteria were: chronic cardiac or respiratory disease, concurrent asthma exacerbation, pneumonia confirmed by CXR in the previous 8 weeks or antibiotic use in the previous 2 weeks, gastroesophageal reflux disease and spastic quadriplegia. Critically unstable patients were also excluded. Patients were recruited while one of 11 Board-Eligible/Certified Pediatric Emergency Physicians (PEP) was attending in the ED. Frontal and lateral views of the chest were obtained for each patient. Patients were randomized into one of 2 groups. In Group A, only the frontal CXR was available for PEP review while in Group B, both views were returned for PEP review. The PEP CXR interpretations for each group were compared to a gold standard taken as consensus agreement of at least 2 out the 3 radiologists who interpreted both views obtained. Post ED-visit, patient management changes (i.e., missed pneumonias by PEP = false negatives) were based upon the initial review of the 2 views by a group of 7 radiologists. RESULTS: There were 534 eligible children during the study period; 33 families declined to participate. Of the remaining 501 patients, 240 were randomized to Group A (1 view) and 261 to Group B (2 views). Both groups were similar in: sex, age, clinical symptoms and signs, treatment provided, and final disposition. The PEP CXR interpretation was equal in accuracy (true positive and true negative diagnoses) between group A and B (70% vs. 72%, RR ± 95% CI = 0.95, 0.78, 1.15). The proportion of false negatives was lower in group A compared to group B (3.4% vs. 4.6%, RR ± 95% CI = 0.85, 0.50, 1.43). CONCLUSIONS: The addition of the lateral CXR to the frontal CXR does not improve the diagnostic accuracy of the PEPs in the diagnosis of pneumonia in children 1–16 years of age. Furthermore, the addition of the lateral CXR may increase the proportion of false negative results.
Key words: radiography, pneumonia, diagnosis, pediatric

012 Comparison of the Predictive Accuracy of Physician Judgement vs. the Canadian C-Spine Rule.
Stiell I, Wells G, De Maio V, Vandemheen K, Clement C, Greenberg G, Lesiuk H, Brison R, Cass D, Dreyer J, Eisenhauer M, MacPhail I, McKnight D, Morrison L, Reardon M, Schull M, Worthington J. Clinical Epidemiology Unit, University of Ottawa, Ottawa.

OBJECTIVES: To compare the predictive accuracy of emergency physicians' clinical judgement to the Canadian C-Spine Rule, a recently developed and highly sensitive clinical decision rule for the use of cervical spine radiography. METHODS: This prospective cohort study was conducted as a component of the Canadian C-Spine/CT Head (CCC) Study in 10 Canadian EDs and involved alert and stable adult trauma patients. Physicians prospectively evaluated patients prior to radiography and performed interobserver assessments when feasible. Physicians also estimated, based upon clinical judgement alone, the probability of unstable cervical spine injury from 0% to 100%. Patients underwent radiography, CT, and follow-up to determine clinically important cervical spine injury. Analyses included comparison of areas under the receiver operating characteristic (ROC) curve with 95% CIs and the kappa coefficient. RESULTS: Among 6,277 patients enrolled over 18 months, the mean age was 36.5 (range 16–97); 50.6% were male; and 64 (1.0%) had a clinically important injury. The physicians' kappa value for a 0% predicted probability of injury was 0.46 (95% CI 0.28–0.65). The respective areas under the ROC curve for predicting C-spine injury were physician judgement 0.85 (95% CI 0.80–0.90) and Canadian C-Spine Rule 0.87 (95% CI 0.85–0.89), ($p = 0.22$). Using a threshold of 0% predicted probability of injury, the respective indices of accuracy for physicians and Canadian C-Spine Rule were sensitivity 92.2% vs. 100% ($p < 0.001$) and specificity 53.9% vs. 46.6% ($p < 0.001$). CONCLUSIONS: While physician judgement shows good overall discrimination between injury and non-injury cases, inter-observer agreement is only fair, and sensitivity is unacceptably low. The accuracy, reliability, and acceptability of the Canadian C-Spine Rule should be explicitly and prospectively evaluated prior to widespread clinical use.
Key words: cervical spine, radiography, clinical prediction rule, utilization

013 The Availability of "Urgent" Ultrasound in Canadian Emergency Departments. A Survey of Emergency Department Directors.
Bajwa GS, Stiell I, Hebert G, Lee J. University of Ottawa, Ottawa.

OBJECTIVES: To determine the availability of "timely" ultrasound (U/S), accessibility and prevalence of U/S in emergency departments (ED), and the interest of directors in the use and implementation of U/S in EDs. METHODS: A mailout survey was sent to the directors of 300 of 800 of the largest EDs across Canada. The survey consisted of 13 questions on demographics, availability of U/S in their departments and the potential future use by emergency physicians (EPs). RESULTS: The response rate to the survey was 52% (155/300) of which 65% were non-teaching hospitals. While 64% of EDs claimed to have after-hours coverage for U/S, the facility to obtain an U/S was rated as difficult 50% of the time. And if U/S was available, 48% of the time it would take between 1 and 3 hours to obtain. 60% of directors surveyed felt that U/S should be performed by EPs and 79% were interested in learning. However, the overwhelming majority, 97%, stated that U/S was not being performed by EPs in their department. CONCLUSIONS: Only 47% said they could obtain an urgent U/S within an hour and 2% within 15 minutes. Only 55% of non-teaching hospitals have 24-hour coverage, and only 50% of those with coverage reported easy access. Across Canada, 5 of 800 EDs have emergency physicians performing focused U/S. There is, however, substantial interest in implementing ED U/S, and even greater interest in EPs learning to perform U/S.
Key words: ultrasonography, emergency department

014 DVT Treatment Protocols in Canadian Emergency Departments.
Spooner C, Kelly KD, Barker S, Holroyd BR, Bullard M, Voaklander D, Rowe BH. University of Alberta, Edmonton, Alta.

OBJECTIVES: To examine the site characteristics, availability of diagnostic tests, and treatments used for deep-vein thrombosis (DVT) in emergency departments (EDs) across Canada. METHODS: Surveys were mailed to 225 ED directors across Canada. Introductory letters, follow-up reminders, phone calls and thank-you letters were used to

increase participation rates. The survey consisted of 20 questions regarding site demographics, availability of testing modalities, and existence of DVT and "rule-out" DVT protocols. Sites were compared on the basis of whether they had an outpatient DVT management protocol in place or not. RESULTS: 143 sites (64%) returned surveys (11% French; 89% English), and 50 (35%) provided full details of their DVT protocols. The sample consisted of 43 (30%) teaching hospitals, 83 (58%) non-teaching and 39 (27%) regional referral centres. Most hospitals (80%) had <500 beds, but 78% had >25,000 ED visits/year. Compared to those sites without protocols, those with a DVT protocol were more likely to have a practising hematologist ($p = 0.003$), employ full time ED physicians ($p = 0.005$), and have more physician hours of weekday coverage ($p = 0.04$). At sites with a DVT protocol, leg ultrasound (96% vs. 87%; $p = 0.05$) and V/Q scans (74% vs. 53%; $p = 0.008$) were more readily available than hospitals without a protocol. In terms of treatment, protocol sites had dedicated DVT teams (41% vs. 10%; $p < 0.001$), rule-out DVT protocols (39% vs. 8%; $p < 0.001$), and used low molecular weight heparin (LMWH) for rule-out DVT pending imaging (90% vs. 61%; $p < 0.001$) and proven DVTs (97% vs. 77%) significantly more often than non-protocol sites. Most sites were interested in participating in DVT research (73%) and receiving DVT CME (93%). CONCLUSION: DVT protocols exist in less than half of Canadian EDs, and there is significant variability in service delivery, treatment and monitoring. Standardized protocol development may improve this situation.
Key words: deep vein thrombosis, emergency department, diagnosis

015 Does More Accurate Testing Result in Patient Benefit in the Investigation of Suspected Acute Urolithiasis?
Worster A. McMaster University, Hamilton, Ont.

OBJECTIVE: To determine if the replacement of intravenous pyelography (IVP) with helical CT scanning (CT) for the investigation of flank pain results in reduction of hospital admission and surgical rates or reduced length of stay (LOS) in the emergency department (ED) for patients. STUDY DESIGN: Retrospective, before and after, cohort study. METHODS: A review of the ED admissions of all patients with a discharge diagnosis of acute urolithiasis/renal colic for a 5-month period prior to the implementation of CT in July 1999 as the primary investigation for acute urolithiasis and for a 5-month period after implementation. RESULTS: A review of 230 patient charts revealed 121 patients who underwent either of the investigations prior to discharge. The surgical rates for the IVP ($n = 60$) and CT ($n = 61$) groups were 5 and 9 respectively ($p < 0.27$) and the admission rates were 12 and 13 respectively ($p < 0.86$). The median times for LOS in the ED for the CT group ($n = 48$) and IVP group ($n = 47$) were compared and revealed the IVP group had a minimally longer stay in the ED (4.77 hours) than the CT group (4.655 hours). Point estimate was 0.235 (95% CI –1.000 hours to 1.490 hours; Mann–Whitney U test (Wilcoxon Rank Test) W = 2302.5; $p < 0.716$). CONCLUSION: Despite being reported as more accurate for the investigation of suspected acute urolithiasis, noncontrast helical CT of the abdomen has not resulted in reduced admission or surgical rates for patients. The suggestion that CT can possibly reduce ED LOS for patients cannot be supported by these findings.
Key words: renal colic, diagnosis, radiography, computed tomography

016 Application of the NEXUS Low-Risk Criteria for Cervical Spine Radiography in Canadian Emergency Departments.
Stiell I, McKnight D, Wells G, Lesiuk H, Vandemheen K, Clement C, Worthington J, Schull M, Reardon M, Morrison L, MacPhail I, Greenberg G, Eisenhauer M, Dreyer J, Cass D, Brison R. Clinical Epidemiology Unit, University of Ottawa, Ottawa.

OBJECTIVES: To evaluate the accuracy, reliability, and potential impact of the NEXUS Low-Risk Criteria for cervical spine radiography, when applied in Canadian emergency departments. METHODS: This prospective cohort study was conducted as a component of the Canadian C-Spine/CT Head (CCC) Study in 10 Canadian EDs and involved alert and stable adult trauma patients. Physicians completed a 20-item data form for each patient and performed interobserver assessments when feasible. The prospective assessments included the five individual NEXUS Criteria but not an explicit interpretation of the overall need for radiography according to the criteria. Patients underwent radiography, CT, and follow-up to determine clinically important cervical spine injury, the previously validated outcome measurement. Analyses included sensitivity and specificity with 95% CIs, kappa coefficient, and potential radiography rates. RESULTS: Among 8,933 patients, the mean age was 36.8 (range 16–97), 51.6% were male, and 148 (1.7%) had an important C-spine injury (fracture 140, dislocation 23, ligamentous instability 9). Kappa values for the NEXUS Criteria were: a) posterior midline cervical spine tenderness 0.78 (95% CI 0.67–0.89), b) focal neurological deficit 0.93 (0.79–1.0), c) altered level of alertness N/A (exclusion criterion for study), d) intoxication 0.23 (–0.17–0.63), e) distracting painful injury 0.41 (0.16–0.66). The combined NEXUS Criteria identified important C-spine injury with a sensitivity of 91.2% (95% CI 85%–95%), a specificity of 37.8% (37%–39%), and a potential 8% increase in C-spine radiography rates to 62.6%. Of 13 patients with important injuries not identified, 1 was treated with internal fixation and 4 with a halo. CONCLUSIONS: The NEXUS Low-Risk Criteria should be further explicitly and prospectively evaluated for accuracy, reliability, and potential impact prior to widespread clinical use.
Key words: cervical spine, radiography, clinical prediction rule, utilization

017 The Efficacy of Inhaled Corticosteroids in the Treatment of Acute Asthma: Treatment Following Emergency Department Discharge.
Edmonds ML, Camargo CA Jr, Brenner BE, Rowe BH. University of Alberta, Edmonton, Alta.

OBJECTIVES: Using oral corticosteroids at discharge for acute asthma is now standard practice; however, the benefit of treatment with inhaled corticosteroid (ICS) in the acute setting is unclear. The objective of this systematic review was to determine the effect of ICS on outcomes in the treatment of acute asthma following discharge (D/C) from the emergency department (ED). METHODS: Randomized controlled trials (RCTs) were identified using the Cochrane Collaboration's Airways Review Group database (using MEDLINE, EMBASE and CINAHL standardized searches), hand searching, bibliographies, pharmaceutical company and author contact. Studies in which an ICS was compared to placebo or any CS after ED discharge (D/C) were considered. Relevance, inclusion and study quality were assessed independently by two reviewers. RESULTS: 10 RCTs were selected for inclusion, from 352 articles identified in the computerized ARG register search. Three RCTs ($n = 909$ pts) compared ICS + CS vs. oral CS alone after ED D/C. Relapses were reduced, but not significantly, with the addition of ICS therapy (OR: 0.68; 95% CI: 0.46, 1.02). No differences were demonstrated between the two groups for relapses causing admission, quality of life, symptom scores, or side effects. Seven RCTs ($n = 1204$ pts) compared high-dose ICS therapy alone vs. oral CS alone after D/C. There were no significant differences between ICS and CS monotherapy for relapse rates (OR: 1.00; 95% CI: 0.66 to 1.52) or for secondary outcomes such as ß-agonist use, symptoms, and side effects. However, short follow-up and the inclusion of mild asthmatics in these latter RCTs complicates interpretation. CONCLUSIONS: The literature on the use of ICS after discharged from the ED with acute asthma, either alone or in combination with CS, remains unclear. Further research is needed to clarify how ICS therapy should be employed following ED care.
Key words: asthma, corticosteroids

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018 Asthma Airway Management: The Prevalence of Ketamine Use as an Induction Agent for Rapid Sequence Intubation.
Worrall JC, Gurr DE, Walls RM, Pollack C. Brigham and Women's Hospital, Boston, Mass.

