1999 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.)

001 Defining the paramedics' ethical dilemma with DNR orders in the prehospital setting.

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OBJECTIVES: Determining the frequency of encounter and the actual practices of emergency medical technicians (EMT) when confronted with the resuscitation of a patient with a "do not resuscitate" (DNR) order and to survey the comfort levels of EMTs with honouring a DNR order. METHODS: A cross-sectional survey was administered to 382 randomized EMTs working in a metropolitan setting. Answers were recorded using 5-point Likert scales, limited-option answers and narrative responses. RESULTS: 57% of respondents indicated that they "sometimes" or "frequently" encountered the resuscitation of a patient who possessed a DNR order. When faced with this situation, 11% indicated they would honour the DNR. An additional 27% would also honour the DNR, but would appear to provide basic resuscitation in order to adhere to regulations requiring the resuscitation of all patients regardless of DNR status. There was no correlation between the numbers of years of service as an EMT and willingness to honour a DNR. EMTs included concern for the family and the patient, fear of legal repercussions, and personal ethics as factors influencing this ethical dilemma. Of those surveyed, 89% indicated they were comfortable with honouring a written DNR order, while only 44% were comfortable with honouring a verbal DNR order. CONCLUSION: Our results indicate that this ethical dilemma is frequently occurring, and that a significant number of EMTs are disregarding current regulations by honouring DNR orders. There was a high level of comfort with honouring written DNR orders. These factors suggest an urgent need for the review of current regulations concerning resuscitation protocols for patients possessing DNR orders.

002 Factors affecting survival of prehospital asystolic cardiac arrest in a BLS-D system.

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OBJECTIVE: Previous studies show that there is a very low but meaningful survival rate in prehospital cardiac arrest with an initial presenting rhythm of asystole. However, there may be an identifiable subgroup in which resuscitation efforts are futile. Improved specificity in prehospital termination guidelines could lead to more efficient resource utilization and less exposure to occupational risk. The purpose of this study was to identify potential field criteria for predicting 100% non-survival when the presenting rhythm is asystole in a BLS-D System. METHODS: This is an observational cohort study in which data was extracted from Phase I and II of the Ontario Prehospital Advanced Life Support (OPALS) Study, which took place in 21 Ontario communities with a BLS-D level of care. All arrests of presumed cardiac etiology during a 7-year period were examined. Case definitions followed the Utstein Style Guidelines. Descriptive and univariate test statistics (student *t*-test, chi-square, Fisher's exact) were used to characterize asystolic arrest. Multivariate stepwise logistic regression analysis was undertaken to determine independent predictors for survival to hospital admission. RESULTS: From January 1, 1991, to December 31, 1997, there were 9899 cardiac arrests. Overall survival to hospital discharge was 4.3%. There were only 9 (0.2%) survivors of asystole. Of the asystolic survivors, 4 (44%) patients had unwitnessed arrests with no bystander CPR performed. There were no survivors if the response time from call received to vehicle stopped was greater than 8 minutes. Multivariate logistic regression analysis indicated that response time (OR 0868; 95% CI, 0.771–0.978) and bystander witnessed (OR 2.6; 95% CI, 1.53–4.4) factors were predictors of survival to hospital admission. CONCLUSION: In a BLS-D system, there is a very low but measurable survival rate of prehospital cardiac arrest when the presenting rhythm is asystole. Unwitnessed arrests with no bystander CPR did not predict 100% non-survival. However, a response time of greater than 8 minutes did. This data adds to the growing literature which will help guide ethical decision making for protocol development and system design in EMS systems.

003 Does pre-hospital thrombolysis improve outcome in acute myocardial infarction? A systematic review of randomized controlled trials.

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OBJECTIVES: To determine whether prehospital thrombolysis, compared to thrombolysis in-hospital, reduces mortality and infarct size in patients with acute myocardial infarction (AMI). METHODS: A systematic review of the medical literature and meta-analysis. The MEDLINE, CINAHL, HealthSTAR, and Cochrane Controlled Trials Registry databases were searched using a strategy to identify randomized controlled studies comparing intravenous thrombolytics administered in the pre-hospital versus in-hospital settings for AMI patients. Articles retrieved by the search strategy were assessed by 2 independent assessors to determine eligibility for analysis. Disagreements between the assessors were resolved by consensus. RESULTS: Fifty-one articles were assessed. Twelve articles, reporting 6 separate studies, met the inclusion criteria for this review. The 2 assessors' initial decision to include the article had a kappa = 0.71. Five of the 6 studies involved a physician examining the patient pre-hospital and administering the thrombolytic. Three different thrombolytics were used in the trials: tissue plasminogen activator (tPA), anistreplase or APSAC, and urokinase. A test of heterogeneity of the mortality outcome was not statistically significant (p = 0.81). A meta-analysis of all 6 studies showed a significantly lower mortality rate for pre-hospital thrombolysis (Odds Ratio = 0.83, 95% confidence interval: 0.70–0.97). Three of the studies measured left ventricular ejection fraction (LVEF). The pooled result of these 3 studies showed a minimal and non-significant decrease in LVEF with pre-hospital therapy: –0.53% (95% CI: –2.718 to 1.658). CONCLUSIONS: This meta-analysis found a small but significant improvement in mortality for those AMI patients who were given thrombolytics in the pre-hospital setting. There was not a significant difference in LVEF.

004 Defining the outcome parameters for prehospital trials in acute pulmonary edema.
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OBJECTIVES: Comparing the existing acute pulmonary edema (APE) prehospital (PH) literature is problematic because of the diversity of outcome measures. This study objective was to define clinically relevant outcomes for future PH trials in APE. METHODS: A MEDLINE search and hand searching of bibliographies identified a list of 21 APE outcome measures. The list was mailed to a random sample of 227 emergency physicians (EP) using the modified Dillman methodology. The respondents selected clinically relevant outcome measures and ranked them by importance. Responses were analyzed using frequencies and a combined ranking score. A selection frequency was pre-set at 70%. RESULTS: The survey response rate was 71% (161). The mean values reported for department visits was 47,000 (SD 16,000) patient visits per year, admission rate 16% (SD 9%) and 28 (SD 10) EP clinical hours per week. Outcome measures selected most frequently were respiratory rate, EP intubation rate, 4-pt respiratory distress scale, heart rate, 4-pt subjective dyspnea scale, survival to discharge, PH mortality and PH intubation. The composite ranking score identified similar measures: 4-pt respiratory distress scale, EP intubation, respiratory rate, 4-pt subjective dyspnea scale, PH intubation rate, and heart rate. There was no significant difference in outcome selection attributed to EP working in communities with or without advanced PH care. CONCLUSIONS: Clinically relevant prehospital APE outcome measures were identified by a survey with a credible response rate. Clinicians appear to favor short-term outcomes for PH interventions. This list of APE outcomes may improve the comparability of future PH trials.

005 An evaluation of PARTY: a Canadian injury prevention program for teenagers.
Nuth J, Mongeon S, Currie S, Curran DA, Ottawa Hospital, General Campus, Ottawa, Ont.

OBJECTIVE: The P.A.R.T.Y. program (Prevent Alcohol and Risk-Related Trauma in Youth) is a Canadian, hospital-based, day-long, injury prevention program aimed at teenagers. To determine whether the P.A.R.T.Y. program has an impact on injury prevention knowledge, attitudes or behaviours of its participants at 6 weeks after completion of the program. METHODS: A previously validated questionnaire, the Spinal Cord Injury Assessment of Risk Instrument (SCARI), was administered to a convenience sample of 257 students from 10 high schools in Ottawa, Canada, between January 1996 to April 1998. The students completed the SCARI immediately prior to the start of the P.A.R.T.Y. program at the Ottawa General Hospital and repeated it 6 weeks later. RESULTS: 203 students had pre and post program questionnaires that could be matched. 48% were male. The mean age was 16.5 years (SD +/– 0.85, range 14–20). On the post program SCARI the students demonstrated a statistically significant improvement in 4 of the 5 sub-scales of the SCARI: 1) knowledge of head and spinal cord injury risk factors ($p < 0.001$), 2) general attitudes to safe behaviours ($p < 0.001$), 3) frequency of reported helmet use ($p < 0.05$) and 4) attitudes toward safe helmet use ($p < 0.001$). The fifth sub-scale, the high risk-taking scale, showed no significant change ($p = 0.22$). CONCLUSION: At 6 weeks after completing the P.A.R.T.Y. program, the participants have significantly improved knowledge about risk factors for injury and more positive attitudes towards safe behaviour. Whether these improvements translate into a decreased incidence of injury over the long-term is the subject of a multi-centered, prospective trial currently underway.

006 Resource contributions by faculties of medicine to support and develop the discipline of emergency medicine in Canada.
Steiner IP, Yoon PW, Goldsand G, Rowe BH. University of Alberta, Edmonton, Alta.

OBJECTIVES: To document the academic activities and degree of support received by Emergency Medicine (EM) training programs in Canada from their respective Faculties of Medicine. METHODS: A seventeen-question survey was developed for this study. The survey was distributed, after Ethics approval, to all Program Directors in EM (RCPS and CFPC) in Canada. Contact was repeated to a maximum of 4 attempts to obtain data. RESULTS: Responses were obtained from 27 (100%) of the 16 CFPC-EM and 11 RCPS Programs. In the academic year 1998–99, 20 RCPS and 86 CFPC-EM resident entry positions were available across Canada. Overall, there were 587 Emergency Medicine Faculty enlisted in these programs, who taught a total of 3049 learners (1369 [45%] undergraduates, 1621 [53%] postgraduates and 59 [2%] "other" learners). These programs are administered as Departments of EM (1 [4%]), freestanding Divisions of EM (2 [7%]), or under other disciplines (Family Medicine: 19 [70%]; Medicine: 3 [11%]; Surgery: 1 [4%]; and the Dean's Office 1 [4%]). Most Program Directors (22 [81%]) receive salary support, although the amount is highly variable. Beyond this, 22 (81%) programs receive other administrative, financial or human resource support; 5 (9%) receive no support at all. Nine (33%) programs have GFT faculty positions. Currently there are 36 academic appointments in EM in Canada: 5 (14%) Full, 12 (33%) Associate, 19 (53%) Assistant Professors; 5 are tenured faculty positions. Eight of the 27 (30%) Canadian programs have Research Directors, 8 (30%) have non-MD academics, and 2 (7%) have designated "educators." CONCLUSIONS: Despite large teaching and clinical responsibilities, EM programs and staff have surprisingly limited support for clinical teaching, education or research. Growth of the discipline is expected to continue in the future, and immediate attention must be paid by the Faculties of Medicine to provide infrastructure support for these programs.

007 Should relatives be allowed to witness the resuscitation of family members?
Rosenczweig C, McKnight D. Vancouver General Hospital, Vancouver, BC.

OBJECTIVES: In the early 1980s, the routine exclusion of relatives from resuscitation procedures was called into question. Research emerged which indicated a potentially significant psychological benefit to witnessing the resuscitation of a family member. The objectives of this study were twofold: (1) to examine the current opinion of emergency department (ED) staff regarding allowing relatives to witness resuscitation, and (2) to determine if staff opinion was consistent with their own desire to be present during the resuscitation of a family member. METHOD: 137 staff members, working at the 3 busiest EDs in Vancouver, BC, were surveyed using a written questionnaire. Two questions were posed: "Should relatives be allowed to witness resuscitation?" and "Would you prefer to be present during the resuscitation of a relative?" RESULTS: The responses of the 32/51 emergency physicians completing the survey were as follows: "absolutely yes" (9.4%), "absolutely no" (37.5%), and "under certain conditions" (53.1%). The responses of the 53/80 nurses completing the survey were "absolutely yes" (13.2%), "absolutely no" (34.0%) and "under certain conditions" (52.8%). Of the 3/6 social workers com-

pleting the survey, all responded "under certain conditions". Further, 32.0% of emergency physicians responded "absolutely yes" to being present during the resuscitation of a personal family member despite being far more hesitant about allowing a patient's relative to do the same. In contrast, only 11.3% of nurses demonstrated the same discrepancy. CONCLUSIONS: This survey demonstrated that the majority of ED staff would not object to relatives being present during resuscitative procedures provided certain conditions were met: (1) The relative was reasonably composed, (2) was accompanied by a qualified staff member, (3) was not present during invasive procedures, and (4) the presence of the relative did not interfere with patient care.

008 The efficacy of formoterol versus salbutamol in emergency department asthma: a randomized controlled study.
Ooi SBS, Lee SK, Lim TK. Emergency Medicine Department, National University Hospital, Singapore.

OBJECTIVES: To determine the efficacy of formoterol vs. salbutamol in treatment of asthma presenting to an emergency department (ED). METHODS: Formoterol is a long acting beta agonist with rapid onset of action. The efficacy of formoterol in the treatment of acute asthma is unknown. In a randomized controlled study of adult patients (n = 38) presenting with acute severe asthma in the ED we compared the efficacy of inhaled formoterol (F: cumulative dose of up to 72 µg via the aerolizer) vs. salbutamol (S: 10 mg via wet nebulizer). If initial treatment failed to improve PEFR by 20% from baseline or relieved acute wheeziness, patients where crossed over to the alternative treatment. Patients who achieved PEFR >50% predicted were discharged. RESULTS: The overall failure rates of initial treatment (% of patients who crossed over) of the 2 regiments were comparable: S = 75% vs. F = 52%. However, patients who received F had significantly lower PEFR after 30 minutes than those on the S regimen [Mean (SD) PEFR 48 (18)% predicted vs. 62 (18)% predicted, p = 0.034] and also had significantly less improvement in PEFR from baseline expressed as % of (Post treatment – Baseline)/(Predicted – Baseline)[Mean (SD) 23 (18)% vs. 40 (18)%, p = 0.009]. CONCLUSION: We conclude that in acute exacerbations of asthma: (1) formoterol is an effective treatment and (2) onset of action of salbutamol is more rapid than formoterol.