BACKGROUND: Intubation is sometimes required in severe, refractory cases of asthma. Rapid sequence intubation (RSI) is the airway management method of choice for patients with status asthmaticus in the emergency department. The Canadian Association of Emergency Physicians and many other experts recommend ketamine as the induction agent of choice because it has a rapid response time and is a good bronchodilator. OBJECTIVE: To determine the prevalence of ketamine use as an induction agent for RSI in the emergency department at teaching hospitals. METHODS: Prospective observational study of 3,131 intubations recorded thus far in emergency departments at 22 teaching hospitals during the second phase (8/97–4/99) of the ongoing National Emergency Airway Registry (NEAR 97). Data included: method of airway management, indication, medications used, purpose of each. RESULTS: Of the 3,131 intubations registered over this period, 99 listed "asthma" as an indication. Seventy-six of these patients were managed with RSI as the first choice of method. An additional three patients were managed with RSI after another method failed. Of these 79 patients, only two were intubated at institutions where ketamine was not available. One patient had a contraindication for ketamine (cerebrovascular accident). Twenty-eight of the remaining 76 patients (37%) were induced with ketamine (95% CI, 26% to 48%). CONCLUSIONS: We conclude that ketamine is not routinely used as an induction agent in the emergency intubation of patients in status asthmaticus.
Key words: intubation, rapid sequence induction, ketamine, asthma

019 The Epidemiology of Acute Asthma Presentations in Alberta.
Rowe BH, Yiannakoulias N, Voaklander D, Svenson L, Schopflocher D. University of Alberta and Alberta Health, Edmonton, Alta..

OBJECTIVES: Many asthmatic patients present to the emergency department (ED) and despite potentially serious consequences, much surveillance information is lost. This study examines the epidemiology of acute asthma presentations to the ED using a unique data set. METHODS: All cases of acute asthma between the ages of 2–55 were eligible for inclusion. Data were derived from a cohort of all patients treated at Alberta EDs in 17 health regions over 1 year. Data were extracted from computerized abstracts coded similarly across all regional EDs using the Ambulatory Care Classification System (ACCS) database. Asthma was coded as 493.0–493.9 categories using ICD-9 coding by medical record nosologists in each hospital and represented the physician discharge diagnostic code. Descriptive statistics and age- and gender-adjusted presentation rates were calculated. RESULTS: Acute asthma accounted for 35,743 (2.4%) of the more than 1.5 million annual visits to Alberta EDs. In addition, 40% of these patients required repeat ED visits for asthma in the same year. Males (18,209; 51%) and females were similarly represented, and patients <16 years old accounted for 17,752 (50%) of all cases. The highest proportion of visits (7,200; 20%) occurred in the 2–5 year age group. The adjusted ED presentation rates varied from 11/1000 ED visits (Capital Health) to 34/1000 ED visits (Lakeland). The lowest ED presentation rates occurred in the two largest urban areas (population >500,000). Most (32,414; 91%) patients were discharged from the ED, with little variation among age groups. However, 63 (<1%) were admitted to an ICU setting, and 2 died in the ED. CONCLUSIONS: Asthma is a common ED problem with marked variation among regions. These results demonstrate the utility of an the ACCS database, an ED population-based diagnostic registry. The registry functions as a surveillance and research tool to focus prospective disease-specific research. This tool has the potential to explore ecological factors associated with acute asthma.
Key words: asthma, epidemiology, registry, emergency department

020 A Description of Invasive Airway Management in a Major Canadian Emergency Medical Services System.
Richards CG, Petrie DA. Dalhousie University, Halifax, NS.

OBJECTIVES: To describe the effectiveness of EMS airway management and to identify cases of unsuccessful EMS intubation and describe how these cases were treated in the emergency department (ED). METHODS: A retrospective review was undertaken of all adult patients requiring endotracheal intubation over a thirteen-month period (Jan. 1, 1999–Jan. 31, 2000) in a Canadian city with a population of greater than 350,000 people. The EMS quality audit (QA) database was reviewed for diagnosis, appropriateness of scene time, medications used, and number of attempts. For cases of unsuccessfully attempted EMS intubations in the final three months of the study, the patients' courses in the ED were reviewed using the National Emergency Airway Registry (NEAR) database in use at the hospital to track ED intubations. In these cases, additional data were gathered, including method and reason for intubation, and medications used. RESULTS: EMS performed a total of 334 invasive airway management attempts on 256 adult patients (mean: 1.30 attempts/patient). The overall EMS successful intubation rate was 84.4%. Scene time was considered appropriate (that is, <15 minutes) in all cases. In the final three months of the study, at least half of the patients requiring ED intubation after an unsuccessful prehospital course were given neuromuscular blocking agents prior to successful intubation. CONCLUSIONS: Prehospital providers can intubate a high proportion of patients, but this rate can be improved. The use of pharmacologic adjuncts to facilitate the prehospital intubation of selected patients is a promising option that further evaluation.
Key words: emergency medical services, intubation

021 Can We Assess Asthma Severity Using Expiratory Capnography in a Pediatric Emergency Department?
Evered L, Ducharme F, Davis G, Pusic M. McGill University Health Centre, Montreal, Que.

OBJECTIVES: To determine the reproducibility and validity of expiratory capnography in the assessment of the severity of airway obstruction in asthmatic children. METHODS: In a cross-sectional study of children presenting to the emergency department with acute asthma, 3 measurements were obtained at baseline: 1) respiratory resistance by forced oscillation (RFO); and 2) capnographs of 5 waveforms using a well-fitting mask and 3) capnographs of 5 waveforms using a mouth-piece. Reproducibility of the slopes of the alveolar plateau and Q angles was determined with the intra-class coefficient (ICC). The slope and the Q angle were correlated with airway resistance. RESULTS: Twelve participants of mean age 9.8 years (range 7–14) had baseline resistance of 126% of predicted. The ICCs are reported in the table. Both the Q angle and the slope correlated poorly with RFO (Q angle: correlation coefficient (r) = 0.2; 95% Confidence Interval (CI): –0.4, 0.7) (Slope: r = –0.1; 95% CI: –0.6, 0.5). CONCLUSIONS: Despite high test-retest reproducibility, particularly using the mouthpiece, neither the Q angle nor slope were good indicators of the severity of airway obstruction, in this small sample of mild asthmatic children.

	ICC (95 % CI)	
	Mouthpiece	Mask
Slope	0.90 (0.78, 0.97)	0.89 (0.77, 0.97)
Q angle	0.94 (0.86, 0.98)	0.62 (0.09, 0.88)

Key words: asthma, capnography

022 Incidence, Mortality Rates and Advanced Life Support Treatment of Prehospital Acute Pulmonary Edema: A Retrospective Cohort.
Mawhinney SW, Su WY, Morrison LJ. Division of Prehospital Care, Sunnybrook and Women's College Health Sciences Centre, University of Toronto, and Toronto Ambulance Service, Toronto, Ont.

OBJECTIVE: To describe the prehospital incidence, mortality and Advanced Life Support (ALS) treatment of presumed acute pulmonary edema (APE) in a system with an annual ALS volume of 51,225 patient carries. METHODS: A retrospective chart review of all retrievable ALS ambulance call reports (ACRs) for one month was performed. Agreement of ACR extraction, data abstraction and double data entry was evaluated using a kappa statistic, ANOVA or percent error. The inclusion criteria were: bilateral crackles/rales, pink frothy sputum, or both on prehospital physical examination. Patients were excluded if crackles/rales resolved with basic airway maneuvers. Descriptive frequencies were reported. RESULTS: The 5026 ACRs retrieved represented 99.3% of the total monthly calls. In this sample, 238 met inclusion criteria, 6 ACRs were excluded. The ACR extraction kappa was 0.97. The two data abstractors performed consistently ($p = 0.40$). The percent error for double data entry was 0.7%. The incidence of prehospital APE was 4.6%. One hundred and two patients were hemodynamically unstable defined as BP $\leq$90 (24) and presence of chest pain (78). One hundred and four (44.4%) patients received ALS interventions and 22 patients were intubated. Ninety-four patients (40%) were given medications and 85 received nitroglycerin. Only 15 patients received the standard regimen of nitroglycerin, morphine and furosemide. The prehospital mortality was 0%. CONCLUSIONS: Approximately 1 in 20 prehospital patients have (presumptive) APE. Almost half of these patients received prehospital interventions, yet the treatment is varied and rarely complies with the standard regimen. The in-field mortality is low.
Key words: emergency medical services, pulmonary edema, congestive heart failure

023 Evaluation of the Myocardial Ischemia Subgroup in the Vasopressin Epinephrine Cardiac Arrest (VECA) Trial.
Stiell IG, Hebert P, Wells G, Clement C, Vandemheen K, Tang A, Higginson L, Dreyer J, Weitzman B. Clinical Epidemiology Unit, University of Ottawa, Ottawa.

OBJECTIVES: We previously reported the overall results of the Vasopressin Epinephrine Cardiac Arrest (VECA) clinical trial. This work rigorously reviews the a priori subgroup of patients with myocardial ischemia. METHODS: This randomized controlled trial was conducted in the EDs, CCUs, and wards of 3 teaching hospitals. Adults who suffered cardiac arrest and required epinephrine according to AHA ACLS protocols were randomly allocated to receive one dose of either vasopressin 40 units or epinephrine 1 mg. Primary outcomes were survival to hospital discharge and to one hour and neurological function according to a modified Mini-Mental Status exam (MMSE). For the current review, two investigators blindly assessed all clinical records including ECGs and autopsy reports to determine whether the initiating cause of arrest could be attributed to myocardial ischemia or infarction. Analyses included the chi-square test with calculation of 95% CIs for the absolute increase in survival (AIS). RESULTS: Overall, 65 of 200 VECA patients were judged to be in the myocardial ischemia subgroup. The 32 vasopressin and the 33 epinephrine patients were similar for all characteristics including age (72.6 vs. 70.0 years), ED location (21.9% vs. 21.2%), witnessed (90.6% vs. 90.9%), rhythm VF/VT (34.4% vs. 27.3%), time collapse-CPR (1.7 vs. 1.6 min), and atropine given (78.1% vs. 75.8%). Comparing vasopressin to epinephrine, survival was not different for discharge (15.6% vs. 15.2%; $p = 0.96$; 95% CI for AIS –18.9% to 19.9%), for one hour (28.1% vs. 36.4%; $p = 0.48$; 95% CI for AIS –16.3% to 32.8%), or any return of pulse (53.1% vs. 66.7%; $p = 0.27$). The status of survivors was not different for mean MMSE scores (34.8 vs. 36.2; $p = 0.51$). CONCLUSIONS: The VECA Trial was unable to demonstrate benefit from vasopressin for any in-hospital cardiac arrest patients, including those suffering myocardial ischemia/infarction.
Key words: cardiac arrest, epinephrine, vasopressin

024 Epidemiology and Survival for Prehospital Cardiac Arrest in an Advanced Life Support System: The Calgary Experience.
De Maio VJ, Millard W, Gant PT, Burgwin DH, Curry G. City of Calgary Emergency Medical Services Department and University of Calgary, Calgary, Alta.

OBJECTIVES: Canadian accounts of the state of prehospital cardiac arrest in an advanced life support (ALS) system remain limited. Calgary, Alberta, is currently Canada's fastest growing centre boasting one of the largest land areas of any city in North America and Canada's first paramedic program. The objective of this study was to establish cardiac arrest incidence and survival rates to serve as a baseline for future prospective studies and comparison for other Canadian ALS programs. METHODS: This observational cohort study included all adult, cardiac etiology, prehospital cardiac arrest cases where resuscitation was attempted. The system provided an ALS level of care, firefighter defibrillation, and a "medical priority dispatch" program that includes post-dispatch CPR instructions. EMS managers abstracted cardiac arrest data elements on a prospective basis directly into a database developed using the Utstein template. Descriptive statistics were used to characterize patient, EMS system, and survival data. RESULTS: From 1993 to 1996, 940 eligible cases were treated. Patients were primarily male (69%) with a mean age of 64 years. Of these, 48% were bystander-witnessed, 13% EMS-witnessed, 34% received citizen CPR, and 57% had an initial rhythm of VF/VT. The ALS response interval from call received to vehicle stopped was 8 minutes or less for 82% of cases with a mean response interval of 5.7 minutes. Survival to hospital discharge was 12% overall, 21% for VF/VT patients, 19% for bystander-witnessed VF/VT, and 32% for all EMS-witnessed cases. CONCLUSION: Although survival from prehospital cardiac arrest remains universally low, survival in this community is relatively good relative to other published ALS reports. We found an impressive citizen CPR rate that rivals the best results found in the current literature and supports community efforts toward making Calgary a "Heart Safe City."
Key words: cardiac arrest, resuscitation, emergency medical services

025 Pre-Hospital Oral Glucose Versus Glucagon for Symptomatic Hypoglycaemia: A Before and After Outcome Comparison of Blood Glucose and Glasgow Coma Scale.
Kloompas M, Mazza C. Division of Prehospital Care, Sunnybrook & Women's Health Sciences Centre, University of Toronto and Toronto Ambulance Service, Toronto, Ont.