009 Asthma quality of life following ED discharge: a randomized controlled trial.
Rowe BH, Bota GW, Fabris L, Barker S, Kelly KD, Milner RA. University of Alberta, Edmonton, Alta.

OBJECTIVES: The appropriate dose of inhaled corticosteroid (ICS) following emergency department (ED) discharge for acute asthma is unclear. We examined outcomes in patients discharged from the ED on oral steroids in addition to varying doses of ICS. METHODS: Patients ages 16–60 with acute asthma receiving <1000 micrograms (mcg) of beclomethasone dipropionate (BDP) or equivalent were eligible for this study. All patients received similar ED treatment and upon discharge received oral prednisone (50 mg × 7 days) and inhaled β-agonists. In a double blind fashion, patients were randomly assigned to receive either 1000 (HI) or 500 (LOW) mcg/day of inhaled fluticasone (1 inhalation BID). Patients were followed for 21 days or until relapse; the main outcome was asthma quality of life (AQLQ). RESULTS: 61 patients were enrolled (31 LOW, 30 HI); the groups were similar at the start of the study. AQLQ scores were higher (less impaired) in the HI ICS group for overall (p = 0.01), emotional (p = 0.02), environmental (p = 0.005), and symptom (p = 0.05) domains at 21 days. Other outcomes such as relapse (p = 0.07) and beta-agonist puffer use (p = 0.62) were similar in both groups at 21 days. Compliance was high and side effects were similar on both the HI and LOW ICS doses. CONCLUSIONS: Patients receiving standard ICS doses at the time of their asthma exacerbation appear to experience earlier improvements in quality of life using high dose ICS in addition to prednisone at discharge. Further studies are required using larger samples, different ICS agents and in other populations.

010 Single dose intravenous ketorolac versus titrated intravenous meperidine in acute renal colic — a randomized clinical trial.
Wood V, Innes G, Christenson J, Lesperance M, McKnight RD. Royal Jubilee Hospital, Victoria, BC.

OBJECTIVES: Intravenous narcotic titration is an accepted method of relieving acute renal colic. Studies have shown that NSAIDs are also effective. Our objective was to compare single-dose i.v. ketorolac (KET) and titrated i.v. meperidine (MEP) with respect to speed and degree of analgesia, adverse effects and functional status. Our hypothesis was that these agents provide equivalent analgesia 60 minutes after drug administration. Our secondary hypothesis was that KET patients would experience fewer adverse effects and less functional impairment. METHODS: This was a multicentre, randomized double-blind equivalence trial in a convenience sample of patients age 18–65 with moderate to severe renal colic, documented by IVP, ultrasound or stone passage. MEP patients received 50 mg IV MEP at time = 0, then 25 to 50 mg q 15 minutes prn for ongoing pain. KET patients received 30 mg i.v. KET at T = 0 and placebo injections q 15 min prn. Adverse effects and categorical/VAS pain assessments were performed every 15 minutes. Functional status was evaluated at 60 minutes. Our primary and secondary end points were the proportion of patients with mild or no pain at 60 minutes and the proportion of patients able to resume normal activity at 60 minutes. RESULTS: The primary end point (successful pain relief) occurred in 49/77 MEP patients (64%; 95% CI, 53–75%) and in 47/65 (72%; 95% CI, 61–83%) KET patients (p-value for equivalence = 0.002). 10% of MEP patients and 44% of KET patients were able to resume normal activity at 60 minutes (p = 0.001). CONCLUSIONS: Single dose KET is as effective as titrated MEP for reducing pain in acute renal colic and causes less functional impairment.

011 Emergency management of supraventricular tachycardia — a comparison between intravenous adenosine and slow infusion of calcium channel blockers.
Lim SH, Lateef F, Anantharaman V. Deptartment of Emergency Medicine, Singapore General Hospital, Singapore.

OBJECTIVES: To compare the efficacy of slow infusions of verapamil, diltiazem and intravenous adenosine in the termination of spontaneous SVT in the emergency department. METHOD: Patients at least ten years of age with regular narrow complex tachycardia and an ECG diagnosis of SVT, not converted by vagal manoeuvres were randomized to have a verapamil infusion at a rate of 1 mg per minute to a maximum of 20 mg; or a diltiazem infusion of 2.5 mg per minute to a maximum of 50 mg; or the administration of intravenous adenosine 6 mg as a rapid bolus, followed by 12 mg if the SVT was not converted. Patients with signs of impaired cerebral perfusion or acute pulmonary edema were excluded. Successfully treated patients were observed for 2 hours for recurrences or complications. RESULTS: Of the 40 patients given verapamil, 39 (97.5%, 95% CI: 86.8% to 99.9%) had their SVT converted (mean dose of 9.8 mg, SD 9.3); and 49 of the 50 patients given diltiazem (98.0%, 95% CI: 89.3% to 99.9%) were converted (mean dose of 21.7 mg, SD

17.15). Of the 89 patients randomized to receive adenosine, 59 (66.3%) converted with 6 mg, 18 (20.2%) required an additional 12 mg. The remaining 12 patients were re-randomized to receive infusions of either verapamil or diltiazem for the conversion of their SVT. The conversion rate with adenosine was 86.5% (95% CI: 77.6% to 92.8%). There were no instances of complications reported in any of the patients. CONCLUSION: Slow infusion of calcium channel blockers is as safe and efficacious as intravenous adenosine for the first line treatment of stable SVT.

012 Optimal defibrillation response times intervals for maximum prehospital cardiac arrest survival rates.
De Maio VJ, Stiell IG, Wells GA, Spaite DW, Ward RE, for The OPALS Study Group. Division of Emergency Medicine and Clinical Epidemiology Unit, University Of Ottawa, Ottawa, Ont.

OBJECTIVE: Many centres optimize their EMS systems to achieve a target defibrillation response interval (DRI) of "call received by dispatch" to "arrival at scene by responder with defibrillator" in 8 minutes or less for at least 90% of cardiac arrest cases. The objective of this study was to analyze survival as a function of time to test the evidence for this standard. METHODS: This prospective cohort study included all adult, cardiac etiology, prehospital cardiac arrest cases from Phases I and II of the Ontario Prehospital Advanced Life Support (OPALS) study. Patients in the 21 Ontario study communities received a BLS-D level of care by ambulance and firefighters, but no ALS. Survival was plotted as a function of the DRI. The equation of the curve, generated by logistic regression, was used to estimate survival at various DRI cut-points. RESULTS: From January 1, 1991, to June 30, 1997, there were 343 (3.7%) survivors overall among the 9,267 cases treated. The DRI mean was 6.23 minutes and 90th percentile was 9.35 minutes. There was a steep drop in the first 4 minutes of the survival curve beyond which the slope gradually levelled off. Controlling for known covariates, the odds of survival with increasing response time was 0.78 per minute (95% CI, 0.74–0.83). The survival function predicts, for successive 90th percentile cut-points: i) survival rates, and ii) additional lives saved per year in the OPALS communities compared to the 8 minute standard: 9 min (4.0%; –18 lives), 8 min (5.2%; 0 lives), 7 min (6.6%; 23 lives), 6 min (8.5%; 53 lives), 5 min (10.9%; 92 lives). CONCLUSION: The "8 minute target" is not supported by our data as the optimal EMS DRI for cardiac arrest. EMS managers should consider the impact upon lives saved of further optimizing their 90th percentile DRI below 8 minutes. Future research should identify the cost-effectiveness for each minute reduction in the DRI.

013 A description of ambulance diversions in a tertiary care region.
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OBJECTIVES: Ambulances redirected to a site, when patient traffic of another centre is overwhelming to ED staff, is a common occurrence. We attempt to describe how the phenomenon of ambulance diversions impacts on the delivery of patient care. METHODS: We retrospectively reviewed the PCR and Computer Trip Records of all diverted ambulances during the time period of April 9 – May 15, 1998. From these data, the transportation times of diverted ambulances were determined. Inappropriate diversions requiring transportation to another site later were recorded. The effect upon patients was determined by scrutinizing the charts for the occurence of adverse events. An adverse event was defined as a patient condition or event that required immediate definitive care actions, and should not be optimally be managed in an ambulance. Two independent investigators examined all the PCRs, and identified adverse events. In the event of disagreement a third adjudicator was used and agreement recorded. RESULTS: There were a total of 332 diversions during the study period. The increase in ambulance transportation times was statistically significant (total transport time 17:41 min vs. 12:33 min). Patients cancelled ambulance trips due to the presence of diversions. Adverse events occurred to patients in diverted ambulances (1.8%). Ambulances were inappropriately diverted 14 times (4.2%). CONCLUSIONS: Ambulance diversions result in increased transportation times, patient initiated trip cancellations, and inappropriate transports required later. There were adverse events that occurred in ambulances that were diverted.

014 What is the quality of life of survivors of out-of-hospital cardiac arrest?
Stiell IG, Nichol G, Martin M, Ward RE, De Maio VJ, Wells GA, Spaite DW, for the OPALS Study Group. Division of Emergency Medicine and Clinical Epidemiology Unit, University of Ottawa, Ottawa, Ont.

OBJECTIVES: Some observers believe that many patients who survive out-of-hospital cardiac arrest function at a very poor level. This sub-study evaluated the one-year quality of life of survivors of cardiac arrest within the Ontario Prehospital Advanced Life Support (OPALS) Study. METHODS: The OPALS Study is a large clinical trial that evaluates BLS-D and ALS interventions for cardiac arrest, trauma, and respiratory distress in 20 Ontario communities. This prospective cohort study included all adult cardiac arrest patients who were treated during the rapid defibrillation or ALS phases of the OPALS Study and who survived to 1 year. Patients were evaluated by telephone for a) 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), and b) the Cerebral Performance Category (CPC), a 5-point scale of function. Analyses included descriptive statistics with 95% CIs and the calculation of the HUI score using a computerized algorithm. RESULTS: During 1994–98, 5,188 consecutive cardiac arrest patients were enrolled with an overall discharge survival rate of 5.2%. This prospective cohort sub-study included 148 one-year survivors: mean age 64.1 (range 16–94), bystander-witnessed 62.2%, EMS-witnessed 21.6%, citizen or fire-initiated CPR 56.1%, initial rhythm VF/VT 91.9%, and response to scene with defibrillator <8 minutes 98.3%. Only 14.2% of patients had a "moderate or severe" CPC disability score. The mean HUI score was 0.82 (SD 0.18) which compares favourably to the general population (0.85) or to those not limited by chronic disease (0.91). CONCLUSIONS: This represents the largest study of out-of-hospital cardiac arrest one-year survivors. Our results clearly demonstrate that these patients have excellent quality of life with very few functioning at a poor level.

015 A prospective assessment of electrocardiogram interpretation in a pediatric emergency department.
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OBJECTIVE: To assess the accuracy of electrocardiogram (ECG) interpretation in a pediatric emergency department (PED). METHODS: Prospective, descriptive study. Using 2 pediatric cardiologists as the gold standard, the PED interpretation of ECGs was compared for 4 outcomes: abnormal rhythms, corrected QT (QT_c) interval, chamber enlargement/hypertrophy and ECG quality. RESULTS: 200 ECGs were done over 6.5 months. Main indications for ECGs were chest pain, syncope and other reasons. Eighteen (9%) ECGs were incomplete: 182

(91%) were included in the study. Eight of 18 (44%) abnormal rhythms were not recognized (atrial arrhythmias, ventricular ectopy, and junctional escape rhythms). Of 101 (50.5%) calculated QT_c intervals, 36 (18%) were incorrect. Thirteen of 13 cases of chamber enlargement or hypertrophy based on age-related criteria were not noted. Four of 4 cases of limb lead reversals were not recognized. CONCLUSIONS: This study demonstrates that non-cardiologist interpretation of pediatric ECGs is poor. Because ED physicians are infrequently required to interpret pediatric ECGs, maintenance of this skill is difficult. Pediatric age-related computer programs would likely enhance the accuracy of pediatric ECG interpretation for QT_c measurement and chamber enlargement, however, correction of deficiencies in recognition of arrhythmias and technical problems will require a concerted training program.

016 Predictive value and interobserver agreement in prehospital 12-lead electrocardiograms.

Christenson J, Ramji A, Marsden J, Ward J, Carerre R, Thompson C. St. Paul's Hospital, Vancouver, BC.

Rapid and accurate ECG diagnosis of AMI is essential to minimize delays in thrombolytic administration.

OBJECTIVE: To asess interobserver variability, sensitivity, and specificity for the diagnosis of AMI. METHODS: A prehospital 12-lead ECG was obtained on 180 patients with chest pain. Two emergency physicians (EP1 and EP2) and 2 cardiologists (C1 and C2) provided a retrospective, independent, blinded interpretation of each prehospital ECG. We determined Kappa values for acute ischemic syndrome (AIS), AMI and ECG criteria for thrombolytic therapy for each pair. We calculated sensitivity and specificity for the discharge diagnosis of AMI for each interpreter. RESULTS: Of the 180 patients: 37 (20%) had AMI, 60 (30%) had angina and 11 (6%) were considered eligible for thrombolytics by ECG criteria by the attending EP. Sensitivity for AMI ranged from 35.1% to 56.8%. Specificity range from 73.2% to 86.6%.

	AMI		AIS		Thrombolysis Eligible	
Pairs	% agree	Kappa	% agree	Kappa	% agree	Kappa
C1 vs. C2	71.9	.45	75.6	.49	84.0	.55
EP1 vs. EP2	67.8	.49	73.2	.49	83.5	.57
C1 vs. EP1	70.2	.48	70.6	.42	78.4	.41
C1 vs. EP2	79.8	.57	80.2	.61	80.1	.43
C2 vs. EP1	69.8	.46	74.2	.49	80.1	.48
C2 vs. EP2	68.2	.39	71.3	.42	79.0	.43

CONCLUSION: Sensitivity and specificity of the prehospital ECG for the diagnosis of AMI varies between observers. Inter-observer agreement of ECG interpretation is good, but not excellent.

017 Can patients with renal colic be safely discharged from the emergency department without an imaging procedure?

Lee S, Dubinsky I. University of Toronto, Toronto, Ont.

OBJECTIVES: To determine the necessity for diagnostic imaging (DI) in the management of renal colic in the emergency department (ED). METHODS: A prospective cohort study was conducted at a two-site university hospital ED from July 1997 to February 1999. Patients presenting with acute flank pain and suspected urinary tract obstruction were enrolled. All patients underwent DI using unenhanced computer tomography (CT) or intravenous pyelogram (IVP) based on radiologists' preference. Imaging results were confirmed by a radiologist. Analgesics were given using a medication protocol. Patient symptom relief was recorded using a visual analogue scale. Results were analyzed for resolution of patient symptoms, discharge status, and whether DI results influenced physician decision-making. RESULTS: Two hundred and thirty-six patients were enrolled. DI was positive for ureteral pathology in 192 patients, 140 (CT) and 52 (IVP). DI changed physician management in 11 cases. Eight cases were admitted for complete obstruction with ongoing pain (3) and obstructive pyelonephritis (5). DI facilitated discharge in 2 cases due to confirmed pyelonephritis with no obstruction. One case required further investigations alternative diagnoses. Three patients had positive CT abnormalities with other diagnoses, with 1 requiring admission. Forty-one patients had negative results and were discharged. All renal colic patients with no fever and pain relief were discharged. CONCLUSIONS: Urgent DI is not necessary in most cases of renal colic. Patients that present with a history and physical exam compatible with renal colic who are afebrile and adequately pain controlled can be safely discharged with close follow up for outpatient evaluation. In the presence of ongoing pain and fever, complete obstruction must be ruled out.

018 CKMB and myoglobin diagnostic parameters vary with chest pain duration.

Innes G, Christenson J, Gibler B, Weaver D, Hoekstra J, Liu T. St. Paul's Hospital, Vancouver, BC.

OBJECTIVE: To define sensitivity, specificity, and likelihood ratios (LR) for 0 and 1 hour CKMB and myoglobin (Myo) levels in ED patients with nondiagnostic ECGs, stratified by chest pain duration. METHODS: A multicenter observational study. Patients >25 years with chest pain and nondiagnostic ECGs were stratified by pain duration (0–4, 4–8, 8–12, >12 hrs). CKMB and Myo assays were drawn at T = 0 (ED exam) and T = 1 hour. Patients were followed for 1 week to identify all cases of AMI. RESULTS (Table 1): Overall, 565 of 5005 patients had AMI. Both assays were insensitive in patients with 0–4 hours of pain. CKMB was as sensitive as Myo in patients with >4 hours of pain. Sensitivity increased with pain duration but no combination of tests achieved 90% sensitivity in any patient strata. Specificity ranged from .96 to .98 for CKMB and .87 to .93 for Myo. CONCLUSION: Myo assays add little to CKMB alone. These markers used alone, paired, or in series (0+1 hr) do not rule-out AMI regardless of chest pain duration. Likelihood ratios presented will help physicians who use

Table 1

		T = 0 hr assay				T = 1 hr assay				0 + 1 hr assays			
CP dur'n at T = 0		0–4	4–8	8–12	>12	0–4	4–8	8–12	>12	0–4	4–8	8–12	>12
CKMB	Sens.	.28	.56	.73	.73	.38	.63	.77	.76	.40	.62	.76	.76
	LR(+)	9.3	19	24	37	12.7	32	19	25	10	21	19	25
	LR(–)	.74	.45	.28	.28	.64	.38	.24	.25	.62	.39	.25	.25
MYO	Sens.	.39	.61	.63	.65	.60	.67	.69	.64	.61	.72	.73	.70
	LR(+)	4.3	8.7	7	5.9	7.5	9.6	7.7	6.4	6.1	9	7.3	5.4
	LR(–)	.67	.42	.41	.39	.43	.35	.34	.40	.43	.30	.30	.34

Bayesian analysis to determine post-test AMI likelihood.

019 Derivation of the "Canadian C-spine Rule" for the use of cervical spine radiography.

Stiell IG, Vandemheen K, Lesiuk HJ, Wells GA, McKnight RD, Brison R, Cass DE, Dreyer J, Eisenhauer MA, Greenberg GH, MacPhail I, Reardon M, Verbeek PR, Worthington JR, Laupacis A. Division of Emergency Medicine and Clinical Epidemiology Unit,

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OBJECTIVES: To develop a highly sensitive clinical decision rule for the use of cervical spine radiography in alert, stable trauma patients, as part of the Canadian CT Head and Cervical Spine (CCC) Study. METHODS: This prospective cohort study was conducted in 10 Canadian EDs and involved adult trauma patients who were at risk for neck injury, had stable vital signs, and a GCS score of 15. Physicians completed a 20-item data form for each patient and performed interobserver assessments when feasible. Patients underwent radiography, CT, and telephone followup to determine clinically important cervical spine injury. Variables correlated with the outcome on univariate analysis and having kappa values ≥0.6 were then assessed by recursive partitioning multivariate analysis. RESULTS: Among 8,015 patients enrolled over 26 months, 125 (1.6%) were determined to have a clinically important injury, including fracture (119), dislocation (20), and ligamentous instability (8). 31 variables demonstrated a univariate *p*-value <0.05 and 12 had kappa values ≥0.06. From these, multivariate analysis led to the final model. The "Canadian C-Spine Rule" states that cervical spine radiography is only required for patients: 1) age 65 or greater, 2) who have paraesthesias, or 3) who are unable to exhibit active rotation 45° left and right. Range of motion is assessed in all low risk patients (simple rear-end MVC, ambulatory at any time, or upright position) and all other patients without midline bone tenderness. This rule demonstrates a sensitivity of 100% (95% CI 97–100%), a specificity of 47.3% (95% CI 46–48%), and the potential to reduce radiography by 25–50%. CONCLUSIONS: The derived "Canadian C-Spine Rule" is highly sensitive for clinically important cervical spine injuries. Prospective validation is required prior to widespread clinical use.

020 A prediction rule for safe early discharge of patients given naloxone for presumed opioid overdose.

Christenson J, Etherington J, Pennington S, Wanger K, Fernandes C, Grafstein E, Innes G, Spinelli JJ, Gao M. St. Paul's Hospital, Vancouver, BC.

Despite recommendations to observe patients with opioid OD for 12–24 hours, early discharge of some is safe. OBJECTIVE: To develop a clinical prediction rule for safe discharge 1 hour after naloxone. METHODS: A prospective, observational study of 573 presumed opioid ODs in a tertiary, urban hospital. One hour after naloxone administration, potential clinical predictor variables were recorded. Based on patient outcomes, assessors blinded to predictor variables categorized each patient into needing further hospital intervention or not. Predictors with acceptable inter-observer reliability and univariate significance were used to develop a clinical prediction rule using logistic regression, regression trees and clinical expertise. RESULTS: Predictors of the need for further hospital intervention were: age ($p = 0.08$), number of naloxone doses ($p = 0.004$), total naloxone dose prior to 1 hour assessment ($p < 0.001$), RR ($p < 0.001$), GCS ($p < 0.001$), temperature ($p = 0.002$), HR ($p = 0.38$), SysBP ($p = 0.01$), O_2 sat ($p < 0.001$), gender ($p = 0.02$), type of narcotic ($p = 0.001$), opioid route ($p = 0.004$), accidental OD ($p = 0.001$), clear response to naloxone ($p < 0.1$), ability to mobilize independently ($p = 0.001$), neurologic findings ($p = 0.001$), and witnessed seizure (0.07). A rule including any of: problem mobilizing, O_2 sat <92%, RR >20 or <10, temp >37.5 or <35.0, HR >100 or <50, GCS <15, identified patients needing further hospital care with 99% sensitivity (95% CI, 0.94–1.0) and 40% specificity (95% CI, 0.36–0.45). Using this rule, 192 patients were identified who could be safely discharged at 1 hour. One patient who required further naloxone for RR = 6 was misclassified. CONCLUSION: A clinical rule can predict safe early discharge after naloxone for presumed opioid OD. Validation of the rule is in progress.

021 Safe early discharge of patients after naloxone for presumed opioid overdose.

Etherington J, Christenson J, Pennington S, Wanger K, Fernandes C, Grafstein E, Innes G, Spinelli JJ, Gao M, Lahiffe B. St. Paul's Hospital, Vancouver, BC.

After naloxone reversal of opioid-induced respiratory failure, 12 to 24 hours of observation is recommended. OBJECTIVE: To determine the safety of early discharge of patients given naloxone for presumed opioid OD. METHODS: This prospective, observational study in a tertiary, urban hospital evaluated a cohort of 573 patients from May 1997 to August 1998. We collected demographic, physiologic and treatment data and used hospital records, phone calls, and data base searches to categorize each patient according to explicit outcome criteria. RESULTS: Mean age was 35.7 ± 0.4 years. 82.4% were male. 85.9% admitted to heroin use. Naloxone was administered prehospital in 513 (90.0%), in the ED in 132 (23.2%) and both in 74 (12.9%). The route of naloxone was SC in 504 (88.0%), IV in 133 (23.2%) and both in 74 (12.9%). The mean total naloxone dose was 0.93 ± 0.02 mg. Median LOS was 2.12 hours. LOS was <2 hours in 278 (48.5%) and 2–4 hours in 130 (22.7%). The final reason for decreased LOC was solely opioid OD in 422 (74.3%), opioid OD plus other reasons (primarily alcohol and other drugs) in 106 (18.7%), and not opioid OD in 40 (7.0%). Six patients developed ARDS and 95 required hospital interventions more than 1 hour after initial naloxone dosing. Interventions included repeat naloxone (60), assisted ventilations (13), supplemental O_2 for hypoxia (80), IV antibiotics (15), fluid bolus (19), inotropes (2), antiarrhythmics (1), surgical procedure (1), bicarbonate (1), charcoal for life-threatening OD (9). No discharged patients died within 24 hours. 5 patients returning within 24 hours and requiring naloxone admitted to repeat opioid use. CONCLUSION: The early discharge of many patients after opioid overdose is safe. A clinical decision rule to predict patients safe for discharge is needed.

022 A clinical decision rule for the use of CT head in patients with minor head injury.

Stiell IG, Lesiuk HJ, Vandemheen K, Worthington JR, Verbeek PR, Reardon M, McKnight RD, MacPhail I, Greenberg GH, Eisenhauer MA, Dreyer J, Cass DE, Brison R, Wells GA, Laupacis A. Division of Emergency Medicine and Clinical Epidemiology Unit, University of Ottawa, Ottawa, Ont.

OBJECTIVES: As part of the Canadian CT Head and Cervical Spine (CCC) Study, the objective was to develop a clinical decision rule for the use of head CT in patients with minor head injury. METHODS: This prospective cohort study included adults with documented loss of consciousness, amnesia, or confusion and a GCS score of 13–15. Physicians in 10 Canadian teaching hospital EDs completed a 22-item assessment form prior to CT scan. In some cases a 2nd physician performed an interobserver assessment. The outcome standard, clinically important brain injury, was determined by CT and a 14-day telephone interview. Analyses included the kappa coefficient, appropriate univariate tests, and chi-square recursive partitioning. RESULTS: The 1,719 patients in the study had these characteristics: mean age 38.3 (range 16–96); male 69.2%; GCS scores: 13 – 3.2%, 14 – 15.1%, 15 – 81.7%; transfers 11.3%; mechanisms: fall– 33.0%, MVC– 28.3%, assault– 10.9%, sports– 7.6%; admitted 25.8%; abnormal CT 9.6%; clinically important brain injury 7.7%; neurological intervention 1.1%; craniotomy 0.8%. A rule with the following 4 factors would have 100%

sensitivity (95% CI 82–100%) and 56.3% specificity (95% CI 54–59%) for predicting neurological intervention: a) initial GCS score 13, or 14 and <15 by 4 hours, or decreases at any time, b) age ≥55, c) exam unreliable due to intoxication, or d) amnesia before impact >30 minutes. Adding 4 additional factors would give 100% sensitivity (95% CI 97–100%) and 40.6% specificity (95% CI 38–43%) for predicting important brain injury: e) witnessed loss of consciousness >15 minutes, f) object recall <3/3, g) repeated vomiting, or h) signs of basilar skull fracture. CONCLUSIONS: This study has derived a highly sensitive decision rule for use of CT Head in minor head injury. The rule should be prospectively validated before clinical use.