OBJECTIVE: To compare the effect of prehospital administration of oral glucose versus subcutaneous (SC) glucagon for the treatment of symptomatic hypoglycemia on blood glucose and Glasgow Coma Scale (GCS). METHODS: Prospective, observational trial of two consecutive cohorts of patients with confirmed hypoglycemia (blood glucose <4.0 mmol/L). For an initial six month period, (control group CG) paramedics (EMT-D) treated 407 hypoglycemic patients with up to 20 g of D-glucose gel orally by protocol. The following 6-month period, (treatment group TG) the same protocol was followed to treat 379 patients with 1.0 mg glucagon (SC) substituted for oral glucose. RESULTS: Patients had similar demographics in both groups for age, gender, prevalence of IDDM and initial glucose level (CG 2.2 ± 0.68

mmol/L, TG 2.3 ± 0.71 mmol/L). The TG had a lower median initial GCS than the CG (median 11 vs. 12, $p = 0.001$). Patients treated with glucagon had higher blood glucose levels at 10 minutes after treatment (TG 3.7 ± 1.6 vs. CG 2.7 ± 1.3 mmol/L, $p < 0.001$) and at 20 minutes after treatment (TG 4.3 ± 1.6 versus CG 3.2 ± 1.5 mmol/L, $p = 0.002$). The change in median GCS scores was better with glucagon (median GCS change 12 to 14 for glucose gel versus 11 to 15 for glucagon, $p < 0.01$). Patients treated with glucagon were also more likely to show subjective clinical improvement on a validated ordinal scale (TG: 232 improved (74%) vs. CG: 120 improved (41%), $p < 0.001$) EMS time interval comparisons were similar for both groups (CG 25.1 ± 10.4 min, TG 24.2 ± 9.2 min for scene time and CG 7.0 ± 5.1 min, TG 7.4 ± 5.3 min for transport time). CONCLUSIONS: Prehospital administration of subcutaneous glucagon for confirmed hypoglycemia significantly increased the blood glucose at 10 and 20 minutes post administration and improved the Glasgow Coma Scale.
Key words: diabetes mellitus, hypoglycemia, glucagons

026 Mortality and Thrombolysis Time Intervals with Prehospital 12-Lead Electrocardiogram and Advance Emergency Department Notification: A Meta-Analysis.
Morrison LJ, Brooks S, Sawadsky BV, McDonald AC, Verbeek PR. Division of Prehospital Care, Sunnybrook & Women's Health Sciences Centre, University of Toronto, Toronto Ambulance Service, Toronto, Ont.

OBJECTIVE: All randomized, historical and concurrent controlled trials of EMS care in suspected acute myocardial infarction (AMI), comparing all-cause mortality (ACM) or thrombolysis time intervals with prehospital 12-lead electrocardiogram (PHECG) and advance emergency department (ED) notification to standard EMS care, were systematically reviewed and analyzed. METHODS: The Cochrane search strategy was used to search MEDLINE (85–99), EMBASE (80–99), Current Contents (93–99), Dissertation Abstracts (81–99), and Index of Scientific and Technical Proceedings (91–98). Bibliographies of texts and journals were hand searched. The search for unpublished studies included the NIH Web site, Medical Editors Trial Amnesty, industry and primary authors. Two authors independently reviewed 1283 citations. Weighted kappa for selection: Titles 0.61 (SE 0.045); Abstracts 0.63 (SE 0.051); Articles 0.79 (SE 0.146). Two authors blinded to title, author and journal, independently abstracted data. Two different authors, blinded as above, independently assessed study quality using a validated scale by Detsky and Naylor (range 0.2–0.59/1.0). The ICC for random raters was 0.84 (95% CI 0.09–0.98). RESULTS: ACM at 42 days was only reported in one study using a historical control (treatment group (TG) 6/71, control group (CG) 20/128, OR 0.499, 95% CI 0.17–1.4, NNT 14, $p = 0.22$, 29% power). The weighted pooled mean on-scene time interval was similar in both groups (TG 20.83 mins SD 12.28, CG 20.47 mins SD 11.34, $p = 0.6735$, 10% difference, 84% power). The weighted pooled mean door-to-needle interval was decreased in the TG by 60.7 mins (TG 35.16 mins, SD 11.24, CG 95.83 mins, SD 43.85, $p < 0.01$). CONCLUSION: There is inadequate data to determine the effect of PHECG with advance ED notification on all-cause mortality in AMI. The significant pooled effect on relevant time intervals should be interpreted with caution due to the overall low study quality and the comparison of different control groups.
Key words: emergency medical services, electrocardiogram, myocardial infarction

027 Determinants of the Risk of Violence in the Emergency Department: Implications for Triage.
Oster A, Bernbaum S, Patten S. Faculty of Medicine, University of Calgary, Calgary, Alta.

OBJECTIVES: To identify the clinical correlates of Emergency Department (ED) violent behaviour in patients presenting to a Psychiatric Emergency Service (PES). METHODS: We analysed data from an electronic PES database covering a 4-year period to April 1998. The database included demographic and clinical data for all patients seen in the service. The PES was physically located in a general hospital ED. RESULTS: 10,582 patient presentations were recorded. Violence was defined as physically or verbally aggressive or assaultive behaviour. Correlates of violence were identified. Patients with a moderate to high score (>26) on the American Psychiatric Association's DSM-IV Global Assessment of Functioning (GAF) scale were violent 5.5% of the time while in the ED. Patients with a GAF <26 had a frequency of violence (FOV) of 17.8% (RR = 3.24, CI 2.50–4.18). Patients with a GAF >26 who also had a history of violence, had a FOV of 15.9% (RR = 2.89, CI 2.39–3.50). Patients with a GAF >26 who had schizophrenia (or a psychotic disorder not otherwise specified) had a FOV of 9.3% (RR = 1.69, CI 1.35–2.12). Patients with a GAF >26 with psychosis and a history of violence, had a FOV of 23.4% (RR = 4.25, CI 3.01–6.01). Patients with a GAF <26 and a history of violence, had a FOV of 35.0% (RR = 6.37, CI 3.77–10.75). Patients with a GAF <26 with psychosis, had a FOV of 23.7% (RR = 4.31, CI 2.86–6.50). Patients with a GAF <26, psychosis and a history of violence, had a FOV of 45.5% (RR = 8.26, CI 3.45–19.74). CONCLUSIONS: Prevention of violence in the ED involves identifying those patients at highest risk and implementing appropriate safeguards and preventive strategies. Our data suggest that patients with a history of violence, those who are severely ill (reflected in a low GAF score) and those with psychotic symptoms are at highest risk. The cumulative impact of these predictors is additive.
Key words: violence, emergency department

028 Adolescent Psychosocial Documentation in the Emergency Department: Testing of an Intervention.
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The emergency department (ED) is the only health contact for many adolescents and could therefore serve as a route for identifying psychosocial concerns. The topics of **H**ome, **E**ducation, **A**lcohol, **D**rugs, **S**moking and **S**ex (HEADSS) are important areas of inquiry when interviewing adolescents. OBJECTIVES: To determine the effectiveness of a HEADSS stamp at improving adolescent psychosocial documentation in the ED chart. METHODS: An interventional study of ED chart psychosocial documentation was conducted which compared a control period to a period with the HEADSS stamp on the chart. Presenting complaints were recorded and psychosocial documentation in the ED chart was compared between the two periods. Historical information from past medical records was also gathered. RESULTS: 153 adolescents (M = 79, F = 74; mean age = 14.1 ± 0.90 years) were seen during the HEADSS period. Documentation of the HEADSS topics ranged from 8%–12% whereas the preceding control period ($n = 153$, M = 85, F = 67; mean age = 14.2 ± 0.90 years) ranged from 0%–7%. During the HEADSS period, ED physicians were more likely to document whether the topics of Education ($p = 0.015$), Alcohol ($p = 0.02$) and Smoking ($p = 0.001$) were addressed as well as whether the patient was interviewed alone ($p = 0.0001$). Physicians were also more likely to report detailed psychosocial assessment (≥4/6 topics addressed; $p = 0.003$) and to refer to a crisis worker or specialist ($p = 0.048$) during the HEADSS period. CONCLUSIONS: The HEADSS stamp is useful in prompting adolescent psychosocial documentation in the ED chart. Routine placement of HEADSS in adolescent ED charts could serve to facilitate psychosocial screening of adolescents.
Key words: adolescent health, documentation

029 The Incidence and Prevalence of Domestic Violence in a Northern Emergency Department.
Rowe BH, Cox JE, Carter MH, Sahai VS, Bretzlaff-Michaud JA, Bota GW. University of Alberta, Edmonton, Alta.

OBJECTIVES: Domestic violence against women is an important cause of health-related morbidity and mortality and consumes enormous resources. Little is known about this problem in the ED, especially in semi-rural, northern regions. This study examines the incidence, prevalence and risk factors of physical domestic violence (DV) in women in a northern Canadian ED. METHODS: A prospective cross-sectional study was performed at an Ontario ED between 2/99 and 6/99. A random sample of women, age >16, presenting to the ED consented to interview in private during their ED stay. A valid and reliable 52-question survey was administered by trained female research nurses; it documented health status and exposure to physical DV. RESULTS: 983 (80%) of 1,223 eligible patients consented; 192 (16%) refused and 48 (4%) were "missed." Mean age was 41 years, 546 (56%) were married or in common-law relationships. Overall, 725 (75%) reported having a current partner; 9% had been threatened or injured by that partner. Seventy (9%) patients reported being injured by a partner during pregnancy; exposure to firearms was high (18%). The lifetime prevalence of physical DV was 51% (95% CI: 49, 55) and injurious events were high. The incidence of physical DV resulting at the index ED presentation was 1% (95% CI: 0, 2). CONCLUSIONS: The incidence of physical DV in this sample was lower than reported elsewhere. However, lifetime DV prevalence was high, injurious events were serious, and access to weapons such as firearms was a concern in this setting. Further research should focus on universal screening and appropriate ED interventions to protect women against further DV.
Key words: domestic violence

030 Plain Gut vs. Non-Absorbable Nylon Sutures in Traumatic Pediatric Lacerations: Short-Term Outcomes.
Karounis H, Gouin S, Eisman H, Chalut D, Pusic M, Williams B. McGill and Montreal Universities, Montreal, Que.

OBJECTIVE: To compare short-term cosmetic outcome and rates of dehiscence and infection in pediatric lacerations repaired with absorbable plain gut versus non-absorbable nylon suture. DESIGN: Randomized clinical trial. SETTING: Montreal Children's Hospital Emergency Department (ED). PARTICIPANTS: Patients 1–18 years of age who presented to the ED with lacerations less than 12 hours old between January 1999 and February 2000. Exclusions criteria were the following: wounds that could be approximated by tissue adhesives, animal/human bites, gross contamination, puncture/crush wounds, wounds crossing joints, lacerations of tendon, nerve or cartilage, collagen vascular disease, immune deficiency, diabetes mellitus, bleeding disorder and scalp lacerations. Patients were randomized into one of two groups: absorbable pain gut sutures (group A) and non-absorbable nylon sutures (group NA). Board eligible/certified pediatric emergency physicians or clinical fellows performed laceration repair in a standardized approach. All wounds were re-evaluated within 10 days by a single research nurse who assessed the wounds using a previously validated wound evaluation score (WES) composed of 6 items (presence of step-off, contour irregularities, margin separation, edge inversion, extensive distortion and overall cosmetic appearance). A score of 6/6 is considered optimal. The presence or absence of dehiscence and infection was also noted. RESULTS: Forty-three patients were eligible of which 10 patients declined to participate. Of the 33 patients enrolled, 19 were randomized to group A and 14 to group NA. Both groups had similar demographics (sex, age), wound size (length, width), wound location and mechanism of injury. No differences were found in the proportion of optimal WES between group A and group NA (68% vs. 62%, RR ±95% CI = 1.11, 0.66,1.88). No differences were found between group A and group NA for the rates of dehiscence (0% vs. 7%) and of infection (0% in both groups). 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 short-term cosmetic outcomes and complication rates are similar. Future prospective studies are required to analyze the long-term cosmesis outcome of traumatic lacerations repaired with absorbable sutures.
Key words: wound management, cosmetic, pediatric

031 Clinical Diagnosis of Clavicle Fractures.
Landine JK, McGraw RC, Pickett W. Queen's University, Kingston, Ont.

OBJECTIVES: Clavicle fractures are a common problem in the ED. Complications are rare and generally restricted to fractures in the medial or lateral third of the clavicle. We set out to determine whether ED physicians can accurately predict clavicle fracture location prior to obtaining x-rays. METHODS: We conducted a prospective analysis with an inception cohort of ED patients. Eligible patients had an injury deemed to be consistent with acute clavicle fracture. Prior to obtaining radiographs, ED physicians or residents completed a questionnaire predicting the location of the fracture. They selected medial third, middle third, lateral third, or unsure. This prediction was later compared to the radiologist's report of the fracture location. RESULTS: Between April 1999 and January 2000, 109 patients with clavicle fractures were seen, and 72 (66%) were enrolled in the study. Of these fractures, 57 (79%) were middle third, 11 (15%) were lateral third, 2 (3%) involved both middle and lateral third, and 2 (3%) were medial third. The physicians correctly predicted the fracture location in 62 patients (86%). The physicians predicted a fracture to be middle third 47 times and in every case (100% accuracy, 95% CI 92%–100%) this prediction was correct when compared to the radiograph. We felt that an important miss would be for the ED physician to predict a middle third fracture when it was in fact medial or lateral. In no cases did this happen. None of the 72 patients had pneumothorax or neurovascular injury. CONCLUSION: These results suggest that ED physicians can accurately predict middle third clavicle fractures on clinical examination. These results support the development of a prospective study to investigate the need for diagnostic radiography in uncomplicated middle third clavicle fractures.
Key words: clavicle fracture, radiography, utilization

032 Clinically Meaningful Values of the Visual Analog Scale of Pain Severity.
Lee J, Stiell I, Hobden E, Wells G. Clinical Epidemiology Unit, University of Ottawa, Ottawa.

OBJECTIVES: Previous studies of the clinically significance of the Visual Analog Scale (VAS) have correlated VAS scores with descriptive categories (e.g., "a little less pain"). The objective of this study was to determine what values of the VAS correspond to the patients' perception of analgesic need, and the values and change in VAS associated with perception of adequate pain control. METHODS: A prospective, observational cohort design was used. Patients presenting with acute pain during study hours were approached for informed consent. Eligible consenting patients were asked to rate their pain severity on a 100-mm horizontal VAS, and stated whether or not they would accept oral and/or parenteral analgesia. The VAS was repeated at discharge, and patients were asked whether they had received adequate treatment for their pain. The unpaired *t*-test was used to compare change in pain scores between groups. RESULTS: Of 124 patients enrolled, 66 were female (53%), with an overall mean age of 36 years: 98 stated they would accept oral analgesics (79%). Their mean VAS was 63 mm (95% CI 58–68), vs. 48 mm (95% CI 37–58) for the 26/124 patients who reported no analgesic need. Parenteral analgesics were required by 62/124 patients (50%). Their mean VAS was 72 mm

(95% CI 66–78), vs. 48 mm (95% CI 41–54) for those who did not want an injection. The mean VAS for the 98 patients who reported adequate pain control at discharge was 31 mm (95% CI 25–36) vs. 53 mm (95% CI 25–36) for those with inadequate pain control. The mean change in VAS was –29 (95% CI –36 to –22) for patients with adequate analgesia vs. –4 (95% CI –9 to 1, T = 5.7, $p < 0.01$) for those with inadequate pain control. CONCLUSION: A mean reduction in VAS of 29 mm may represent a minimum clinically significant difference corresponding to patients perception of adequate analgesic control. Further studies of the clinical utility of the VAS are needed.
Key words: pain, analgesia, visual analog scale

033 Computer-Assisted Instruction of Carpal Bone Radiograph Interpretation.
Westendorp MW, McGraw RC, Pickett W. Queen's University, Kingston, Ont.

OBJECTIVES: To develop a computer-assisted self-directed training module to teach carpal bone radiograph interpretation to clinical clerks, and to evaluate the efficacy of the module as a teaching tool. METHODS: Using commercially available authoring software, we developed a computer program designed to teach carpal bone radiograph interpretation. The program was made available on existing computer workstations and for downloading to personal computers over the World Wide Web. Following an 8-month period where the module was a mandatory component of the clerkship rotation in Emergency Medicine, we recruited a convenience sample of 36 students that included pre-clerkship students, clinical clerks, and residents. We used an OSCE (objective structured clinical exam) format to measure skill in carpal bone radiograph interpretation. We wanted to compare the scores of the clinical clerks who had completed the module with the scores of students from various levels of medical education who had not. RESULTS: The median score (out of 7) for a group of clerks who completed the module was 5 ($n = 10$). The median score for a group made up of clerks who did not complete the module and residents with no specific training in carpal bone radiograph interpretation was 2 ($n = 7$). The Mann–Whitney Test showed a statistically significant difference in performance between the two groups as measured by mean ranked scores (Mann–Whitney U = 8.50, $p = 0.008$). The median score for emergency medicine residents, who have specific training in carpal bone radiograph interpretation was 6 ($n = 9$). There was no statistically significant difference in mean ranked scores between them and the clerks who completed the module (Mann–Whitney U = 25.00, $p = 0.092$). CONCLUSIONS: We have developed a computer-assisted self-directed training module to teach carpal bone radiograph interpretation and it appears to be an effective teaching tool.
Key words: radiography, medical education

034 Evaluating the Impact of an Advanced Paramedic Educational Intervention on the Cancelled Call Rate and Paramedic Documentation of Capacity Assessment: A Before and After Observational Study.
Riley J, Burgess R, Schwartz B. Division of Prehospital Care, Sunnybrook & Women's College Health Sciences Centre, University of Toronto, and Toronto Ambulance Service, Toronto, Ont.

OBJECTIVE: To compare the rates of cancelled calls, paramedic documentation of capacity and signature acquisition on the refusal section of the Ambulance Call Report (ACR), before, immediately after and 1 year post an educational intervention. METHODS: ACRs were reviewed for all Advanced Life Support (ALS) calls occurring during the three periods of interest. The number of patient initiated cancellations was compared for each period. Paramedic compliance with documentation of capacity and signature obtainment was determined from a consecutively extracted sample of every fourth call report, to a total of 75, from each period. Reviewers were blinded to the study period and accuracy was measured using 20% double data entry. The intervention was a 1.5-hour module on the assessment and documentation of capacity. A chi-square test of significance was applied for all comparisons. RESULTS: The total number of ACRs was 7,744 before the intervention, 7,444 immediately after and 7,604 one year later. The proportion of cancelled calls prior to the intervention (0.090; 95% confidence interval [CI] 0.084–0.097) decreased significantly in the periods immediately after (0.021; 95% CI 0.017–0.024) $p < 0.01$ and 1 year later (0.066; 95% CI 0.061–0.072) $p < 0.01$. There was no change in documentation rate for capacity in the three periods (1/75, 0/75, 0/75) $p = 0.366$, and no change in the rate of signature acquisition (64/75, 64/75, 59/75) $p = 0.453$. The error rate for data entry was 0.74%. CONCLUSIONS: An educational module directed at improving paramedic assessment and documentation of capacity in patients refusing transport resulted in a significant reduction in the number of cancelled calls immediately after and 1 year following the intervention. There was no improvement in the rate of capacity documentation on the ACR or in signature acquisition.
Key words: emergency medical services, documentation

035 Factors Associated with Field Pronouncement and Futile Resuscitation of Out-of-Hospital Cardiac Arrest Patients.
De Maio VJ, Stiell IG, Wells GA, Spaite DW, Martin M, O'Brien J-A, for the OPALS Study Group. Clinical Epidemiology Unit, University of Ottawa, Ottawa.

OBJECTIVES: Many EMS programs have adopted termination of resuscitation policies for cardiac arrest in response to research establishing the futility of transport after unsuccessful advanced life support (ALS) measures in the field. This study evaluated out-of-hospital termination practices and determined predictors of unsuccessful resuscitation, as part of the Ontario Prehospital Advanced Life Support (OPALS) Study. METHODS: This prospective cohort study included all adult, cardiac etiology, out-of-hospital cardiac arrest cases within 11 communities with established field pronouncement policies and prehospital ALS care. Case definitions followed the Utstein style. Univariate (chi-square and *t*-test) and stepwise logistic regression (LR) analyses identified factors associated with field termination and overall non-survival to hospital discharge. RESULTS: From 1995 to 1999, there were 978 (52%) field terminations among the 1,875 cases treated. Survival was 5.0% overall. LR analysis found factors independently associated with field pronouncement and their odds ratios (95% CI): age ≥80 years 1.8 (1.4–2.3), unwitnessed arrest 2.2 (1.8–2.7), no citizen CPR 1.3 (1.0–1.8), non-VF/VT rhythm 3.1 (2.5–3.9), and successful intubation 1.5 (1.1–2.0). Non-survival was independently associated with: age ≥80 years 3.0 (1.2–7.7), unwitnessed arrest 4.3 (2.2–8.3), defibrillation response interval >8 minutes 8.5 (1.2–62.3), non-VF/VT rhythm 9.4 (4.7–18.8), and successful intubation 2.0 (1.1–3.7). CONCLUSION: This study demonstrates that field termination occurs frequently for unwitnessed arrests in elderly patients with non-VF/VT rhythms. Factors associated with futile resuscitation are age >80 years, unwitnessed arrest, defibrillation response interval >8 minutes, non-VF/VT rhythm, and successful intubation and could form the basis for evidence-based EMS field termination guidelines.
Key words: resuscitation

036 Analysis of Pre-Hospital Transport of Head-Injured Patients After Regionalization of Neurosurgery Resources.
Holmen C, Sosnowski T, Latoszek K, Dow D, Rowe BH. University of Alberta, Edmonton, Alta.

OBJECTIVES: The objectives of this study were to determine the factors (e.g., paramedic, system, or patient) associated with initial transport to a non-NS Emergency Department (ED), following regionalization of NS services. METHODS: A retrospective chart review was performed

6 months following NS regionalization. All charts of patients secondarily transferred to the NS service from January 1996 to November 1998 were examined. The EMS consisted of 5 acute care EDs, all with CT scanners, and 1 designated NS ED. EMS guidelines mandated transport of possible head injured (HI) patients to the NS centre if GCS was <14 or Prehospital Index >4 (using mechanism of injury). Charts were accessed from the Regional Trauma Program and EMS electronic databases. Charts and ambulance reports were matched, and reviewed independently by two researchers to determine reasons for the original transport to the non-NS site. RESULTS: 91 charts were identified and 82 (90%) patients fulfilled criteria for transfer to the NS centre due to HI. There was a bimodal age distribution: 38% were 30–49 years old and 29% were 60–79 years old. 70 patients were male (85%) and only 6 (7%) were pediatric. In 17 cases (21%) there was no history of head trauma. In 28 (34%), alcohol intoxication was documented, and 11% admitted to chronic alcohol abuse. Triage guidelines were followed in all but 5 (6%) cases. NS consultation was delayed by 6.5 hours by a second transfer. Following transfer, all patients were admitted, 25 (30%) underwent craniotomy and 18 (22%) died. The most common (35%) final diagnosis was subdural hematoma. CONCLUSION: Few inappropriate pre-hospital decisions were identified, and patient factors appeared most commonly responsible for secondary HI transfer to a NS centre in this EMS. However, long delays and serious outcomes were identified, and this suggests a re-evaluation of NS screening criteria may reduce these inappropriate transports.
Key words: emergency medical services, trauma system, traumatic brain injury

037 The Vertical Access Interval: A Prospective Observational Comparison of the Impact of this Interval on the Emergency Medical Service Response Time for High-Rise Buildings vs. Houses.
Angelini MP, Peerbaye Y, Burgess R, Schwartz B, Morrison LJ. Division of Prehospital Care, Sunnybrook & Women's Health Sciences Centre, University of Toronto, Toronto Ambulance Service, Toronto, Ont.

OBJECTIVES: To compare the time interval between ambulance arrival at the scene to paramedic arrival at the patient ("vertical response" time) between high-rise buildings and houses; To define the barriers encountered by paramedics in responding to emergency calls in high-rise apartment buildings. METHODS: A pilot study (42 cases) completed in December 1999 had promising results. This larger study was prospective, single blinded, and observational. An independent third-party observer collected time intervals on emergency medical service (EMS) calls. Potential barriers impeding EMS access to patients were recorded. RESULTS: The median vertical response interval for 118 calls was 96.5 seconds (interquartile range, 49.25 to 150.0 seconds) and represented 24% of the total EMS response time. Vertical response time for emergency calls originating from apartment buildings ($n = 40$) were significantly prolonged in comparison to those from houses ($n = 24$) (median 142.5 sec vs. 68 sec, $p < 0.05$). The median vertical response interval for apartment buildings where EMS calls originated ≤2 floors above ground was 131 sec (96–185 sec). The most common barriers encountered were the need for an entry code to enter the building (25/40, 62.5%) and the elevator was too small to fit stretcher in prone position (19/40, 47.5%). In potentially life-threatening calls (delta priority), median vertical response interval times in apartment buildings ($n = 20$) were significantly longer than in houses ($n = 13$) (127 sec vs. 63 sec, $p < 0.05$). CONCLUSIONS: The vertical response interval represented a significant component of the total EMS response time and was longer for calls originating in apartment buildings. The increased response time due to vertical access significantly prolonged the time to treatment in the highest priority calls where delay has been shown to effect outcome.
Key words: emergency medical services, response time

038 Conditions Under Which EMS Crews Do Not Resuscitate Out-of-Hospital Cardiac Arrest Victims.
Nagendran J, Yoon PW, Steiner IP. University of Alberta, Edmonton, Alta.

OBJECTIVES: Much of the research on out-of-hospital cardiac arrest (OHCA) victims focuses on the patient population that received resuscitative efforts. The objective of this study was to determine the circumstances under which Emergency Medical Service (EMS) crews elected not to initiate resuscitative efforts. METHODS: Over a 12-month period, EMS records of all OHCA victims were examined. Analysis and comparison were performed on the resuscitation and the non-resuscitation (NR) groups. The study area was a large Canadian city (population: 800,000) with a single, centralized EMS system which permits declaration of death in the field and respects standardized do-not-resuscitate (DNR) orders. RESULTS: Of the 792 OHCA cases studied, no resuscitative efforts were documented on 371 (46%) patients for whom an ambulance was initially dispatched. For the NR group, the initial event was less often witnessed (6% vs. 53%; $p < 0.05$) and bystander CPR was less often provided (4% vs. 44%; $p < 0.05$) to victims. The average age of the NR group was 61 years and the male-to-female ratio was 1.8:1; this was not significantly different from the resuscitation group profile (mean age 59 years and male-to-female ratio of 2.2:1). Cardiac monitors were applied to 95 (26%) NR patients, and the most common rhythm was asystole (98%). Documented reasons for NR status were rigor mortis in 244 cases (66%), lividity in 184 (50%), and signs of decomposition in 16 (4%). Only 17 (5%) patients had a DNR order. 45 NR patients (12.1%) had no cardiac monitor applied and no documentation of rigor mortis, lividity, or decomposition. CONCLUSIONS: A large proportion of OHCA patients in this urban centre do not undergo resuscitative interventions. The probability of falling into this group of patients is increased when the initial event is not witnessed and if bystander CPR is not provided. The application of a cardiac monitor was not consistent for all OHCA patients. Further research in this area would be enhanced with the use of standardized protocols for the reporting of OHCA victims.
Key words: emergency medical services, resuscitation

039 Cost-Effective Adenosine Dosing in the Emergency Department.
Sedran RJ, Abu-Laban RB. Vancouver General Hospital, Vancouver, BC.