023 Intravenous beta-agonists in acute asthma: a systematic review of the literature.

Travers A, Jones AP, Kelly KD, Barker S, Camargo CA Jr, Rowe BH. University of Alberta, Edmonton, Alta.

OBJECTIVES: The role of intravenous beta agonists (IVB) in patients with acute asthma is controversial. The objective of this study was to determine the benefit of IVB for patients treated in the emergency department (ED) with acute asthma. METHODS: Randomized controlled trials (RCTs) were identified using the Cochrane Airways Review Group database, hand searching, and reference list review. Studies where IVB were compared to placebo and/or standard care for acute asthma were considered and pooled using weighted mean differences (WMD) or odds ratios (OR) with 95% confidence intervals (95% CI). RESULTS: From 976 identified references, fifteen trials were included; a total of 584 patients have been studied. All studies were from centers outside North America, published between 1974 and 1997, and involved severe acute asthma. Peak expiratory flows (PEFR) were unchanged following IVB compared to all other treatments at 60 minutes (WMD: 20.6; 95% CI: –7.4, 48.6) and 120 minutes (WMD: –1.3; –21.4, 18.9). Overall, no patient subgroups demonstrated significant PEFR improvements. In the highest quality studies, heart rates were higher 120 minutes following IVB compared to all other treatments (WMD: 8.9, 95% CI: 1.4, 16.4); there was also a trend towards more autonomic side effects with IVB use (OR: 2.25, 95% CI: 0.5, 10.4). CONCLUSIONS: Current evidence does not support the use of IVB in ED patients with severe acute asthma. Since no subgroups were identified in which its use should be considered, and side effects appear more pronounced with its use, IVB use should be restricted. Future acute asthma research should focus on other treatment options.

024 A comparison of vasopressin versus epinephrine for in-hospital cardiac arrest.

Stiell IG, Hebert PC, Wells GA, Vandemheen K, Tang ASL, Dreyer J, Higginson LAJ, Weitzman BN. Division of Emergency Medicine and Clinical Epidemiology Unit, University of Ottawa, Ottawa, Ont.

OBJECTIVES: To compare vasopressin and epinephrine for the survival of in-patient cardiac arrest and to determine the potential for conducting a large definitive trial. METHODS: This triple-blinded randomized controlled trial was conducted in the EDs, critical care units, and wards of 3 Canadian teaching hospitals. Adults who suffered cardiac arrest and required epinephrine were randomly allocated to receive either vasopressin 40 units or epinephrine 1 mg at the point of first epinephrine administration according to AHA ACLS protocols. The primary outcomes were survival to hospital discharge and to 1 hour and neurological function according to a modified mini-mental state exam (MMSE) and the Cerebral Performance Category (CPC) scale. The sample size of 200 for this preliminary trial offered 80% power to detect a 20% absolute difference in survival to 1 hour. The hypothesis of improved survival with vasopressin was tested using the chi-square test with calculation of 95% CIs for the absolute increase in survival (AIS). RESULTS: 201 patients were enrolled and the 104 vasopressin and 97 epinephrine group patients were similar for all clinical and demographic characteristics. Comparing vasopressin to epinephrine: survival was not different for hospital discharge (11.5% vs. 13.4%; $p = 0.69$; 95% CI for AIS −11.6% to 7.8%) or for 1 hour (38.5% vs. 35.1%; $p = 0.62$; 95% CI for AIS −10.5% to 17.3%); the status of survivors was not different for mean MMSE scores (33.9 vs. 34.6; $p = 0.75$) or for median CPC scores (1 vs. 1); survival in the myocardial ischemia subgroup ($n = 67$) was better for vasopressin: discharge (9.7% vs. 0%; $p = 0.06$) and 1 hour (32.3% vs. 11.1%; $p = 0.03$). CONCLUSIONS: This study demonstrated no overall benefit from vasopressin. The value of vasopressin for patients with myocardial ischemia should be prospectively evaluated in clinical trials.

025 Screening for iron-deficiency in the paediatric emergency department.

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BACKGROUND: The American Academy of Pediatrics recommends routine screening of all children for iron deficiency (ID). Routine Canadian practice is to screen only high-risk infants. The group at highest risk for iron-deficiency, children 6–36 months of age, is also the group most likely to present to the emergency department (ED) for evaluation of fever and to have a complete blood count (CBC) done. OBJECTIVE: The objective of this study was to (a) determine the prevalence of ID in children having a CBC performed during an ED visit and (b) to determine whether the diagnosis of iron deficiency is being missed in the ED. SETTING: A tertiary care pediatric ED. METHODS: For the 2-month period Jan–Feb 1999, the CBC results of all children 3–36 months of age were examined. Children with low mean corpuscular volume (MCV ≤72 fl) were identified and a subset of their charts reviewed to see if the treating physician had considered iron deficiency by either documenting arrangements for further tests or by treating the patient with any form of iron. RESULTS: During the study period, there were 4214 patient visits by children 3–36 months of age for whom 419 CBCs were performed. The MCV was low in 66 (16%). Thirty charts were reviewed. Patients with low MCVs rarely had further blood testing arranged (3/30; 10%) or any form of iron therapy prescribed (1/30; 3%). Even markedly decreased MCV (<65 fl) were not addressed 8 of 10 times.

	Total	Further lab tests	Iron prescribed
MCV low	30	3	1
MCV low and RDW high	26	3	1
MCV low, Hgb low, RDW high	4	0	1

CONCLUSIONS: Though our study is prone to under-reporting the sensitivity of current screening, it is likely that, in a PED staffed by pediatricians, a significant number of cases of iron deficiency are being missed.

026 Comparison of Canadian vs. US emergency department visits for acute asthma.

Rowe BH, Bota GW, Pollack E, Pollack CV, Clark S, Emond SE, Camargo CA Jr. University of Alberta, Edmonton, Alta.

OBJECTIVE: To compare ED visits for acute asthma in Canada vs.

USA. METHODS: Prospective cohort study at 77 North American EDs (8 Canadian, 69 US) during 1997–98, as part of the Multicenter Asthma Research Collaboration. Inclusion criteria were physician diagnosis of acute asthma and age 2–54. RESULTS: Of 3031 enrolled patients (pts), 155 (5%) were seen in Canadian EDs. Canadians, compared to their US counterparts, were more likely to be white (88% vs. 19%; $p < 0.001$), have insurance (100% vs. 75%; $p < 0.001$), and have a primary care provider (90% vs. 75%; $p < 0.001$). Pts in Canada were more likely to be using inhaled steroids (ICS – 59% vs. 34%; $p < 0.001$). US pts presented with more severe asthma (as measured by pulmonary index in children or PEFR in adults) than Canadians ($p < 0.001$). The use of β-agonists was similar between the groups, while use of ipratropium bromide use was higher in Canada (77% vs. 26%; $p < 0.001$) and use of systemic steroids was higher in the USA (69% vs. 78%; $p < 0.001$). Canadian sites tended to admit fewer pts overnight (12% vs. 22%; $p < 0.01$) but they were more likely to keep pts in the ED for 6+ hours (23% vs. 7%; $p < 0.001$). Designating prolonged ED stays as "admissions" removed any apparent difference between Canadian and US admission rates (26% vs. 25%; $p = 0.75$). Systemic corticosteroids were similarly prescribed at discharge ($p = 0.03$), but ICS use was higher in Canadian pts (65% vs. 24%; $p < 0.001$). CONCLUSIONS: Among pts presenting to the ED with acute asthma, Canadians were more likely to be on preventive medications. Canadians presented with less severe asthma, were treated less aggressively while in the ED, but were more commonly prescribed ICS at discharge. These findings help to explain reported differences in asthma admission and relapse rates between Canada and the USA.

027 The single storey family dwelling versus the condo: the effect of vertical access on emergency medical service response time.

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OBJECTIVES: To determine: 1) if the time interval between ambulance arrival at the scene to paramedic arrival at the patient ("vertical response" time interval) in high-rise buildings is significantly longer than in houses; 2) the barriers encountered by paramedics in responding to emergency calls in high-rise apartment buildings; and, 3) the effect of barriers to paramedic access to patients on this time interval. METHODS: A prospective, single blinded, observational study. 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 42 calls was 109 seconds (interquartile range, 76.5 to 198.5 seconds) and represents 25% if the total EMS response time. Vertical response time for emergency calls originating from apartment buildings ($n = 17$) were significantly prolonged in comparison to those from houses ($n = 10$) (median 198.5 seconds vs. 79 seconds, $p < 0.001$. The median vertical response interval for apartment buildings where EMS calls originated ≤2 floors above ground was 157.5 seconds (137.3 to 215.5 seconds). The most common barriers encountered were the need for an entry code to enter the building (88.2%) and the elevator was too small to fit stretcher in prone position (82.4%). In potentially life-threatening (delta priority), median vertical response interval times in apartment buildings ($n = 6$) were significantly longer than in houses ($n = 6$) (218.5 seconds to 80.0 seconds), $p < 0.001$. CONCLUSIONS: The vertical response interval represents a significant component of the total EMS response time and is significantly longer for calls originating in apartment buildings. Barriers impeding paramedic access to patients significantly prolong this interval. The increased response time due to vertical access significantly impacts on time to treatment in the highest priority calls where delay has been shown to effect outcome.

028 Time to recurrent ventricular fibrillation or ventricular tachycardia after defibrillation.

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OBJECTIVES: Early defibrillation is the cornerstone of prehospital treatment of ventricular fibrillation and pulseless ventricular tachycardia (VF/VT). Current American Heart Association protocols recommend immediate rhythm analysis following defibrillation by semi-automated external defibrillators (SAEDs), with no delay for even a pulse check. If SAED analysis recommends "no shock indicated" after the 5 to 15 second analysis period, personnel proceed to intubation or CPR, delaying further analysis and defibrillation by 1 to 3 minutes. No study to date has determined the optimal timing of rhythm analysis after defibrillation, given that patients will often show electrical silence or marginally organized electrical activity in the period immediately following defibrillation. The present study looks at the time to recurrent VT/VF after defibrillation in the prehospital setting. METHODS: This is a retrospective analysis of all available rhythm strips from prehospital resuscitation attempts where VT/VF recurred within 3 minutes of defibrillation. Two blinded cardiology fellows measured the time to recurrent VT/VF after each defibrillation. RESULTS: Over the 18-month study period, 223 tapes met the inclusion criteria. 16% of VT/VF recurred by 5 seconds after defibrillation, 50% by 30.5 seconds, and 75% by 61 seconds. CONCLUSIONS: 84% of VT/VF recurred more than 5 seconds after defibrillation and were therefore missed when using current SAED protocols. Prehospital SAED protocols may need to be redesigned taking these results into account.

029 The use of systemic beta-agonist in acute asthma in North American EDs.

Travers A, Rowe BH, Clark S, Camargo CA Jr, University of Alberta, Edmonton, Alta.

OBJECTIVES: Little is known about the epidemiology of the use of systemic (non-inhaled) β-agonists in North American emergency departments (EDs). This study examines the prevalence of systemic (intravenous: IV, subcutaneous: SC, intramuscular: IM, oral: PO) β_2-agonist use for acute asthma in North American EDs and the factors associated with their use. METHODS: This prospective cohort study was performed in 77 North American EDs affiliated with the Multicenter Airway Research Collaboration (MARC). Acute asthmatics, aged 2–54, presenting to the ED were interviewed during their visit and by telephone 2 weeks later. Care was left to the discretion of the treating ED physician. RESULTS: Of 4099 eligible patients, 3031 were enrolled in the study (74%); 1,847 were adult (18–54) and 1,184 were children (2–17). Overall, 5% (144/3031) received systemic β_2-agonist: 117 (81%) within, and 27 (19%) prior to ED arrival. No patients received IV β_2-agonist. Univariate analysis demonstrated that adults receiving SC β_2-agonist required more frequent inhaled treatment (4 vs. 3 during their stay, $p < 0.05$), more systemic corticosteroids (92% vs. 67%, $p < 0.05$) and stayed longer in the ED (243 minutes vs. 180 minutes, $p < 0.05$). Finally, admission rates were higher in the SC group (80% vs. 54% in adults and 77% vs. 46% in children, $p < 0.05$). Multivariate analysis of patient characteristics revealed that increasing age (OR 1.2 per 10 years, 95% CI: 1.0–1.3), use of oral β_2-agonist in the past 4 weeks (OR 1.8, 95% CI:

1.1–2.9), high severity scores (OR 3.3, 95% CI: 1.8–6.1), and ED length of stay (OR 1.1, 95% CI: 1.0–1.2) were independent predictors of systemic β_2-agonist use. CONCLUSIONS: The use of systemic β_2-agonist in North American EDs is uncommon, and most frequently seen in patients with more severe exacerbations of asthma. Clinicians and researchers should re-evaluate the role of systemic agents.

030 The reliability of diagnostic codes used in a customized in-house emergency medicine database — the New Emergency Resource Database (NERD).

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BACKGROUND: Few Canadian emergency departments (EDs) capture electronic patient data and specifically lack computerized discharge diagnostic codes. The New Emergency Resources Database (NERD) at St. Paul's Hospital ED is a customized in-house, software package that combines a Web-based Oracle database (diagnostic, acuity, and procedural data) with the hospital's ADT system (demographic data) to capture a complete data "picture" of each patient. The NERD system captures ED specific diagnostic codes (subset of ICD-9 CM) from a pull down menu that are grouped into 14 general diagnostic categories. The procedural and physician-derived acuity codes are based on British Columbia MSP billing codes. All diagnostic, acuity, and procedural data is physician entered. OBJECTIVES: To assess the reliability of the physician-entered emergency department ICD-9 CM codes and patient acuity levels. METHODS: Four randomly selected emergency physicians read 128 consecutive ED charts from a randomly selected day. Each physician assigned diagnostic, acuity and procedural codes. The kappa statistic (k) was used to calculate inter-rater reliability of the 4 emergency physicians. Sample sizes were chosen to give a k = 0.60 with a power of 0.8 and probabilities of type I and II errors of 0.05 and 0.2 respectively. RESULTS: The NERD data gathering process is reliable with k = 0.78 (95% CI 0.76–0.83) for all the codes in the study. The kappa value for physician assigned acuity codes was 0.61 (95% CI 0.53–0.70). CONCLUSION: Inter-rater agreement between physicians entering diagnostic codes was very good. This data suggest that the codes can be used for evidence-based medicine, outcome, or cost effectiveness studies. The limitations of this study include the inability to detect specific coding problems within diagnostic categories. The analytical method described can be refined to focus on specific categories or diagnoses. The reliability of physician entered acuity levels while satisfactory, should be improved.

031 A comparison of aggressive fluid resuscitation versus no fluid resuscitation in an animal model of blunt trauma.

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OBJECTIVE: To compare, in models of moderate and severe blunt trauma, the effect of fluid resuscitation on blood loss. METHODS: Twelve splenectomized, 20-kg pigs were entered into each of a moderate and a severe injury group. All animals were anesthetized for the entire experiment. Animals in the moderate injury group suffered a femoral fracture, blunt impact to the right upper quadrant and 2 liver lacerations. Animals in the severe injury group were subjected to the same injury with an additional liver laceration. All of the injuries were done simultaneously in a controlled, reproducible manner developed previously by the authors to simulate blunt trauma. After trauma simulation and a 15-minute "prehospital" phase, animals were randomized to either the treatment arm or the control group. Subjects not surviving the prehospital phase were excluded from the study. Animals in the treatment arm were resuscitated with two 20 ml/kg boluses of normal saline, followed by rapid infusion of pentaspan until their blood pressure returned to baseline. Control group animals were monitored, but no fluids were given. The primary endpoint of this study was blood loss, which was evaluated postmortem. Secondary endpoints of hematocrit, urine output, rate of blood loss, central venous and arterial blood pressure and mortality were also collected. RESULTS: In the moderate trauma group, blood loss in the resuscitated group was 1255 ml (+/–655) versus 346 ml (+/–145) in the control. For the severe trauma group, blood loss in the resuscitated group was 1802 ml (+/–426) versus 567 ml (+/–173) in the control. Rate of blood loss was higher in the treatment groups, as was urine output. Hematocrit was much lower in the resuscitated groups. There was a slight trend towards survival in the control groups, but no statistically significant difference. CONCLUSIONS: In this model of moderate and severe blunt trauma, fluid resuscitation significantly increased blood loss.

032 The effectiveness of inhaled corticosteroids in the treatment of acute asthma in the emergency department: a meta-analysis.

Edmonds ML, Camargo CA Jr, Pollack CV, Rowe BH. University of Alberta, Edmonton, Alta.

OBJECTIVES: Inhaled corticosteroid (ICS) use in asthma is increasing, and research suggests ICS and systemic corticosteroids (CS) should be considered different treatments. This systematic review was designed to determine the benefit of ICS for acute asthma in the emergency department (ED). METHODS: Randomised controlled trials (RCTs) were identified using the Cochrane Collaboration's Airways Review Group database, hand searching, bibliographies, pharmaceutical company and author contact. Studies in which an ICS was compared to placebo or any CS were considered. Relevance, inclusion and study quality were assessed independently by 2 reviewers. Trials were combined using odds ratios (OR) or weighted mean differences (WMD). RESULTS: From 396 identified references, 17 potentially relevant articles were identified and 7 were included. Six of the trials were published after 1994; overall, study quality was high. The trials were small, with the largest involving 111 patients. Four trials included only adults and 3 included only children. The severity of asthmatics included in the studies varied widely, as did the ICS and dose used. Two studies compared ICS to CS, 2 studies compared ICS plus CS to CS, and 3 studies compared ICS alone vs. placebo. Various outcome measures were used, including pulmonary function tests, clinical scores, admission rates and incidence of adverse side effects. Despite the marked differences in study characteristics, preliminary results suggest a homogeneous decrease in admissions in the group treated with ICS (OR 0.45, 95% CI 0.26, 0.76). CONCLUSIONS: Recent interest in the use of ICS in the ED has led to a number of small studies with disparate study characteristics. Individually, studies have not demonstrated a clear benefit with addition of ICS to standard therapy; however, pooled analyses suggest a beneficial effect of ICS. To clarify this issue, a large randomised controlled trial of ICS use in the ED is needed.

033 Meeting the educational needs of off-service residents rotating through the emergency department: comparing resident needs to educational outcome.

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OBJECTIVES: To determine the extent to which off-service residents rotating through a tertiary hospital emergency department (ED) are achieving both their own expectations and the educational expectations of their program directors. METHODS: A 144 item survey using a 5-point Likert scale was developed and given to off-service residents rotating through the ED both at the beginning and the end of their rotations. The survey was divided into 3 sections, ED presentations, skills and diagnoses. An identical survey was given to the trainees' program directors. Residents were grouped into 3 groups for comparison: medical trainees, surgical trainees and family medicine trainees. Comparisons were made using Wilcoxon rank sum tests. RESULTS: 25 trainees and 16 program directors were surveyed. Overall there were few differences between expectations and outcomes. We fell short of meeting the expectations of surgical trainees approach to resuscitation presentations (p = 0.02) and resuscitation skills (p = 0.03). Family medicine residents did not have their expectations met in managing orthopaedic diagnoses. Additionally, surgical program directors expectations were not met in the resuscitation presentations and skills sections (p = 0.02 and 0.03 respectively). CONCLUSIONS: Educational expectations of trainees are not always met in an emergency medicine rotation. Assessing the meeting of these expectations may be useful in designing alternative learning models for areas in which the expectation is not being met.

034 Low molecular weight heparin in the acute treatment of unstable angina: a systematic review.

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OBJECTIVES: To determine the effectiveness of low molecular weight (LMWH) compared to unfractionated (UFH) heparin in the treatment of adults who present to the emergency department (ED) with acute coronary syndromes (ACS). SEARCH STRATEGY: Studies were identified in EMBASE, MEDLINE and other computerized databases. Pharmaceutical manufacturers, primary authors and content experts were contacted to identify additional studies. Bibliographies from included studies, reviews and texts were searched. SELECTION CRITERIA: Randomized (RCTs) or quasi-randomized trials were eligible. Studies were included if patients presented with ACS (e.g., unstable angina or non-Q wave MI), were treated with UFH or LMWH, and either MI or death was reported. Two reviewers independently assessed studies for relevance, inclusion and methodological quality. DATA ABSTRACTION: Data were extracted independently and analyzed using Review Manager. RESULTS: Four trials were identified, with a total of 4831 patients (2446 LMWH; 2385 UFH). Patients receiving LMWH demonstrated a significant decrease in MI (odds ratio [OR] = 0.71; 95% confidence interval [CI]: 0.52, 0.97). Despite a trend, there was no significant decrease in urgent re-vascularizations in the patients receiving LMWH (OR = 0.77; 95% CI: 0.6, 1.0). There was no difference in recurrent angina (OR = 0.73; 95% CI: 0.47, 1.13) using LMWH. While LMWH caused less thrombocytopenia (OR = 0.65; 95% CI: 0.43, 0.97), major (OR = 0.92; 95% CI: 0.71, 1.21) and minor (OR = 0.91; 95% CI: 0.37, 2.2) bleeding problems were similar between treatments. A non-significant increase in deaths was observed using LMWH (OR = 1.63; 95% CI: 0.46, 5.74). CONCLUSIONS: Despite some encouraging results, evidence does not clearly support changing current practice from UFH to LMWH for the early treatment of ACS. Further research is pending to clarify this issue and the review will require updating.

035 A comparison of arterial and venous blood gases in 218 emergency department patients.

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OBJECTIVE: To determine if venous blood gas parameters (pH, P_{CO_2} & the resultant calculated HCO_3) accurately predict arterial values, rendering arterial puncture unnecessary. METHODS: 218 consecutive patients presenting to an academic emergency department were prospectively enrolled over 6 months. Eligible patients were those requiring arterial blood gas sampling (ABG) as determined by the attending physician or housestaff. Following verbal consent, arterial and venous samples were obtained. Recorded data included: age, sex, vital signs, oxygen saturation, medications, presenting complaint, discharge diagnosis, and indication for ABG. The database was analyzed using Excel & SPSS. RESULTS: 215 patients (98.6%) had arterial and venous sampling within 15 minutes; the remainder were within 40 minutes. The patient age range was 15–90, with an mean of 60.4. Pearsons R for arterial and venous pH = 0.913, P_{CO_2} = 0.921 & HCO_3 = 0.953 ($p < 0.001$ for all), illustrating high correlation. Paired t-tests reveal statistically significant differences: mean difference (arterial pH-venous pH) = 0.036, $p < 0.001$; mean difference (arterial P_{CO_2}-venous P_{CO_2}) = −6.18, $p < 0.001$; mean difference (arterial HCO_3-venous HCO_3) = −1.45, $p < 0.001$. Regression analysis provides the following equations: Venous pH = 0.84 (arterial pH) + 1.13; Venous P_{CO_2} = 0.89 (arterial P_{CO_2}) +10.84; Ven HCO_3 = 0.9 (arterial HCO_3) + 3.72. CONCLUSIONS: Arterial and venous blood gas values are very highly correlated. Mean differences between arterial and venous values are small, but statistically significantly different. Use of the regression equations to convert between the venous values and the more familiar arterial values enables the physician to accurately replace arterial puncture with less invasive venipuncture.

036 Underutilization of aspirin in acute myocardial infarction in the emergency room.

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OBJECTIVES: To review the use of aspirin (ASA) in the emergency room (ER) setting in cases of acute myocardial infarction (AMI). METHODS: All patient charts with a discharge diagnosis of AMI from the Hamilton General Hospital in 1997 were reviewed for ASA therapy. RESULTS: Of the 260 charts reviewed, 94 were excluded in total, as direct consults to specialists (28), inpatient AMI (6), and transfers from other hospitals (60). Of the 166 ER-admitted patents, 18 were treated with ASA by prehospital ambulance personnel (11%). From 148 remaining ASA-eligible patients in the ER, 3 were excluded due to documented contraindications. Of the 145 ASA-eligible patients, 13 were ASA-treated by consultants (9%), 92 were treated by ER physicians (63%), and the remaining 40 patients were not ASA-treated (28%). ASA was given in 2 of 5 thrombolysis situations (40%), and 2 of 6 arrest situations (33%). Mean ASA treatment times were 1.7 hours by ER physicians, and 4.8 hours by consultants. CONCLUSIONS: Aspirin, a critical intervention in mortality reduction in AMI, is being underutilized in the ER setting, despite the absence of contraindications. Aspirin is also underutilized in thrombolysis and arrest situations. When treated by consultants, there are significant delays in treatment time.

037 Polypharmacy, adverse drug related events and potential adverse drug interactions in elderly patients presenting to an emergency department.

Hohl CM, Dankoff J, Afilalo M, Colacone A, Unger B. McGill University, Montreal, Que.

OBJECTIVE: To document the incidence of polypharmacy, adverse drug related events (ADREs) and potential adverse drug interactions (PADIs) in the elderly on ED presentation. METHODS: A retrospective chart review was conducted on 300 randomly selected patients age 65 and older who visited the Jewish General Hospital ED between January 1 and December 31, 1998. ADREs were defined according to a standardized algorithm described by Bergman et al (1981.) PADIs were identified using a drug interaction database PharmVigilance. RESULTS: After excluding 17 patients with inadequate documentation 283 were left for review. Of these, 257 patients (90.8%) were on at least 1 prescription or over the counter medication, 13.1% were on 1, 23.7% were on 2 or 3, 22.6% on 4 or 5, 18.4% on 6 or 7 and 13.1% on 8 or more medications on presentation. Medication consumption ranged from 0 to 17 and averaged 4.2 ± 3.1 drugs per patient. ADREs accounted for ED presentation in 12.5% of all patients on medication. The most frequently implicated classes of medications were NSAIDs, antibiotics, anticoagulants, diuretics, hypoglycemics, beta-blockers, calcium-channel blockers and chemotherapeutic agents. We observed a trend towards higher admission rates in patients who presented with ADREs as opposed to individuals who presented for problems unrelated to medication use (43.8% vs. 30.3%.) We found a total of 144 PADIs in 89 (31.4%) of medication regimens. In patients who presented with an ADRE the likelihood of finding an additional PADI was 84%. CONCLUSION: ADREs were found to be an important source of morbidity in elderly patients presenting to our ED. In addition, we discovered PADIs in a significant proportion of our patients. Emergentologists must be vigilant in monitoring patients for medication related problems.

038 Interventions to decrease emergency department overcrowding: impact on emergency department return visits and hospital readmissions.