OBJECTIVES: Current guidelines for the treatment of PSVT with adenosine call for a 6-mg IV dose followed by 12 mg if required. Frequently 6 mg is ineffective thus many patients receive a total of 18 mg. As there is no safety benefit from a lower starting dose, this calls into question the cost-effectiveness of the sequential dosing strategy. We sought to determine whether a single 12-mg dose in ED patients with PSVT would result in cost savings. A threshold minimum of 50% conversion with 6 mg was established *a priori* as the point at which cost would favor current guidelines. METHODS: The charts for all ED patients at a tertiary hospital coded with a discharge diagnosis of atrial dysrhythmia from June 1997 to June 1999 were retrospectively reviewed using explicit criteria. Information was collected on demographics, case specifics, adenosine dosing and conversion success. The results were analyzed using Stata (Version 5.0, Macintosh). RESULTS: 251 charts were reviewed and 85 cases of PSVT were identified, 51 of which received adenosine: 27 patients converted with 6 mg (52.9%; 95% CI, 38.5%–67.1%) and an additional 12 patients converted with 12 mg (23.5%; 95% CI, 12.8%–37.5%). In total, 39 patients converted from PSVT with adenosine (76.5%; 95% CI, 62.5%–87.2%). CONCLUSIONS: The results marginally favor maintaining the current sequential 6-mg/12-mg adenosine dosing strategy. Sample size projections indicate that a study of up to 1,200 cases could be required to nar-

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row the confidence intervals sufficiently to be certain which side of the 50% threshold the 6-mg conversion rate from adenosine actually lies.
Key words: supraventricular tachycardia, adenosine

040 ED-Based Parenteral Antibiotic Therapy: An Emerging Treatment Strategy for Cellulitis.
Murray HE, Tourigny P. Queen's University, Kingston, Ont.

OBJECTIVES: Patients in Canadian EDs with cellulitis are now often treated with outpatient parenteral antibiotic therapy (OPAT) delivered through the ED instead of hospital admission. This change in practice has not been previously documented. The goal of this study was to quantify the numbers and types of patients receiving OPAT. METHODS: This retrospective cohort was performed in a tertiary referral centre. Charts from all 1998 ED patient visits with a discharge diagnosis of skin infection were reviewed. Analyses included descriptive statistics with 95% CIs, univariate and multivariate associations. RESULTS: 778 charts were reviewed and 488 patients were included. Study patients had the following diagnoses: cellulitis (42.4%), abscess (34.2%), wound infection (17.8%) and erysipelas (5.5%). 167 patients (34.2%) were treated with ED based OPAT. 57 patients (11.7%) were referred for subspecialty consultation and 33(6.8%) were admitted. Of the patients treated with OPAT, 120 (71.9%) were managed by the ED physicians alone. These patients had 427 ED visits, with a mean 3.2 visits per patient (95% CI, 2.9–3.6). Univariate predictors of OPAT ($p < 0.05$) were previous antibiotic treatment, immunocompromise, history of fever, chills or vomiting, lymphangitis, fever in ED and absence of pus. Multivariate predictors of OPAT were fever in ED (OR 3.95; 95% CI, 1.6–9.8), previous antibiotics (OR 2.73; 95% CI, 1.5–5.0) and lymphangitis (OR 2.58; 95% CI, 1.4–4.8). CONCLUSIONS: ED based OPAT for skin infections is an emerging phenomenon in Canada. Further study is needed to determine the cost-effectiveness of this treatment strategy.
Key words: cellulitis, outpatient, cost-effectiveness

041 Identification of HIV and Hepatitis C Infected Patients in a Northern Urban Emergency Department.
Rowe BH, Mashinter L, Joffe M, Mackey D, Preiksaitis Y, Houston S. University of Alberta, Edmonton, Alta.

OBJECTIVES: Transmission of blood borne pathogens like HIV and Hepatitis C (HC) from patients is a potential risk for all emergency department staff. However, data regarding disclosure of these infections in the ED setting remains sparse. This anonymous unlinked study examined HIV and HC disclosure in a Canadian urban ED sample. METHODS: Patients aged 15–54 were included if they presented to one of 2 EDs and had a CBC drawn. Left over blood was collected and serotested for HIV and HC. The list of study patients was cross-referenced against local lab and clinic databases of known HIV and HC seropositive patients prior to unlinking and serotesting. ED records of known seropositives were reviewed for evidence of patient HIV or HC disclosure. RESULTS: A total of 3,057 adult cases were identified from 06/99–07/99. Overall, 39 (1.3%) patients had proven HIV infection and 302 (9.8%) had proven HC infection. More patients (32 [82%]) with HIV were previously known to the laboratory or to ID clinics/physicians compared to patients with HC ($p < 0.001$). Patients with HIV more commonly disclosed their infection in some way (24[75%]) in the ED than did those who had HC ($p = 0.02$). Only 130 (43%) patients were known to have HC infection. CONCLUSIONS: Most HIV patients are aware of their infection and disclose this to health providers in the ED. However, HC is a much more common infection, and more than half of these patients are unaware of their illness. Moreover, since few HC patients disclose their disease to the ED staff, the transmission risk posed by unknown HC positive patients is considerable for health workers.
Key words: hepatitis C, HIV, transmission, seropositive

042 Do Injection Drug Users Have Different Medication Requirements in Procedural Sedation?
Grafstein E, Innes G, Roland K. St. Paul's Hospital, Vancouver, BC.

BACKGROUND: Injection drug users (IDUs) may require increased sedation medications that put them at higher risk of adverse events (AE) during procedural sedation. OBJECTIVES: To compare mean dose, medication choices, AE and ED length of stay (LOS) for IDUs. METHODS: A retrospective survey of patients receiving procedural sedation in an inner city Canadian ED from January 1997 to October 1999. During procedural sedation, all patients have a standard sedation form completed that documents drug administration, vital signs and patient outcomes. We reviewed 539 consecutive patients who underwent procedural sedation and excluded 38 patients whose IDU status was uncertain. RESULTS: 166 patients were IDUs and 335 were non-IDUs ($n = 501$). 92.6% (315) of the non-IDUs received midazolam/fentanyl, 3.6% (8) received thiopental, 1% (4) received ketamine, and 2.4% (8) received other medications. 71% (118) of the IDU group received midazolam/fentanyl, 23% (38) received ketamine, and 6.6% (11) received thiopental. The commonest procedures in IDUs were I&D of cutaneous abscesses (73%) and shoulder relocation (13%); and in non-IDUs shoulder relocation (30%) and Colles' fracture reduction (28%).

Characteristics	IDU	non-IDU	*p* value
Age (year)	32.8 ± 0.4	40.8 ± 18.5	
Midazolam avg. (mg)	4.7 ± 2.8	3.5 ± 1.8	$p < 0.0001$
Fentanyl avg. (ug)	349 ± 232	248 ± 138	$p < 0.0001$
Nadir O_2 sat <90%	3 (2%)	17 (5%)	
Reversal:RR <10	7 (4.2%)	39 (11.7%)	
Nadir sys BP <90	17 (10%)	14 (4%)	
Reversal:sys BP <90	1 (0.6%)	3 (0.9%)	

Median LOS was 94 minutes (IQR 70–135) for non-IDU patients and 102 minutes (IQR 69.3–165) for IDUs. No arrhythmias, deaths, or intubations occurred in either group. CONCLUSIONS: IDUs require more medications for procedural sedation and have slightly longer ED LOS. IDUs have no appreciable increased risks of adverse events than non-IDU patients.
Key words: procedural sedation, complications, intravenous drug use

043 The Canadian Activase for Stroke Effectiveness Study (CASES).
Fletcher D, Hill MD, Buchan AM, for the CASES Investigators.

BACKGROUND: Therapy for acute stroke using rtPA was approved in Canada in February 1999. The Canadian Activase for Stroke Effectiveness Study Group was formed to study the use of rtPA in Canada in a 2 year post-marketing study. PURPOSE: To prospectively assess the safety of rtPA in the Canadian context and to examine whether the efficacy of rtPA for acute stroke, demonstrated in randomized trials, can be translated into effectiveness in clinical practice across Canada. METHODS: The CASES group is a multi-stakeholder collaboration involving the Canadian Stroke Consortium (CSC), the Heart & Stroke Foundation of Canada, Hoffman–LaRoche Canada and physicians across the country. Canadian centres were registered and recruitment is ongoing. Patient information is being collected prospectively and evaluated in a blinded fashion. Each centre has been asked to have study protocol approved by the local research ethics board. Demographics, stroke risk factors, blood pressure, biochemistry, hematology, and CT scans are being collected. NIH stroke scores and modified Rankin scores are being collected. Outcomes will be monitored at discharge and at 3 months.

RESULTS:

90 day outcome measure (n = 135)	
Median modified Rankin score	3
Independent (mRS 0–2)	47%
Dependent (mRS 3–5)	36%
Dead	17%
Median NIHSS score	3
Living at home	60%

CONCLUSIONS: CASES is an ongoing prospective evaluation of the effectiveness of rtPA in acute stroke. The symptomatic hemorrhage rate is 4.0%, and other 90-day outcomes are commensurate with those observed in randomized trials.
Key words: stroke, thrombolysis, tissue plasminogen activator

044 Platelet Hyperactivity and Platelet/Leukocyte Interactions Associated with Ischemic Cerebrovascular Disease.
Holroyd BR, Rowe BH, Saddiqui M, Folk D, Etches WS, Shuaib A, Stewart MW. University of Alberta, Edmonton, Alta.

BACKGROUND: Platelets (plt) play an important role in thrombus formation in transient ischemic attacks (TIA) and strokes (CVA). This study was designed to examine plt function and other cellular interactions in TIA and CVA patients. METHODS: A convenience sample of adult (>18 years) cases (acute TIAs/CVAs) and controls (age and gender matched) were enrolled in this prospective laboratory study after informed consent was obtained. Plt function (adhesion and aggregation) and white blood cell (WBC)-plt interactions were rapidly determined using a modification of a previously validated technique based on plt binding to immobilized von Willebrand factor (VWF) (*Br J Haem* 1997;97:321). RESULTS: Samples from 15 cases and 8 ED controls were available for analysis. Mean age was 71.1 years (SD = 11.6), 16 of 23 (70%) were male, and 9 (60%) of the cases were already receiving anti-platelet agents. Age, gender, plt, hemoglobin, and WBC counts were similar between the groups ($p > 0.05$). Plt hyper-function was identified in 13 (87%) cases compared to only 2 (25%) controls ($p = 0.006$). WBC-plt interactions were observed in 5 (33%) cases compared to only 1 (13%) controls ($p = 0.36$). Overall, only 1 (4%) of the patients had wbc-plt interactions without plt hyperactivity. CONCLUSIONS: Plt hyper-function and plt/wbc binding are commonly identified in ED patients who present with TIA/CVA, irrespective of their previous anti-platelet therapy. These data suggest an association between thrombosis and the inflammatory response in this patient group. These results identify a unique opportunity to diagnose and manage acute ischemic cerebrovascular diseases.
Key words: stroke, transient ischemic attack, platelet function

045 Physician Charting in the Emergency Department: Does a Change in Chart Format Result in Improved Documentation?
Bijlsma JJ, Mcleod KI, Abu-Laban RB. Vancouver General Hospital, Vancouver, BC.

OBJECTIVES: Documentation is an important aspect of patient care. In November 1997, a new chart, which included numerous labeled fields to facilitate and encourage documentation, was introduced in the Vancouver General Hospital emergency department. We sought to determine whether this change in chart format resulted in an improvement in emergency physician documentation for an *a priori* derived item list. METHODS: A retrospective time series was carried out covering four time periods (May and October of 1997 and 1998). Five charts for each of 20 emergency physicians were randomly selected from each time period when possible. Each chart was reviewed using explicit criteria for documentation of time of initial assessment, oxygen saturation, Glasgow Coma Score, tetanus status, progress notes, time of progress notes, test results, and discharge instructions. The primary outcome was a by-item comparison of documentation proportion pooled for the time periods before versus after introduction of the new chart. Results were analysed using Stata (Version 5.0, Mac). RESULTS: 342 charts were reviewed. A significant improvement following introduction of the new chart was found in documentation of time of initial assessment (15.3%, 95% CI 9.8%–20.9% vs. 53.6%, 95% CI 46.3%–60.9%, $p < 0.0001$), tetanus status (2.5%, 95% CI 0.1%–4.8% vs. 6.7%, 95% CI 3.0%–10.4%, $p < 0.03$), and discharge instructions (42.9%, 95% CI 35.3%–50.5% vs. 64.8%, 95% CI 57.8%–71.8%, $p < 0.0001$). Documentation of other reviewed items was unchanged. CONCLUSION: Emergency physician documentation for some items can be improved by a change in chart format. Overall documentation proportions were low for many of the items studied, however no attempt was made to assess the necessity of specific documentation in each case. Further research is warranted on methods to improve physician documentation through changes in chart format.
Key words: documentation, emergency department

046 Data Recording and Resource Utilization by Low Back Pain Patients in the ED.
Bullard MJ, Kelly KD, Sher A, Dorji H, Voaklander D, Rowe BH. University of Alberta, Edmonton, Alta.