Afilalo M, Cardin S, Colacone A, Collet JP, Tselios C, Lang E, Kohn R, Grad W, Schull M, Guttman A, Dankoff J. SMBD–Jewish General Hospital, McGill University, Montreal, Que.

OBJECTIVE: To examine the impact of an ED overcrowding intervention on the rate of ED revisits and hospital re-admissions. METHODS: In September 1993, measures to reduce ED congestion were introduced at the SMBD–JGH. During the pre-intervention (PRE-I: August 1992 – July 1993) and the post- intervention periods (POST-I: October 1993 – September 1994), a systematic sampling technique was employed to identify ED (PRE-I: 870 and POST-I: 1009) and hospital discharges (PRE-I: 825 and POST-I: 927). Excluded from the sampling were obstetrical cases (30%). All hospital re-admissions and ED revisits within 7 days of discharge were reviewed and classified independently by 4 ED physicians split into 2 teams. RESULTS: A decrease in ED length of stay (LOS) was observed in the POST-I (13.8 hours vs. 6.8 hours, $p < 0.001$) with no negative effect on the rate of return (all returns to the ED [11.0% vs. 12.5%, $p = 0.33$], unplanned and related returns [6.8% vs. 6.1%], and avoidable returns [0.95% vs. 0.95%]). An increase in the number of frequent ED users (> 4 visits in the last 12 months: 4.6% vs. 7.1% $p = 0.02$) was noted. For patients discharged from hospital we observed a decrease in the mean LOS (9.3 vs. 7.9 days, $p < 0.001$) POST-I, and no difference in revisit rates (all returns 7.5% vs. 6.6%, $p = 0.45$; returns to the ED 5.2% vs. 5.3%; readmission rate 2.2% vs. 1.1% $p = 0.11$). Unplanned and related (4.8% vs. 4.4%) and avoidable (0.6% vs. 0.3%) returns decreased slightly POST-I. A small increase in the number of patients hospitalized more than twice (24.6% vs. 29.4% $p < 0.03$), and patients using the ED at least twice (23.4% vs. 29.7%, $p = 0.003$) in the last year was observed. CONCLUSION: Implementation of an intervention to control ED crowding does not necessarily lead to an increase in the ED revisits or hospital re-admissions.

039 Adequacy of over-the-counter acetaminophen dosing regimen in febrile children presenting to the ED.

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OBJECTIVE: To determine if the recommended over-the-counter (OTC) acetaminophen dosing regimen (age-based) provides an effective 10 mg/kg dose in febrile children under 12 years of age who present to the ED. METHODS: Chart review of ED visits from November 1, 1998, to February 28, 1999. All children less than 12 years of age with fever (temperature >38.0°C axillary or orally and >38.5°C rectally or tympanic) were included. The student *t*-test was used for statistical analysis and $p < 0.05$ was considered significant. RESULTS: 554/1983 (27.9%) children were included. 240/554 (41.5%) febrile children would receive less than 10 mg/kg of acetaminophen by OTC dosing regimen. By age group, those receiving less than 10 mg/kg were as follows: <4 months 40/50 (80%), 4–11 months 87/122 (71.3%), 12–23 months 61/166 (36.7%), 2–3 years 34/110 (30.9%), 4–5 years 6/54 (11.1%), 6–8 years 8/39 (20.5%), 9–10 years 2/10 (20%), and 11–12 years 2/3 (66.7%). Statistical significance was achieved in the less than 4 month age group: average dose was 8.0 mg/kg with 95% confidence intervals (7.3, 8.6), and in the 4–11 month age group the average dose was 9.3 mg/kg (9.0, 9.6). CONCLUSIONS: Many children receive less than an effective dose of acetaminophen using the OTC regimen. Particularly at risk are children less than 1 year of age. This underdosing by OTC acetaminophen preparations may potentially lead to excess utilisation of the ED by concerned parents.

040 The patient-centred method in the emergency department: Does it impact on patient perception?

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OBJECTIVES: To determine the frequency of use of the patient-centred method (PCM) in the emergency department (ED) and to assess the impact of the PCM on patient perception. METHODS: One hundred and twenty-one patient–physician interactions were prospectively observed and objectively evaluated using a previously validated scoring system. Demographic information was collected regarding patient age, marital status, and sex. Patients completed a survey regarding their encounter from which a patient perception score (PtPM score) was determined. Mean scores for objective use of the PCM (PCM score) were calculated. Correlation between PCM and PtPM was determined using multiple regression analysis. Data was analyzed using SPSS. RESULTS: The mean age was 41.3 years. Fifty-three percent of patients were married. Mean illness severity on a numeric rating scale from 0 to 10 (as judged by the emergency physicians) was 3.06. Forty-nine percent of patient interactions were patient-centered. Patient perception of the "patient centredness" of their encounters was 3.31 out of 4, on average. There was no significant correlation between PCM and PtPM. CONCLUSIONS: The PCM is used frequently in the ED. Patient perception of its use does not appear to be significantly correlated to objective measures of its use.

041 Adrenal insufficiency in critically ill ED patients in Taiwan: a pilot study.

Shin C-S, Bullard MJ, Chin T-F, Chen J-C, Liao H-C, Liaw S-J. University of Alberta, Edmonton, Alta.

OBJECTIVE: To determine the prevalence of low cortisol levels, and

percentage of adrenocortical insufficiency, among critically ill patients presenting to a tertiary care hospital ED. METHODS: A convenience sample of patients with severe sepsis (SIRS criteria + evidence of infection + evidence of at least 1 organ system failure) or acute myocardial infarction (elevated cardiac enzymes) presenting to a 110,000 visit, 3500-bed hospital ED were prospectively enrolled. As part of the laboratory test battery random serum cortisol levels were checked. An ACTH stimulation test was performed on any patient with random cortisols of <15 µg/dl. RESULTS: Of the 30 patients who met inclusion criteria and were enrolled in the pilot study, 23 had severe sepsis and 7 had an AMI. The average patient age was 62.7 ± 6.11 (SD) years and the male to female ratio was 1.7:1. Nine of 23 (39%) patients with severe sepsis had cortisol level of <15 µg/dl on arrival, along with 4 of 9 (44%) AMI patients. Hyponatremia and hypotension were not associated with low cortisols ($p > 0.05$); however, low cortisols were positively associated with herbal drug use ($p = 0.01$). A total of 13 (43%; 95% CI: 25, 65) patients had spot cortisols of <15 µg/dl and 2 (7%) did not respond appropriately to ACTH stimulation. CONCLUSION: The prevalence of low cortisol levels among this group of seriously ill patients is much higher than most literature would suggest. The relationship between reported herbal usage and cortisol suppression should be investigated to determine whether exogenous steroids are being used.

042 Improving staff compliance with an emergency department intranet.

Bullard MJ, Liaw S-J, Hu P-M, Chen J-C, Liao H-C, Hsu P-Y. University of Alberta, Edmonton, Alta.

OBJECTIVE: To evaluate the effect of personnel and procedural changes in improving computer utilization. METHODS: A retrospective database review. Patients presenting to a 110,000 visit, 3500 bed tertiary care center ED for the pre- and post-intervention periods, July to December 1994 and 1996 were compared for compliance and data entry accuracy. Four hundred randomly selected cases were then chosen from each time period and the charts and computer entries reviewed for concordance. Interventions included: 1) a clerk to assist in patient entry at triage, and completing computer dispositions for discharged patients; 2) keystroke requests for porters and old charts to simplify nursing work; and 3) computer log data used as objective measures for physician evaluations. RESULTS: The overall key-in rate rose from 58.32% in 1994 to 87.46% ($p < 0.0001$) in 1996. Vital sign accuracy improved from a mean of 86.47% to 92.32 ($p < 0.05$). Concordance between the chart and computer ED diagnoses were 94.5% in 1994 and 97% ($p = 0.079$) in 1996 and for chief complaint improved from 96.7% to 99% ($p = 0.027$). Completion of patient dispositions following the addition of the clerk rose from 60% to 89.2% ($p < 0.0001$). CONCLUSION: Computerized patient tracking was clearly enhanced by the addition of a clerk to monitor and assist in data entry. In addition an extended ED patient log as a measure of educational performance may increase compliance in parallel.

043 Diagnostic and treatment approaches to transient ischemic attacks (TIAs) in the emergency department.

Chang E, Kochanski P, Kelly KD, Rowe BH, Shuaib A. University of Alberta, Edmonton, Alta.

OBJECTIVE: To evaluate the investigation and treatment of patients with a discharge diagnosis of TIA in the ED. METHODS: A retrospective chart review was conducted in a tertiary care hospital with responsibility for neuroscience regional referrals. Consecutive ED charts with a discharge ICD-9 code of TIA during 1998 were selected for review. The charts were reviewed by 2 independent coders using a standardized data form. Data collection included: patient demographics, the character and length of the symptoms, and investigation and treatment approaches. RESULTS: 293 TIA charts were reviewed. The gender ratio was 1:1 with a mean age of 66 years. The majority of patients (75%; 95% CI: 70, 80) were initially evaluated by ED physicians; the remaining patients were seen directly by specialty services. The average length of time from symptom onset to arrival in ED was 6.3 hours and the average duration of symptom was 4.6 hours. Most of the patients had CT scan (79%; 95% CI: 74, 83), CBC (73%; 95% CI: 68, 78) and ECG (75%; 95% CI: 70, 80) in the ED. Carotid Doppler was performed in ED in 16% (95% CI: 12, 21)) or booked as an outpatient in 26% (95% CI: 21, 31) of patients. Most (67%; 95% CI: 62, 72) patients were referred to a neurologist or referred back to their primary care provider (12%; 95% CI: 7, 17). The majority of patients were discharged from the ED (75%; 95% CI: 70, 80). Among those who were discharged, anti-platelet or anti-thrombotic medications were not prescribed to 27% (95% CI: 21, 33) of patients. CONCLUSION: Practice variation exists with respect to the investigation and treatment of TIAs in this teaching hospital. Carotid Doppler investigation and use of anti-platelet therapy for patients with TIA are sub-optimal. Clinical practice guidelines and TIA rapid assessment clinics may change these results.

044 The incidence and analysis of paediatric injury in Trivandrum, Kerala, India.

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BACKGROUND: Injury is becoming the hidden epidemic in developing countries that are economically progressing to enter the global market; however, these countries are ill equipped to deal with this shift. Is this trend occurring in the pediatric population as well? OBJECTIVE: To determine the incidence of pediatric surgical admissions accounted for by injury at the SAT Hospital, a public, tertiary care pediatric hospital. To determine the 3 top causes of pediatric mortality in the surgical ward. To analyze injury and mortality by mechanism, organ system, severity, season and age. METHOD: Data including name, hospital file number, sex, age, incident date, location, and admitting and discharge diagnoses (ICD-9), AIS and ISS, admission and discharge date, length of stay, and mortality of all 1996 pediatric admissions and outpatient accident victims to the SAT Hospital were retrospectively collected. Data were analyzed by calculating the incidence of injury. Injury data was analyzed according to mechanism, organ system, severity, age, and month. Causes of mortality, mechanisms, and organ systems involved were also determined. RESULTS: Injury accounted for 20% of all pediatric surgical admissions, and was the second leading cause of mortality on the ward. The main mechanism of injury and mortality was motor vehicle accidents. The main cause of death was burns. The head and neck area was most frequently injured. There were no seasonal variations. Incidence of injury increased with age. Males were injured more than females. CONCLUSION: Injury accounts for a substantial proportion of morbidity and mortality in the pediatric population of Trivandrum, India. Efforts need to be directed for the prevention and treatment of pediatric injury in developing countries.

045 Are juvenile delinquents at risk in the wilderness?

Denny CJ, Schull MJ, Redelmeier DA. University of Toronto, Toronto, Ont.

OBJECTIVE: To compare adverse event rates between referred youth (RY) and voluntary youth (VY) participating in wilderness courses. METHODS: We identified all adolescents (age 14–18) attending outdoor education courses at a Northern Ontario wilderness school between 1996 and 1997. Individuals were classified as either referred for behavioural problems (RY), or attending on their own initiative (VY). A database was compiled consisting of all reported adverse events occurring while on course (injuries, illnesses, or behavioural incidents). RESULTS: Referred youth were less common than voluntary youth (187 and 510, respectively). The most common course activities were canoeing, rock climbing and white water kayaking. Adverse events were twice as common in referred youth as in voluntary youth (41% versus 19%, $p = 0.001$). The relative risk of adverse events in RY compared to VY was 2.16 (95% CI, 1.69 to 2.77). When analyzed independently, injuries, illnesses and behavioural incidents were also twice as likely to occur in RY as in VY. No deaths occurred in either group. All results were statistically significant and were also confirmed by Kaplan–Meier analyses. CONCLUSIONS: Referred youth are twice as likely to experience an adverse event during outdoor education courses as voluntary youth, despite both groups being removed from their home environments. To warrant putting these youth at risk, we must assess the efficacy of courses such as these. Furthermore, we must question whether simple interventions are able to modify socioeconomic gradients in health.

046 Practice variation in the management of cellulitis in the emergency department: a review of five urban centres.

Dong S, Kelly KD, Oland R, Holroyd BR, Rowe BH. University of Alberta, Edmonton, Alta.