OBJECTIVES: To determine the diagnostic and treatment practices and chart documentation for low back pain (LBP) patients seen in the emergency department (ED). METHODS: From 01/04/97 to 31/03/98 there were 4,233 patients with LBP seen in five regional EDs; 1,368 (32%) were seen at the University of Alberta Hospital (UAH). A structured form audit was completed on randomly selected patients at the UAH. RESULTS: Of 500 ED visits selected, 50 (11%) patients were excluded because they were not seen by an ED physician or were misclassified. Of the remaining 450, 53% were male, mean age was 49 years and 143 (32%) were over the age of 50. Discharge diagnosis was mechanical LBP in 347 cases (77%) and discogenic pain in 68 (15%). Only 41 patients (9%) presented following an injury. Data abstraction revealed many charting omissions, including failure to document motor strength in 176 patients (39%), failure to document straight leg testing ($n = 16$, 23%), cross leg testing ($n = 45$, 66%), and bowel or bladder function ($n = 43$, 63%) in patients with suspected discogenic LBP, and failure to document cancer history ($n = 86$, 60%) and presence or absence of abdominal aortic aneurysm ($n = 136$, 95%) in patients over age 50 with non-traumatic LBP. Only 27 (6%) lumbar radiographs were ordered for patients with non-traumatic LBP. Most patients ($n = 431$, 96%) were discharged on non-steroidal or simple analgesics ($n = 187$, 42%), and only 36 received more potent narcotics. CONCLUSIONS: While the care of patients with LBP appeared to be consistent with recommended guidelines, documentation and writing legibility were poor. This study suggests a role for age and etiology-driven, structured LBP charting templates that would facilitate better record keeping, as well as decision prompts to assist physicians in managing patients with LBP.
Key words: documentation, back pain, emergency department

047 Validation of a Prediction Rule for Safe Early Discharge of Patients Given Naloxone for Presumed Opioid Overdose.
Christenson JM, Etherington J, Pennington S, Wanger K, Fernandes C, Grafstein E, Innes G, Spinelli JJ, Raboud J. St. Paul's Hospital, UBC, Vancouver, BC.

OBJECTIVE: To validate a previously developed clinical prediction rule which identified patients with presumed opioid overdose who were safe for early discharge. METHODS AND RESULTS: 486 patients given prehospital or emergency department naloxone for presumed opioid overdose were prospectively evaluated one hour after naloxone administration for prediction rule parameters. The rule predicts safe dis-

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charge (at 1 hour) for patients with all of the following: respiratory rate >10 and <20 breaths/min, heart rate >50 and <100 beats/min, oxygen saturation >92% on room air, temperature >35.5 and <37.5, Glasgow coma score of 15, and ability to mobilize as usual. After discharge, patients were followed up by telephone and by searching regional hospital, coroner's and provincial vital statistics databases. In the study cohort, the following adverse outcomes occurred within 24 hours: death (2), assisted ventilations (22), supplemental oxygen for hypoxia (86), IV antibiotics for pneumonia, CNS infection or sepsis (15), fluid bolus for hypotension (19), inotrope (3), antiarrhythmic (2), or mannitol (0) administration, emergency surgical procedure (0), bicarbonate for acidosis (0), charcoal for other life-threatening overdose (9). The rule was 98.3% sensitive (95% CI, 93.9%–99.8%) and 36.8% specific (95% CI, 31.9%–41.9%) in predicting adverse events. CONCLUSION: The previously developed clinical rule to predict the safe discharge of patients with presumed opioid overdose will allow many patients to be discharged safely one hour after naloxone administration.
Key words: naloxone, opioid overdose, heroin, clinical prediction rule

048 Interobserver Agreement in the Assessment of Potential Cervical Spine Injuries.
Stiell I, Wells G, Brison R, Greenberg G, Vandemheen K, Clement C, Cass D, Dreyer J, Eisenhauer M, MacPhail I, McKnight D, Morrison L, Reardon M, Schull M, Worthington J. Clinical Epidemiology Unit, University of Ottawa, Ottawa.

OBJECTIVES: To determine the interobserver agreement or consistency in physician assessment of clinical signs and symptoms in potential neck injury patients. This methodological sub-study was an important component in the derivation of the Canadian C-Spine Rule for cervical spine radiography in the Canadian C-Spine/CT Head (CCC) Study. METHODS: This prospective cohort study was conducted in 10 Canadian EDs and involved alert and stable adult trauma patients. Physicians prospectively evaluated patients for 22 standardized clinical findings prior to radiography and performed blinded and independent interobserver assessments when feasible. Analyses included calculation of the kappa coefficient with 95% CIs. RESULTS: 300 physician assessments were conducted on 150 patients whose characteristics were similar to those of the main study population for mean age (36.5; range 16–90), female (52.2%), MVC (63.1%), falls (15.9%), ambulance arrival (73.2%), admission (22.3%), but with a higher incidence of clinically important cervical spine injury (9.6%). Kappa values for the clinical findings were:

Clinical finding	Kappa	95% CI
Midline neck pain	0.69	0.55–0.83
Immediate neck pain	0.48	0.34–0.61
Paresthesias*	0.77	0.63–0.92
Subjective weakness	0.54	0.27–0.81
Ambulatory*	0.87	0.79–0.95
Rearend MVC*	0.91	0.82–1.0
Upright position*	0.78	0.67–0.90
Intoxication	0.23	0.17–0.63
Distracting injury	0.41	0.16–0.66
External head injury	0.76	0.64–0.88
Motor deficit	0.93	0.79–1.0
Sensory deficit	0.60	0.28–0.92
Midline tenderness*	0.78	0.67–0.89
Able to rotate*	0.62	0.29–0.96
Able to flex	0.60	0.31–0.89

*Indicates component of Canadian C-Spine Rule.

CONCLUSIONS: Findings with only fair to moderate agreement were immediate neck pain, intoxication, and distracting painful injury. All components of the Canadian C-Spine Rule showed excellent interobserver agreement and this suggests that physicians should be able to consistently interpret the overall rule. This reliability will be explicitly and prospectively evaluated in ongoing studies.
Key words: cervical spine, radiography, utilization, clinical prediction rule

049 Comparison of the Canadian CT Head Rule to Physician Judgement.
Stiell I, Worthington J, Dreyer J, Vandemheen K, Clement C, De Maio V, Schull M, Reardon M, Morrison L, McKnight D, MacPhail I, Greenberg G, Eisenhauer M, Cass D, Brison R, Wells G. Clinical Epidemiology Unit, University of Ottawa, Ottawa.

OBJECTIVES: To compare the predictive accuracy of emergency physicians' clinical judgement to the Canadian CT Head Rule, a recently developed and highly sensitive clinical decision rule for the use of CT in patients with minor head injury. METHODS: This prospective cohort study was conducted as a component of the Canadian C-Spine/CT Head (CCC) Study in 10 Canadian EDs and involved adults with loss of consciousness, amnesia, or confusion and a GCS score of 13–15. Physicians completed a 22-item assessment form prior to CT scan. The outcome standards were "need for neurological intervention" and "clinically important brain injury" on CT. Physicians also estimated, based upon clinical judgement alone, the probability, from 0% to 100%, of brain injury and of neurological intervention. Analyses included comparison of areas under the receiver operating characteristic (ROC) curve with 95% CIs. RESULTS: Among 1,416 patients enrolled over 18 months, the mean age was 38.1 (range 16–96), 66.6% were male, 97 (6.9%) had a clinically important brain injury, and 11 (0.8%) underwent neurological intervention. Comparing physician judgement to the Canadian CT Head Rule for predicting brain injury on CT, the respective areas under the ROC curve were 0.77 (95% CI 0.72–0.83) vs. 0.87 (0.85–0.89) ($p < 0.05$); sensitivities were 91.8% vs. 97.2% ($p < 0.05$); and specificities were 36.5% vs. 49.0% ($p < 0.001$). Comparing physician judgement to the Canadian CT Head Rule for predicting neurological intervention, the respective areas under the ROC curve were 0.75 (0.58–0.92) vs. 0.96 (0.95–0.97) ($p < 0.01$); sensitivities were 72.7% vs. 100% ($p < 0.01$); and specificities were 72.4% vs. 80.9% ($p < 0.001$). CONCLUSIONS: Compared to the Canadian CT Head Rule, physicians fared poorly in predicting the presence of important brain injury on CT or the need for neurological intervention among minor head injury patients.
Key words: brain injury, computed tomography, utilization, clinical prediction rule

050 Validity Evaluation of the Brain Injury Proxy Outcome Assessment Tool in the CCC Study.
Stiell I, Morrison L, Schull M, Vandemheen K, Clement C, Brison R, Cass D, Dreyer J, Eisenhauer M, Greenberg G, MacPhail I, McKnight D, Reardon M, Worthington J. Clinical Epidemiology Unit, University of Ottawa, Ottawa.

OBJECTIVES: This methodological sub-study assessed the validity of a "Proxy Outcome Assessment Tool," administered to patients in the Canadian C-Spine/CT Head (CCC) Study, which is designed to develop a decision rule for imaging minor head injury patients. In Canada, approximately 35% of minor head injury patients do not undergo CT in the ED and require follow-up to determine outcome. METHODS: The CCC Study is a prospective cohort study conducted in 10 Canadian EDs and includes patients with loss of consciousness, amnesia, or confusion and a GCS score of 13–15. The outcome

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measures were "need for neurological intervention" and "clinically important brain injury" demonstrated on CT. In this sub-study, all patients with abnormal CT scans and a sample of patients with normal scans were assessed by telephone at 14 days. The "Proxy Outcome Assessment Tool" consists of 5 general questions as well as the validated Katzman Short O-M-C Test (scored from 0 to 28 errors). Descriptive statistics with 95% CIs were calculated. RESULTS: Of 2,536 CCC Study minor head injury patients, 172 (6.8%) were entered in this sub-study. These patients were similar to the overall study group except for a higher proportion with important brain injury (39.5%) and need for neurological intervention (3.5%).

	Important brain injury		Neuro intervention	
Interview question	Sensitivity	95% CI	Sensitivity	95% CI
Headache "moderate-severe"	22%	13%–32%	0%	0%–54%
Memory/concentration problems	29%	19%–40%	33%	6%–64%
Seizure	3%	1%–9%	0%	0%–54%
Weakness in arm	13%	7%–23%	17%	1%–49%
Returned to usual activities	75%	63%–83%	100%	48%–100%
Katzman error score >10	11%	5%–20%	17%	1%–49%
Overall assessment tool	87%	76%–92%	100%	54%–100%

CONCLUSIONS: This sub-study confirms the validity of the "Proxy Outcome Assessment Tool" to rule out important negative outcomes in neurologically intact CCC Study patients. This was an essential step in developing the Canadian CT Head Rule.
Key words: brain injury, computed tomography, utilization, clinical prediction rule

051 Comparison of Recursive Partitioning and Logistic Regression Modelling in the Derivation of the Canadian C-Spine Rule.
Stiell I, Wells G, De Maio V, MacPhail I, Cass D, Clement C, Worthington J, Schull M, Reardon M, Morrison L, McKnight D, MacPhail I, Greenberg G, Dreyer J, Brison R. Clinical Epidemiology Unit, University of Ottawa, Ottawa.

OBJECTIVES: The Canadian C-Spine Rule (CCR) for cervical spine radiography was derived by use of recursive partitioning (RP). This study compared the accuracy of the CCR algorithm to a model developed by another statistical technique, logistic regression (LR). METHODS: This secondary data analysis was based on a prospective cohort study conducted in 10 Canadian EDs and involved alert, stable adult trauma patients at risk for neck injury. Physicians completed a 20-item data form for all patients who then underwent radiography to determine the outcome, C-spine injury. Variables correlated with this outcome on univariate analysis and having kappa values $\geq$0.6 were then assessed by two multivariate statistical techniques. Chi-square RP analysis (KnowledgeSEEKER) was used for the original CCR derivation and backwards stepwise LR (SPSS) was used for this analytic study. The two models were compared by receiver operating characteristic (ROC) curve analysis. RESULTS: The Canadian C-Spine/CT Head (CCC) Study dataset contained 8,933 potential neck injury cases, including 148 (1.7%) with cervical spine injury. 31 variables demonstrated a univariate p value <0.05 and 12 had kappa values $\geq$0.6. The RP model lost no cases to missing values and contained 7 variables. The LR model lost 71 cases to missing values and contained 8 variables, including 3 not in the original CCR (high-risk mechanism, immediate neck pain, and ability to flex). Comparing the RP to the LR models, respectively: Hosmer–Lemeshow goodness-of-fit statistic 0.93 vs. 0.94, area under the ROC curve 0.87 vs. 0.91 ($p < 0.01$), sensitivity 100% vs. 99.3% ($p = 0.31$), and specificity 46.6% vs. 55.8% ($p < 0.01$). CONCLUSIONS: LR provides a model with better overall discrimination and only slightly lower sensitivity. Further research should determine the clinical acceptability of a decision rule based upon an LR-derived scoring system rather than an RP-based algorithm.
Key words: clinical prediction rule, methodology

052 Impact of Computerized Maps on Ambulance Dispatch Response Times in Eastern Ontario.
McLelland K, Jones G, Pickett W. Queen's University, Kingston, Ont.

OBJECTIVES: To study the effect of computerized mapping on ambulance dispatch response times. METHODS: Response times for all priority 4 calls taken by the Quinte Thousand Island Central Ambulance Communication Centre were recorded for July through September 1998 (baseline year; no computerized mapping system in place) and then compared to the same measures taken during July through September 1999 (intervention year; mapping system in place). Various time intervals in the dispatch process were evaluated to determine the impact of the computerized mapping. RESULTS: Between July and September 1998, 970 priority 4 (urgent/life-threatening) calls were dispatched in the absence of a computerized mapping program, whereas 1136 priority 4 calls were dispatched between July and September 1999 (computerized mapping in place). There was no appreciable difference in the median T1–T2 time (call received until ambulance notified) between the two years. There was, however, a significant decrease in the percentage of T1–T2 times greater than 75 seconds (13.8% in 1998 and 9.8% in 1999; chi-square (1df): 6.76; $p = 0.009$). There was no difference in the median T0–T4 time (call connect until ambulance arrival on scene). CONCLUSIONS: While there was some suggestion that the proportion of excessively long dispatch response times was reduced due to the new mapping system, we were unable to determine a difference in the overall response times between study years. We are currently investigating whether or not factors such as adequacy of initial training, physical location of map terminal, compliance with map use and increased call volume may have masked potential benefits of computerized maps.
Key words: emergency medical services, dispatch, response time

053 Retropharyngeal Abscess: A Ten Year Experience.
Murray H, Keogh K. Queen's University, Kingston, Ont.

OBJECTIVES: Retropharyngeal abscess (RPA) is an uncommon but potentially life-threatening pediatric illness. The goal of this study was to review the experience of one academic centre over a 10 year period. METHODS: This retrospective review took place at a university affiliated pediatric tertiary care centre. Data was abstracted from all charts with an ICD-9 diagnosis of RPA from 1989 to 1999. Descriptive statistics with 95% CIs were calculated. RESULTS: 51 patients were identified, with a mean age of 5.6 years (95% CI 4.3–6.8). 6 patients (11.8%) had a history of pharyngeal trauma; 4 had FB penetration and 2 were postoperative. Torticollis was documented in 29 patients (56.9%) while 10 (19.6%) had evidence of stridor. Mean WBC was 21.3 (95% CI, 18.5–24.1). 39 patients (76.5%) underwent soft tissue neck x-ray examinations. 5 of these were reported as normal, 4 noted retropharyngeal gas and 30 reported a widened pre-vertebral space. 38 patients (74.5%) had CT examinations, 33 (78.6%) of which indicated a RPA. The remaining 5 showed swelling of the prevertebral soft tissues. 10 patients developed airway obstruction and required definitive airway management (9 ETT, 1 surgical airway). RPA was managed operatively in 33 patients (64.7%) and conservatively with IV antibiotics in 18 (35.3%). 15 (29.4%) patients had persistence or recurrence of RPA after treatment and 4(7.8%) required repeat operative I&D. CONCLUSIONS: This

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case series reviews the epidemiology of RPA at one centre. CT scanning has become the gold standard for confirming the diagnosis of RPA. Future research will focus on the utility of soft tissue neck x-rays as a screening tool in patients with potential RPA.
Key words: retropharyngeal abscess

054 Care of Community-Acquired Pneumonia: The Impact of Adding Levofloxacin to a Hospital Formulary.
Marras TK, Chan CK. University Health Network, University of Toronto, Toronto, Ont.

INTRODUCTION: Community-acquired pneumonia (CAP) is a common disease with significant morbidity, mortality and financial burden. The administration of antibiotics within 8 hours of presentation to the emergency department is associated with lower mortality. Recent CAP guidelines recommend newer-generation fluoroquinolones, such as levofloxacin, in several settings. OBJECTIVES: To assess clinical outcomes and treatment costs before and after introducing levofloxacin on to our formulary, and adherence to and impact of applying recent CAP treatment guidelines. METHODS: Retrospective cohort study, reviewing charts of all CAP patients admitted between October 1997 and June 2000 to the Toronto General and Toronto Western Hospitals. Patients will be risk-stratified according to the Pneumonia Severity Index (PSI), and treatment costs and clinical outcomes will be analyzed. RESULTS: We expect to identify 600–1,000 cases. To date, we have identified 24 cases from the pre-quinolone era and 52 from the post-quinolone era. Interim analysis of the post-quinolone era, comparing patients who received levofloxacin at some time during their hospital course (ever-levofloxacin, 24 cases), with patients who never received levofloxacin (never-levofloxacin, 28 cases), shows that both groups were composed of elderly patients (median age 75 and 78 respectively, $p = 0.16$); 17% and 14% respectively came from a long-term care facility ($p = 0.83$); and the median PSI class was 4.5 and 4 respectively ($p = 0.48$). These very preliminary data show trends to lower mortality (4% vs. 11%, $p = 0.40$) and lower median drug cost per patient ($54.00 vs. $62.21, $p = 0.59$), but a slightly longer median hospital stay (7.5 vs. 7 days, $p = 0.92$) in the ever-levofloxacin group. No trend reached statistical significance. CONCLUSIONS: Interim results regarding the use of levofloxacin in the inpatient treatment of CAP are encouraging and support current guidelines. A much larger data sample is required before making firm conclusions. Analysis of 2–3 times the current number of cases will be presented.
Key words: pneumonia, therapy, guideline

055 Determinates of HIV and Hepatitis C Infection in Two Northern, Urban Emergency Departments: Results of Anonymous Unlinked Surveillance.
Rowe BH, Mashinter L, Joffe M, Mackey D, Preiksaitis Y, Houston S. University of Alberta, Edmonton, Alta.

OBJECTIVES**:** Transmission of blood borne pathogens like HIV and Hepatitis C (HC) are potential risks to all emergency staff. Data regarding the epidemiology of these infections in non-US ED settings are limited. METHODS: Consecutive patients aged 15 to 54 were included if they presented to either of 2 urban Canadian EDs and had a CBC drawn. Left over blood was collected and serotested for HIV and HC after removal of all personal identifiers. The list of study patients was cross-referenced against local databases of known HIV and HC seropositive patients prior to unlinking and serotesting. Univariate and multivariate analyses were performed. RESULTS: Samples from 3057 individuals were analyzed. All age groups were equally represented, 7% (213) were aboriginal, and 1654 (51%) were male. Medical diagnoses were common (2193 [71%]) and injury accounted for 643 (21%) cases. Overall, 39 (1.3%; 95% CI, 1.0%–2.0%) patients had proven HIV infection which was most closely associated with known and proven HC infection ($p < 0.001$). More patients (302 [9.8%; 95% CI, 9.0%–11.0%]) were HC seropositive which was closely associated with aboriginal status ($p < 0.001$), increasing age ($p < 0.001$), male gender ($p < 0.001$), hospital ($p < 0.001$), and proven HIV infection ($p < 0.001$). CONCLUSIONS: The prevalence of HC was high in unselected ED attendees at these 2 sites while the prevalence of HIV was low. Most HIV infection was associated with HC seropositivity, suggesting intravenous drug use transmission. These results emphasize the importance of observing universal precautions in ED practice and educating staff about exposure risks.
Key words: hepatitis C, HIV, seropositivity

056 Clinical Utility of Blood Cultures in the Emergency Department.
Innes G, Roland K, Grafstein E, Christenson JM. St. Paul's Hospital, University of British Columbia, Vancouver, BC.

OBJECTIVES: ED blood cultures (BC) may seldom affect patient outcomes. Our objectives were to estimate the rate of true positive BC, the proportion of BC that are potentially useful, and to identify clinical characteristics of patients having useful BC. METHODS: During a 6 month period, adults who had BC drawn in our inner city ED were identified using the lab database. The study included all patients with positive BC and a concurrent random sample of negative cultures. Demographics, comorbidity, clinical predictors and diagnostic data were gathered from ED charts. BC were defined as potentially helpful if 3 parameters were met: 1) The BC grew a non-contaminant organism, 2) Antibiotic Rx was changed after the BC result, 3) The organism was not grown in primary site cultures (e.g., urine, CSF). RESULTS: 767 ED patients had BC drawn. Of these, 23 (3%) grew contaminants and 83 (11%) grew pathogens. Antibiotics were subsequently changed in 47 cases (6%); however, in 21 of these, the pathogen also grew in primary site cultures and in 16, appropriate antibiotics had already been initiated in the ED. BC may have been useful in 16 patients (2.1%) by causing appropriate treatment changes ($n = 10$), by leading to a diagnosis of endocarditis ($n = 4$) or by identifying an unexpected organism in patients already appropriately treated ($n = 2$).

Parameter	BC(+), $n = 106$	BC(–), $n = 129$	BC helpful, $n = 16$
IVDU n (%)	52 (49)	41 (32)	10 (62)
HIV (+)	34 (32)	31 (24)	3 (19)
Mean pulse	105	96	107
Mean BP	116/67	129/75	115/69
Mean temp	37.6	37.3	37.7
WBC	10.3	9.0	9.3
D/C from ED	11 (10%)	26 (20%)	0 (0%)

CONCLUSION: Relatively few ED BC are helpful. Accepted predictors (e.g., WBC, fever) may not identify patients likely to benefit. A clinical prediction rule for ED BC should be developed.
Key words: blood cultures, utilization, utility

057 Emergency Department Point of Care Pregnancy Testing.
Filiatrault L, Ng DC, Whitlow K, Pudek M. Vancouver General Hospital, Vancouver, BC.

OBJECTIVES: Point of care ED testing may facilitate patient management. We sought to determine the user satisfaction, time impact and diagnostic performance of a urine pregnancy test utilized by nurses in a tertiary ED. METHODS: After delivery of a standardized training pro-

gram, we prospectively evaluated the Abbott TestPack Plus hCG Combo with On Board Controls urine pregnancy test (ATP). All patients deemed by an emergency physician to require pregnancy testing were eligible. Subjects had simultaneous ED point of care ATP testing done by an emergency nurse and central laboratory urine or serum pregnancy testing using a Tandem ICON 2 ImmunoConcentration Assay. The laboratory result was considered the gold standard. ED staff were blinded to the laboratory result when interpreting the ATP and were surveyed to determine user satisfaction and time impact of the test. RESULTS: A convenience sample of 128 patients were enrolled. There were 16 positive laboratory results for a pregnancy prevalence of 12.5%. The ATP had one false positive and one false negative result giving a sensitivity of 93.8% (95% CI 69.8%–99.8%) and a specificity of 99.1% (95% CI 95.1%–99.9%). Overall ATP accuracy was 98.4% (95% CI 94.5%–99.8%). The survey indicated that the laboratory result was available in a median time of 62 minutes versus 5 minutes for the ATP ($p < 0.001$) and that users were highly satisfied with the test and believed it accelerated patient disposition. CONCLUSIONS: Point of care urine pregnancy testing by ED nurses is rapid, highly accurate, and accelerates patient disposition. At our institution, the ATP has now replaced central laboratory pregnancy testing.

Key words: pregnancy, diagnosis, point-of-care

058 Ketamine vs. Fentanyl/Midazolam for Procedural Sedation in Intravenous Drug Users.

Innes G, Grafstein E, Christenson JM, Roland K. St. Paul's Hospital, University of British Columbia, Vancouver, BC.

OBJECTIVES: To compare the safety and adverse effects of fentanyl/midazolam (F/M) vs. ketamine (ket) procedural sedation (PS) in injection drug users (IDUs). METHODS: All patients undergoing PS in our inner city ED have medications, vital signs and adverse events recorded in real time on an explicit procedural sedation record. We reviewed PS records from all IDUs who underwent PS from Jan. 1997 to Oct. 1999. RESULTS: Of 163 patients, 50 received IV ket and 113 received F/M. Females comprised 58% of the ket group and 42% of the F/M group. Other baseline parameters including age (mean = 33.3), pulse, RR, BP and O2 saturation were similar between groups. The most common procedures were abscess drainage (76 vs. 73%) and shoulder relocation (10 vs. 14%) in the ket and F/M groups respectively. Median ketamine dose was 75 mg (IQR, 50–100). Most (49/50) ket patients received midazolam pre-treatment (median 4 mg; IQR = 2–4.75), and 26 received supplementary fentanyl (median 100 ug; IQR = 0–250). Nadir systolic BP fell below 90 mm Hg in 3 ket patients (6%) and 15 F/M patients (13%). Nadir O2 saturation fell below 90% in 3 ket patients (6%) and 6 F/M patients (5%). Six ketamine patients (12%) suffered emergence reactions, 3 requiring benzodiazepine treatment. Reactions included agitation (3) and transient delirium (3). One other patient described "weird" but pleasant dreams. In the F/M group, median fentanyl and midazolam doses were 300 ug (IQR, 200–500) and 4 mg (IQR 3–6). Six F/M patients (5%) suffered AEs, including agitation (3), hypoventilation requiring bagging (2) and prolonged hypotension (1). No patients required intubation and none suffered significant or ongoing morbidity. ED length of stay was 140 minutes (IQR, 92–191) in the ketamine group and 98 minutes (IQR, 59–162) in the F/M group. CONCLUSIONS: IV ketamine has fewer adverse hemodynamic and ventilatory effects but is associated with longer ED lengths of stay. It causes emergence agitation that is transient and easily treated.

Key words: procedural sedation, intravenous drug user, ketamine, fentanyl, midazolam

059 Factors Predicting ED Patients' Perception of Inadequate Analgesic Treatment: A Logistic Regression.

Lee J, Stiell I, Hobden E, Nuth J, Wells G. Clinical Epidemiology Unit, University of Ottawa, Ottawa.