OBJECTIVES: To examine the epidemiology of patients presenting to Canadian urban emergency departments (EDs) with a diagnosis of cellulitis and determine the extent of diagnostic and treatment practice variation among 5 sites. METHODS: From computerized provincial ED diagnosis information, 10% of charts from April 1, 1997, to March 31, 1998, were randomly selected for review. All 5 EDs in 1 urban region were sampled; physicians were unaware of the study when seeing patients. A standardized audit form was used to collect information pertaining to visits for the incident infection case. Cases were excluded if simple cellulitis was not the primary diagnosis or if procedures were initially required. RESULTS: A total of 416 adult charts were identified; mean age was 46 and 39% were male; 38% underwent a medical examination prior to the ED presentation. Cellulitis was most commonly located in the upper (41%) and lower (48%) extremities. Most cases were treated with intravenous cefazolin (58%; range among sites: 49%–66%). Each case required a median of 4 (IQR: 1, 9) ED visits. Some patients (14%) required an increase in dose (3%) or a change in antibiotic regimen (11%) during their treatment. Few patients (3%) required a second change in regimen. Specialist consultations were obtained in 6% of patients and few (7%) were hospitalized. The most common discharge prescription was oral cephalexin (62%). CONCLUSIONS: Considerable practice variation exists with respect to ED cellulitis management. These results suggest the need for the development of practice guidelines for the treatment of this common ED problem.

047 Practice variation in the diagnosis and treatment of deep vein thrombosis presenting to the emergency department: a call for practice guidelines.

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OBJECTIVES: To examine the presentation, diagnostic testing, and treatment of proven deep vein thromboses (DVT) presenting to the emergency department (ED) in a large urban centre. METHODS: Computerized records of all patients presenting to all 5 EDs in 1 regional health authority were searched to identify DVTs (ICD-9 code 451). Data were abstracted from charts by a single coder; physicians were unaware of the study at the time of patient presentation. A standardised audit form documented risk factors, diagnostic testing and treatment approaches. RESULTS: A total of 607 records were identified during the 2 years (1996–1997); 439 (72%) were proven DVTs. Gender ratio was 1:1; mean age was 58.1 years. Most patients (56%) presented primarily to the ED for assessment of leg symptoms. DVTs were located primarily in proximal veins (74%); isolated distal (25%) and isolated iliac (1%) vein DVTs were less common. Of 428 patients who had diagnostic testing performed, the use of venography was high (overall: 70%). Considerable diagnostic variation existed; initial ED investigation was more commonly venography (62%; range among the 5 sites: 33–82%) than ultrasound (38%; site range: 18–67%). Testing using D-dimers (overall 3%; range: 0–5%) was rare. Using multivariate analyses, hospital site, past history of PE, diabetes, and presence of calf edema were significant predictors of venogram use. All patients were hospitalised, with a median length of stay of 6 days. Most patients (78%; site range: 62–92%) received intravenous heparin and the overall use of low molecular weight heparin was rare (5%). CONCLUSIONS: Compliance with current diagnostic and treatment recommendations for DVT are low. Prospective, multi-centred studies are required to confirm this finding and guidelines may be required to reduce practice variation. In addition to improving care, the potential for resource savings exists.

048 The application of qualitative and quantitative methods in the development of paramedic occupational competency profiles.

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OBJECTIVES: To develop a new paramedic competency profile and perform a primary validation using qualitative methods. METHODS: Consumers were surveyed to identify their 3 top expectations of the ambulance service and paramedics given their need in an emergency situation. Discussions with cross Canada Paramedic focus groups were analyzed qualitatively to identify content themes and associated paramedic competencies. Concurrently, paramedic curriculum and related documents were used to create a paramedic competency profile. This draft profile was given to focus group participants. They were asked to score each competency on perceived frequency and importance using a 10-point Likert scale and assign a level of training to evaluate the skill or behaviour. RESULTS: The derivation of the instrument ensured face and content validity. The response rate was 64%. Of the 254 competencies, 236 were identified high in importance and 18 were scored as medium to low importance. In this latter group, 44% were Critical Care Transport related, 30% research and evidence-based medicine, and 26% routine miscellaneous items. The consumer and focus groups identified 6 content themes including "technical competence," "rapid response," "caring, compassion," "professional behaviour," "ability to stabilize/transport," and "calm/controlled/decisive." The competencies associated with these themes were scored high on importance ensuring a measure of concurrent validity. The paramedics suggested that most competencies should be evaluated in "preceptorship." Additional content from the focus group discussions

generated 46 new items that were added to the final draft competency profile. CONCLUSION: A paramedic competency profile has been developed and validated by a process involving consumer and paramedic focus groups and individual surveys. The paramedics identified clinical preceptorship as the key to achieving mastery.

049 Assessment of adverse outcomes during procedural sedation — What monitoring is necessary?

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OBJECTIVES: To determine the incidence and type of adverse outcomes, and the rate of naloxone and flumazenil use during procedural sedation. METHODS: All patients who undergo procedural sedation in this tertiary urban emergency department are fully monitored (cardiac, automatic BP, respiratory rate, and oxygen saturation) until alert and oriented. To capture all adverse events, a designated nurse records the monitoring data on a sedation record as the sedation procedure is occurring. A retrospective chart review of all procedural sedation records from July 1997 to December 1998 was undertaken. Age, reason for sedation, underlying medical problems, pre-procedure vital signs, nadir mid-procedure vital signs, use of and indication for reversal agent, and adverse outcomes were recorded. Adverse outcomes were defined as respiratory depression, cardiac arrest, BP <90 mm Hg systolic and/or <50 mm Hg diastolic, intubation, or arrhythmia. RESULTS: 274 procedural sedations were performed during this period. Mean initial BP was 131.9 ± 22.9 mm Hg systolic and 75.2 ± 13.9 mm Hg diastolic. Mean nadir BP was 115.9 ± 20.2 mm Hg systolic and 67.3 ± 14.4 mm Hg diastolic. Initial and nadir HR were similar. No cardiac arrhythmias or deaths occurred. 34 patients had a nadir BP <90 mm Hg systolic and/or <50 mm Hg diastolic. Overall, naloxone was used in 64 cases and flumazenil in 31 cases (3 received both). Of these, 23 patients were hypopneic (RR <8), 15 had excess drowsiness, and there was no obvious indication in 55 (normal VS.). Only 2 hypotensive patients received reversal agents. One septic patient with pneumonia and bilateral pneumothoraces received narcan and flumazenil for hypopnea and hypotension and was ultimately intubated for persistent hypoxia. The indications for reversal were questionable in the second case. CONCLUSION: No serious adverse events occurred in our series. More limited guidelines for cardiac monitoring and continuous blood pressure monitoring during procedural sedation may be safe and should be investigated.

050 Early report on emergency sternal intraosseous infusion in adults.

Grafstein E, Christenson J, Macnab A, Findlay J, Horwood B, Johnson D, Pollack C Jr, Robinson DJ, Rumball C, Stair T, Tiffany B, Whelan M, Boychuk B. University of British Columbia, Vancouver, BC.

OBJECTIVE: Intraosseous (IO) infusion into the adult sternum is now possible with the use of the F.A.S.T.1™ Intraosseous Infusion System (Pyng Medical Corp., Vancouver, BC). This report describes the success rates and complications in the first 50 patients. METHODS: Six emergency departments and 5 prehospital systems in Canada and the US provide prospective data on the use of the IO system. Indications include ≥18 years of age, urgent need for fluids or medications, and unacceptable delay or inability to achieve standard vascular access. Exclusions are previous sternal surgery or bone abnormality, small size, and nonviability or infected skin. This FDA approved device is a handheld introducer enclosing a bone probe to accurately reproduce the depth of bone penetration of a spring-loaded stainless steel tip attached to an infusion tube. RESULTS: Success rate for achieving vascular access was 84% overall, 74% for first-time users and 95% for experienced users. Of the 8 insertion failures, 5 were in patients described subjectively by the user as very obese, 1 had 3 previous sternotomies, and in 2 there was failure to penetrate the bone. Mean time to achieve vascular access was 83 seconds overall, 91 seconds for first-time users, and 72 seconds for experienced users. Flow rates of up to 80 ml/min were reported for gravity drip. Conscious patients who had IO insertion using a lidocaine protocol ($n = 9$) reported little or no pain during the insertion. No complications or complaints were reported at 2 month follow-up ($n = 11$). SUMMARY: Sternal intra-osseous infusion using the F.A.S.T.1 IO System provides rapid, safe and effective vascular access.

051 Single dose intravenous cefazolin and oral cephalexin compared to intravenous cefazolin for the treatment of cellulitis.

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OBJECTIVES: To compare the efficacy of an oral and an intravenous (IV) antibiotic regimen for the treatment of cellulitis in the ED. METHODS: This before-after controlled clinical trial included consecutive adult patients with cellulitis considered severe enough to warrant IV antibiotics by the attending physicians at this Canadian teaching hospital. Excluded were patients with sepsis, failure of oral therapy, cellulitis in a diabetic foot, otitis externa, or penicillin allergy. In the "before" period, December 1997 – April 1998, patients received the standard therapy of cefazolin 2 g IV bid until clinically improved. In the "after" period, December 1998 – April 1999, patients were treated with 1 dose of IV cefazolin 2 g and then cephalexin 500 mg orally qid until better. Patients were evaluated for "clinical failure," defined as any 1 of 7 poor outcomes. Outcomes were compared by the chi-square and Student's *t*-test as appropriate. RESULTS: The 71 patients in the IV group and the 32 patients in the oral group were similar for all baseline characteristics. Compared to the oral group, the IV group had a strong trend towards more treatment failures (18.9% vs. 32.4%; $p = 0.15$) and this included more patients with spread of cellulitis (15.6% vs. 18.3%), lymphangitis (0% vs. 2.8%), persistent pain (3.1% vs. 9.9%), hospitalization (0% vs. 5.6%), and lack of improvement (9.4% vs. 18.3%). The oral group had fewer ED visits per patient (3.0 vs. 4.5; $p < 0.001$) and fewer referrals to plastic surgery (0% vs. 12.7%) or to infectious diseases (0% vs. 1.3%). CONCLUSION: The oral antibiotic protocol for severe cellulitis reduced the number of ED visits and intravenous doses given without compromising patient outcomes and may actually be associated with better outcomes. This study confirms the safety of an oral treatment regimen for severe cellulitis in the ED.

052 A new clinical protocol for the management of atrial fibrillation in the emergency department.

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OBJECTIVES: To develop and prospectively validate a new clinical protocol for the management of atrial fibrillation (AF) in the emergency department (ED) in order to standardize physician practice and patient care, and to improve cost effectiveness. METHODS: We reviewed the literature pertaining to the ED treatment of AF and crit-

ically examined each trial with respect to patient population, randomization, sample size, blinding, and potential bias. We then reviewed 100 consecutive charts of patients presenting to our ED with a discharge diagnosis of AF. Data was compiled regarding therapy, disposition, and follow-up. The data was examined for consistency of therapeutic approach within our centre, as well as the relationship of such therapy to the evidence available. We subsequently designed a new evidence-based protocol. RESULTS: An ideal approach to AF in the ED was not apparent after critical review of the literature. With regard to our own centre, there was remarkable interphysician, and even intraphysician, variability in the management of AF. Specifically, there was wide variability in decisions regarding rate control agents, anticoagulation, and patient disposition and follow up. These issues were addressed in the design of our new protocol. CONCLUSIONS: Although ideal therapeutic options for ED treatment of AF are not clear from the available evidence in the literature, it is important that some consensus be reached. The approach to numerous elements of treatment varies remarkably within our ED. We plan to validate our protocol prospectively in the ED with respect to patient safety, physician preference, and cost effectiveness.

053 A comprehensive assessment of avoidability in a population of emergency department revisiters.

Lang E, Afilalo M, Colacone A, Dankoff J, Cardin S, Tselios C, Grad W, Kohn R, Schull M, Guttman A. SMBD–Jewish General Hospital, McGill University, Montreal, Que.

OBJECTIVES: To determine the rate of avoidability in a population of Emergency Department (ED) revisiters and describe a process through which these revisits can be systematically classified. METHODS: ED discharges on every 13th day over a 10-month period were screened and patients who returned to the ED within 7 days of their initial discharge were included in this study. Prior to the chart review process, a detailed classification system by which avoidable and unavoidable ED revisits could be designated was developed. A 4-member physician panel, split into 2 teams, independently reviewed the charts of patients who revisited in order to determine whether the revisits were scheduled or unscheduled (planned or unplanned); related or unrelated; and avoidable or unavoidable. Discordant determinations were later settled through a consensus process. The extent of independently determined concordance (prior to consensus) as to whether the revisits were unscheduled, related and avoidable are described using the Kappa coefficients. RESULTS: A total of 214 revisits were analyzed by the physician panel, of which 83 revisits were deemed after consensus to be scheduled (38%, k = 0.83). From the remaining 131 unscheduled revisits, 116 were similarly determined to be related to the index ED visit (89%, k = 0.62) and of those, 17 were felt by consensus to be avoidable (15%, k = 0.33). The percent of avoidable revisits in the population of revisters sampled was 8% (n = 17) by consensus and 13% (n = 28) when avoidability was determined independently. The most commonly identified reasons for avoidable revisits consisted of errors in diagnosis (9/17) or treatment (15/17), whereas expected evolution of disease (82/96) and patient related factors (44/96) were the most common reasons found for unavoidable revisits. CONCLUSION: Using a chart review methodology, only a small proportion of all ED revisits can be traced to errors in diagnosis or treatment identified at the index visit.