OBJECTIVES: Little data exist regarding factors associated with ED patients' perceptions of the effectiveness of their analgesic treatment. The objective of this study was to explore factors associated with patients' perceptions of inadequate treatment of acute pain. METHODS: Logistic regression data were collected as part of a prospective observational study. Adult patients presenting to a teaching hospital ED with acute pain (renal colic, migraines, extremity injuries, and abdominal and back pain of less than 72 hours duration) were eligible. Patients who provided informed consent were asked to rate their pain severity on a 100-mm horizontal Visual Analog Scale (VAS). At discharge, the VAS was repeated and patients were asked whether they had received adequate pain treatment. Logistic regression was used to explore factors associated with the patients' perceptions of inadequate analgesic therapy, using automated stepwise procedures to select the final model. A significance level of 0.05 was required for model entry. RESULTS: 124 patients were enrolled: the mean age was 36 years and 66 were female (53%). Presenting complaints included abdominal pain (36%), extremity pain (38%), back pain (12%) and other (14%). Inadequate analgesia was reported by 26/124 patients (21%). Variables predictive of perceived inadequate treatment, their odds ratios, and 95% CIs were: 1) "reduction in VAS per 10 mm" (OR 0.7, 95% CI 0.9–0.6) and 2) "female gender" (OR 3.8, 95% CI 1.4–10.6). Age, presenting complaint, waiting time, and if analgesics were ordered did not enter the model. The Hosmer–Lemeshow statistic was 2.5, ($p = 0.96$ to reject hypothesis of good fit). CONCLUSION: A significant number of ED patients have inadequate pain control. Change in pain severity on VAS and gender may be associated with perceived adequacy of pain control, however further study is warranted.

Key words: analgesia, visual acuity scale

060 Code School: Applied Use of a Computer-Operated Patient Simulation Manequin to Teach Post Graduate Year One (PGY-1) Residents.

Rabin EA, Rosenblum RM, Lund AJ, Brindley P, Paul T. University of Alberta, Edmonton, Alta.

OBJECTIVES: PGY-1 residents act as code team leaders during Coronary Care Unit (CCU) rotations. Residents prepare for this role by completing the Advanced Cardiac Life Support (ACLS) course prior to residency. In ACLS, algorithms are memorized and practiced in controlled and unrealistic situations using rhythm generators. There is a gap between ACLS and acting as code team leader in the hospital setting. The objective of this project was to develop and evaluate an innovative method of delivering this educational requirement using a computerized patient simulator. Educational Intervention: The PGY-1 Code School was designed to provide a practical review of ACLS and related skills. The course outlines roles and responsibilities of the multidisciplinary code team and teaches leadership skills. There is time reserved for hands-on experience leading mock codes on a computer-operated patient simulator that provides a unique, realistic and real time environment for the learner. Evaluation: The two day PGY-1 Code School allows for the training of 48 students each week. The pilot course will run in the summer of 2000. PGY-1 residents will be surveyed with questions related to perceived knowledge, experience and confidence in running cardiac codes. The answers of those who have participated in a CCU rotation without the Code School preparation will be compared to those who have completed the Code School. CONCLUSION: PGY-1 Code School is designed to bridge the gap between training and clinical reality, and to facilitate the acquisition of leadership skills. The program evaluation will probe for evidence of the effectiveness of such a course in enhancing the skills, knowledge, multidisciplinary teamwork and confidence of residents.

Key words: medical education, resuscitation, ACLS

061 When the Clinical Impression is "Deep Vein Thrombosis vs. Cellulitis": Do Patient Characteristics Predict the Duplex Diagnosis?
Rabuka CE, Azoulay LY, Kahn SR. McGill University Health Centre, Montreal, Que.

OBJECTIVES: 1) To determine the proportion of patients who had a final diagnosis of deep vein thrombosis (DVT), cellulitis, or both among emergency department (ED) patients in whom the initial clinical impression was "DVT versus (vs.) cellulitis" and who underwent duplex scanning. 2) To determine which baseline clinical parameters, if any, predicted the final diagnosis. METHODS: Baseline demographic, historical, physical exam, and laboratory variables were collected in a chart review of ED patients with the diagnosis of cellulitis vs. DVT, leading to referral for duplex scan. Patients with positive and negative duplex studies were compared on these variables using the Student *t*-test or the Chi-square test. RESULTS: Of 109 patients, 19 had a positive duplex scan (17.4%), 2 of who were treated for both DVT and cellulitis. Comparing patients with positive vs. negative duplex scan: 5.3% vs. 14.4% had constitutional symptoms; 0% vs. 12.2% had rigors ($p = 0.056$); 26.3% vs. 4.4% had recent surgery; 0% vs. 7.8% had distinct margins of erythema ($p < 0.01$); 15.8% vs. 3.3% had varicose veins; 5.3% vs. 18.9% were currently on antibiotics; 15.8% vs. 26.7% had diabetes; 31.6% vs.16.7% had peripheral vascular disease; and 50% vs. 21.4% had an elevated WBC. CONCLUSION: There are differences in a number of baseline characteristics of "DVT vs. cellulitis" patients with positive vs. negative duplex scans, some of which were statistically significant despite the limited sample size.
Key words: deep vein thrombosis, cellulitis, diagnosis

062 Predicting Severe Obstruction from Urinary Calculi Using Pain Scales.
Papa L, Stiell I, Lee J, Wells G, Mahoney J. Clinical Epidemiology Unit, University of Ottawa, Ottawa.

OBJECTIVES: Pain may be an important predictor of disease severity in patients with urinary calculi. This study prospectively assessed pain as a predictor of severe obstruction due to renal colic. METHODS: Consecutive patients with suspected renal colic were assessed prospectively at 2 teaching hospital EDs based on acute flank pain and hematuria. A 10 cm visual analogue scale (VAS) was used to assess patients' pain on arrival and at discharge from the ED. Severe obstruction was defined by the following IVP (intravenous pyelogram) criteria: i) urine extravasation, or ii) prolonged dense nephrogram with delayed filling of the ureter >15 minutes, or iii) delayed ureteral filling below the stone longer than 2 hours. Severe obstruction suggested the need for imaging in the ED. Appropriate univariate analyses with 95% CIs were performed. RESULTS: From January to September 1999, 447 patients with suspected renal colic were identified. A total of 333 patients (75%) had an IVP done (84% within 24 hours of presentation). Severe obstruction was identified in 62 (19%) of all IVPs. Arrival VAS pain scores (mean +/– SD) were significantly higher ($p = 0.002$) in patients with severe obstruction (8.5 +/–2 cm) than those without severe obstruction (6.9 ± 3.2). Discharge VAS scores were also significantly greater ($p = 0.027$) in those with severe obstruction (2.5 ± 2.4 cm) than those without (0.9 ± 1.8 cm). Emergency physicians correctly estimated the likelihood of severe obstruction in only 28% of cases. CONCLUSION: Physicians are unable to predict severe obstruction in the ED. Pain on arrival and at discharge from the ED are significant indicators of severe obstruction and therefore the need for urgent imaging. If we could derive a clinical decision rule, using tools such as pain scales, to identify those patients who will have severe obstruction from their calculi, we could be more accurate with imaging in the ED.
Key words: renal colic, pain severity, visual analog scale

063 Incidence of Akathisia from Intravenous Metoclopramide for Migraine Headache.
Seviour CM, Harrison DW, Abu-Laban RB. Vancouver General Hospital, Vancouver, BC.

OBJECTIVES: Akathisia is a distressing side effect of metoclopramide, a drug commonly used to treat migraine headachse. We sought to determine the incidence of metoclopramide-induced akathisia (MIA) as this information is required before evaluating preventative interventions. METHODS: A prospective study was carried out at a tertiary ED from January 1997 to January 1998. Adults treated with 10 mg of IV metoclopramide for migraine headache were eligible. Patients without exclusions completed questionnaires before and 30 minutes after therapy, blinded to the true purpose of the study. The questionnaires contained a 10-cm visual analogue scale (VAS) of headache severity and a series of Likert scale symptom questions. Nested within these "distractions" were the three subjective questions from the Prince Henry Hospital Akathisia Rating Scale. An increase of two or more in the summed score of the nested questions was considered diagnostic of MIA. RESULTS: 92 of 104 patients studied recorded full responses. Scores for virtually every distraction question decreased or remained unchanged after therapy. Within this strong improvement trend were 11 patients who had a diagnostic increase in their akathisia score (12.0%; 95% CI, 6.1%–20.4%). Many of these cases had increases in 2 or all 3 of the nested questions. Mean VAS scores for headache severity decreased significantly after therapy (8.3 cm before vs. 3.1 cm after, $p < 0.0001$) and 83% of respondents reported they would accept metoclopramide again. CONCLUSIONS: This study demonstrates that the incidence of MIA is significant and that metoclopramide is an effective therapy for migraine headache. Further research on measures to prevent or reduce MIA is warranted.
Key words: headache, migraine, metoclopramide, akathisia

064 Access to Firearms and Other Weapons and Threats of Domestic Violence in a Northern Emergency Department.
Rowe BH, Cox JE, Carter MH, Sahai VS, Bretzlaff-Michaud JA, Bota GW. University of Alberta, Edmonton, Alta.

OBJECTIVES: Weapon use in domestic violence (DV) increases the risk of serious injury, disability, and mortality. Little is known about the access to household weapons and the threat these pose to women. This study examines access to firearms and threats using weapons in women visiting a northern Canadian ED. METHODS: A prospective cross-sectional study was performed in which a random sample of consenting women (age >16) were interviewed in private during their ED stay by dedicated female research nurses. Within the 52-question survey, specific items focussed on household firearms and other weapons. RESULTS: 983 (80%) of 1223 eligible patients consented; 177 (18%) reported having a firearm in their present dwelling. Overall, 153 (16%) women had previously been threatened with a weapon; more women (123 [13%]) had been threatened using weapons (e.g., knives, tools, etc) other than guns ($p = 0.002$). Threats with other weapons were strongly associated with firearm threats ($p < 0.001$). However, firearms were generally stored safely: unloaded (166 [93%]), in locked storage (144 [79%]), and separated from ammunition (122 [71%]). Weapon-related threats were most strongly associated with previous injury from a partner during pregnancy ($p < 0.001$), any previous injury by a partner ($p < 0.001$), and respondent alcohol use ($p = 0.05$). CONCLUSIONS: Firearm ownership and threats with weapons (including firearms) were common in this patient sample. Any weapon threat(s) must be considered a serious issue for both patients and health care workers, since injury is closely associated with partner violent action.
Key words: domestic violence, firearms

065 Factors Associated with Patient Length of Stay in the Emergency Department.

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OBJECTIVES: Canadian Emergency Departments (EDs) are faced with increasing patient volumes and limited resources. This study was performed in order to examine the factors associated with patient length of stay (LOS) in the ED. METHODS: A review of 1047 patient care charts from a continuous 168-hour period in January 1999 was performed. The setting was a Canadian urban tertiary care trauma centre ED that sees over 60,000 visits per year. For each chart, the initial triage score, admit/discharge decision time, departure time, use of ancillary services (laboratory tests and diagnostic imaging), and consultation with specialty services were recorded. Regression analysis was performed to determine which factors were significantly associated with a longer LOS. RESULTS: Of the 1047 charts, 152 (14.5%) were excluded from detailed analysis due to incomplete documentation. The mean time a patient stayed in the ED was 4.8 hours (SD 4.5 h) with a wide variation. Generally, patients triaged with intermediate acuity scores had longer lengths of stay compared to patients with the higher or lower acuity scores (mean times – level 1: 2.8h; level 2: 4.6h; level 3: 6.3 h; level 4: 4.6h; level 5: 3.1h). The use of x-ray services prolonged a patient's LOS by a mean of 0.8 hours ($p < 0.05$) and the ordering of lab work prolonged visits by an average of 2.9 hours ($p < 0.05$). Patients requiring specialty consultation stayed an average 2.8 hours longer in the ED than those patients without specialty consultation did. A decision to admit the patient to hospital was also associated with an increased LOS (mean 2.7h; $p < 0.05$). Time of day of arrival did not appear to be a significant factor associated with a patient's total time in the ED. CONCLUSIONS: Our findings suggest that multiple factors contribute to prolonging patient LOS in the ED. Research on the means of reducing these delays in similar settings is urgently needed.

Key words: length-of-stay, utilization

066 Circadian Variation in the Presentation of Patients with Chest Pain to the Emergency Department.

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OBJECTIVE: To determine if there is circadian variation in time of presentation to the ED of patients complaining of chest pain. METHODS: A review of hospital records, conducted at a Canadian tertiary care hospital for the period October 1, 1997 to March 31, 1998. The following groups were identified: 1) anyone whose presenting complaint included "chest pain" or "angina"; 2) anyone who was diagnosed with chest pain, angina, or acute myocardial infarction. Data for 1,979 patients was analyzed by dividing the day into eight 3-hour intervals and into four six-hour intervals. Analysis used the chi-squared test for goodness of fit. RESULTS: The presenting time of all patients in the study showed significant circadian variation both for 3 hour and for 6 hour intervals (each $p < 0.0001$). The peak intervals were 9:00–11:59 and 12:00–17:59, respectively. The presenting time of patients diagnosed with an ischemic syndrome (angina or acute MI) also showed significant variation for 3 and for 6 hour intervals (each $p < 0.0001$). The same peaks were observed. For patients diagnosed with an acute MI, the 3 hour interval did not achieve significant variation ($p = 0.6$), while the 6-hour interval just achieved significant variation ($p = 0.44$). The 6-hour interval 12:00–17:59 was a peak. There was no significant variation in the per patient probability that a patient had an AMI. CONCLUSIONS: The presentation time to the ED of all patients with chest pain, and of those diagnosed with an ischemic syndrome, does not correlate with previously reported circadian distributions in onset of myocardial ischemia. There was no significant circadian variation in the probability that a patient complaining of chest pain was having a myocardial infarction.

Key words: chest pain, myocardial infarction

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