054 Geriatric air medical transport: a program review.

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OBJECTIVE: The purpose of this study was to descriptively review the air medical transport of geriatric patients within the Nova Scotia provincial air medical program. METHODS: This study was based upon a retrospective chart review, May 14, 1996, to February 24, 1998, including patients >65 years of age transported by air ambulance. All missions including trauma and non-trauma were included in the adult services component (>16 years of age) of the air program. The total population served is approximately 1,000,000. RESULTS: 59 geriatric patients were transported out of a total of 175 adults during the study period, representing 33.7% of the adult services total (175). Medical calls numbered 48 (81.3%) with 11 (18.6%) being trauma. Other results: mean age; 73.7 (+/–6.1) years, range 65–89 years, male patients 41 (69.5%), "young-old" (<80) 48 (81.4%), "old-old" (>80) 11 (18.6%), intubated 36 (61%), alive after tertiary discharge 40 (67.8%), diagnosis of medical/cardiac 25 (42.4%), medical/other 23 (39.0%), trauma ISS mean 25.2 (+/–12.2), discharge location (n = 40): home 25 (62.5%), regional hospital 15 (37.5%). CONCLUSIONS: Air medical transport is classically associated with trauma transport of the younger patient. This program review demonstrates that a significant proportion of air medical transport in this province is geriatric in origin, often very ill patients. All air medical programs should have strategies, education and protocols that reflect the unique pathophysiology of the elderly.

055 Is spiral computed tomography the diagnostic imaging of choice for patients with renal colic?

Lee S, Dubinsky I. University of Toronto, Toronto, Ont.

OBJECTIVE: To determine the efficacy of spiral computer tomography (CT) vs. intravenous pyelogram (IVP) in diagnosing renal colic in the emergency department (ED). METHODS: A prospective cohort study was conducted at a two-site university hospital ED from July 1997 – February 1999. Patients presenting with acute flank pain and suspected urinary tract obstruction were enrolled. Baseline blood work for renal function and a urinalysis were performed. One hundred sixty-eight patients underwent helical unenhanced CT and 68 patients underwent IVP. All diagnostic imaging results were confirmed by a radiologist. RESULTS: Evidence of ureteral stone disease was confirmed to be present in 140/168 CT patients and 52/68 IVP patients. CT could detect the size and location of stones, the degree of obstruction and secondary signs of ureteral obstruction on all patients. CT offered additional information regarding other diagnoses not available with IVP. Three patients had CT demonstrated alternate diagnoses: 1 ruptured appendix (admitted), and 1 ovarian cyst and 1 renal rnass (discharged). The average length of stay (LOS) was 7.2 hours for IVP patients and 5.2 hours for CT patients. Two patients had allergies to contrast dye, necessitating utilization of CT. Five patients were diagnosed with complete obstruction, with 3 requiring admission due to ongoing pain. Five patients were admitted due to the presence of obstructive pyelonephritis. CONCLUSION: Spiral CT is a valuable diagnostic tool in the management of renal colic in the ED. Further studies need to be done to evaluate CT as a more effective means of diagnosing and managing patients presenting with flank pain, from both a radiological and patient LOS perspective.

056 Review of the compliance with advanced trauma life support protocol among patients referred to a level I trauma centre.

Lewell M, McCauley W, Anderson S, Lee A. University of Western Ontario, London, Ont.

OBJECTIVE: The purpose of this study was to review the compliance with advanced trauma life support (ATLS) protocol among trau-

ma patients referred to the London Health Science Centre (LHSC) and to recommend strategies for improvement of trauma care. SETTING: A university-affiliated teaching hospital and level I regional trauma centre. METHODS: Retrospective chart review of all trauma patients with an injury severity score (ISS) >12 referred to LHSC between May 1995 and April 1996. RESULTS: A total of 170 patients were reviewed; complete data was available for 129 in the trauma team activated (TTA) group and 29 in the trauma team not activated group (TTNA). Deviations from ATLS protocol were defined as: minor (no effect on morbidity or mortality), moderate (possible but no immediate effect on morbidity and mortality), and severe (life or limb threatening consequences). In the TTA group there were a total of 217 deviations (136 minor, 55 moderate and 26 severe). In the TTNA group there were a total of 69 deviations (48 minor, 16 moderate and 5 severe). The mean number of deviations from protocol per patient was 1.5 in the TTA group versus 2.4 in the TTNA group ($p = 0.002$). The mean Injury Severity Scores were 28.3 for TTA and 19.6 for TTNA ($p = 0.02$). CONCLUSION: In our population of referred patients with an ISS >12, 17% do not have trauma team activation. In the TTA group there was a mean of 1.5 deviations from ATLS protocol per patient and 2.4 in the TTNA group. This occurred despite the fact that the mean ISS was significantly lower in the TTNA group. RECOMMENDATIONS: ATLS education among referring hospitals should be enhanced in an effort to lower the total number of deviations from protocol. Early trauma team activation must be emphasized.

057 Continuing medical education in emergency medicine: detailing to the process of change. Does it impact of changing physician behaviour?

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OBJECTIVES: To assess the effectiveness of a Day in Emergency Medicine Continuing Medical Education (CME) program and to compare the effectiveness of the educational programme with and without academic detailing. METHODS: Participants at the annual CME day were assessed using a 16-item multiple-choice test at the beginning of the day (pre-test) and after each mini-lecture (post-test 1). Physicians agreeing to participate were randomized into 2 groups. Both groups received a newsletter approximately 4 months later. Control group physicians were contacted by telephone approximately 3 months later and their individual scores were discussed. Both groups received a follow up test approximately 6 months later (post-test 2). Pre-test and post-test 1 and 2 scores were compared between experiment and control groups using the Wilcoxon Rank Sum Test. RESULTS: 26 physicians agreed to participate. There was no difference between experimental and control scores between pre-test and post-test 1. Both groups improved their appropriateness scores significantly between the pre-test and the post-test 1 ($p = 0.0001$ and 0.001 for control and experimental groups respectively). RESULTS from post-test 2 demonstrated that only the experimental group maintained the increased scores at 6 months ($p = 0.028$). CONCLUSIONS: A traditional CME intervention resulted in significantly increased appropriateness scores on a multiple-choice test on the day of the intervention. Physicians who received academic detailing had significantly improved self-reported clinical appropriateness at 6 months when compared with physicians who received no academic detailing.

058 Critical pediatric equipment availability in Canadian hospital emergency departments.

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OBJECTIVE: To assess the availability of pediatric resuscitation equipment items in Canadian hospital EDs and to identify risk factors for the unavailability of these items. METHODS: Questionnaire survey of 736 Canadian hospital EDs with a maximum of 3 mailings. RESULTS: Response rate 88.3% (650/736). Results indicate that EDs with <10% pediatric patients, without pediatric consultants for the ED, without pediatric advanced life support (PALS) trained physicians, or >200 km from a university centre, were more likely to be missing significant equipment items. An intraosseous needle was unavailable in 32.4% of EDs with <10% pediatric patients (odds ratio [OR] 2.47, 95% C.I. 1.34–4.57), in 21.3% without pediatrician consultants (OR 3.12, 95% C.I. 1.12–8.69), in 32.3% without physicians trained in PALS (OR 2.18, 95% C.I. 1.24–3.85), and 21.8% if the ED was >200 km away from a university centre (OR 1.66, 0.98–2.82). Centres without PALS trained physicians were less likely to have pediatric resuscitation dosing guidelines available in the ED, 14.8% unavailability (OR 3.76, 1.45–9.77). SUMMARY: The identified equipment deficiencies pose a potentially life threatening risk for critically ill children in Canada.

059 Instrument development to measure the paramedic's perspective of field pronouncement.

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OBJECTIVES: Interventions designed to improve the quality of field pronouncement (FP) need an instrument to measure the effect on the EMT-P. This study evaluates the reliability and validity of a survey instrument measuring the EMT-P's comfort and technique of FP. METHODS: A mail survey of 120 EMT-Ps was done using the modified Dillman methodology. 60 EMT-Ps were re-tested within 2 weeks. Questions were sorted for analysis into subgroups assessing psychological comfort (PC), opinion (O), technical skills (TS) and coping skills (CS). RESULTS: The response rate was 95.8% (115). The double data entry error rate was <0.1%. Relevant mean descriptive frequencies were: age, 36 (SD = 5), annual number of FPs, 12 (SD = 10) and years of PH experience as EMT-P, 5 (SD = 4). The face and content validity was consistent with a content matrix derived by the focus and advisory groups. Concurrent or predictive validity was not measured, as surrogate comparative instruments do not exist. The Cronbach's alpha overall was 0.78 and for subgroups PC = 0.87, O = 0.82, T = 0.41 and CS = 0.48. The test-retest reliability coefficient overall was 0.94 and for subgroups: PC = 0.91, O = 0.89, T = 0.5 and CS = 0.82. A 95.8% response rate supports the instrument's generalizeability. CONCLUSIONS: Overall the instrument has reasonable internal consistency with strength in the psychological comfort and opinion subgroups. The moderate Cronbach's alpha for the other 2 subgroups suggest that they may not be measuring the same attribute or alternatively further subgroups may be identified with post-hoc analysis. The intra-rater reliability is high. This mail survey is a valid and reliable instrument for assessing the EMT-P psychological and technical outcome of FP interventions.

060 Gamma hydroxybutyrate overdose and coma.

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INTRODUCTION: We present a case of coma that by history was thought to represent an intracerebral catastrophic event, but which was

induced by a toxin. CASE REPORT: A 44-year-old male was witnessed to stiffen up in a chair and collapse at work. He was unresponsive with pinpoint pupils when emergency health services (EHS) arrived. There was no witnessed seizure activity. He vomited once, and was not protecting his airway; therefore EHS attempted an unsuccessful intubation with sedation. He was intubated in the emergency department and an urgent CT was performed, which did not reveal any abnormalities. After a period of several hours he abruptly became responsive, initially being agitated and gradually more cooperative. He was able to tell us that he had ingested gamma hydroxybutyrate (GHB). He was extubated and discharged shortly after. DISCUSSION: GHB is a CNS depressant that is being investigated for the treatment of narcolepsy and alcohol withdrawal. It is used recreationally as a body building aid, a euphoriant, an aphrodisiac and a "date-rape" drug. It is one of the drugs taken at "RAVE" parties across Canada. Patients with overdose may present in coma. There has been 1 case series that suggests a deep coma that alternates with agitation when stimulated may be a common presentation. This drug is extremely accessible, and there is even a Web page on the Internet describing how to manufacture it in home kitchens. CONCLUSIONS: GHB use appears to be on the rise. Clinicians should consider the ingestion of GHB as the cause for coma of unknown origin, particularly if the coma is associated with a RAVE party.

061 Developing a new model for transmitting a patient's treatment wishes from long-term care facilities to emergency departments.
Pauls MA, Singer PA, Dubinsky I. University of Toronto and The Toronto Hospital Emergency Department, Toronto, Ont.

OBJECTIVES: To identify and describe health-care provider's ideal model for transmitting a patient's treatment preferences from long-term care facilities to emergency departments (EDs). METHODS: A qualitative study using semi-structured focus group interviews and content analysis. A total of 35 participants were recruited from 5 health-care provider groups: ED nurses, ED physicians, paramedics, long-term care nurses, and long-term care physicians. Participants were asked to identify problems with the current process used to transmit patient's treatment preferences and then to describe their ideal model. The interviews were transcribed and a grounded theory methodology was used to identify the key themes. These themes were synthesized into a single model. RESULTS: Participants felt a general, less specific directive was preferable to a highly detailed one. They were concerned that patients may make poorly informed choices, or may make choices that have unintended effects if the directive is too detailed. All focus groups agreed that information about resuscitation should be provided to patients and families before or at the time of admission to a long-term care facility. It should be done in a sensitive manner, using different methods such as videos and booklets, and with little pressure to make an immediate decision. CONCLUSIONS: Improving the transmission of patient's treatment wishes from long-term care facilities to EDs will require a greater emphasis on the early and ongoing education of patients and families and less concern about the specific form used.

062 Acute stroke: factors associated with out-of-hospital time delay.
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OBJECTIVES: To document the recognition and prehospital times from stroke onset to emergency department (ED) arrival and to identify factors associated with arrival within 2 hours, the practical time window for treatment with tissue plasminogen activator (t-PA). METHODS: We determined the onset of stroke to ED arrival time in 118 patients with the paramedic diagnosis of stroke through retrospective chart review. Time intervals and potential variables associated with delay were obtained from the paramedic call reports. Factors included age, sex, medical history of stroke or hypertension, presence of any power deficit, altered level of consciousness, and Glasgow coma scale (GCS). Factors were analyzed to assess association with ED arrival within 2 hours of symptom onset using logistic regression analysis. RESULTS: 236 charts with the diagnosis of stroke were retrieved. Time intervals and variables were documented in only 118 charts. The median time from stroke onset to arrival in the ED was 54.5 minutes; 105 patients (89%) presenting within 2 hours. The median time from stroke onset to 911 call was 15.5 minutes. Logistic regression analysis identified no association between arrival within 2 hours of symptom onset and the variables age, sex, medical history of stroke and/or hypertension, presence of any power deficit, altered level of consciousness, and GCS. CONCLUSION: The median time from stroke onset to ED arrival was 54.5 minutes, with 89% of patients arriving within the 2 hour theoretical time window for t-PA. Earlier arrival was not associated with these stroke risk factors or symptoms in this population.

063 An audit of the demographical features and treatment efficacy in patients presenting to the emergency department with benign headache.
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OBJECTIVES: During the year spanning June 1995 – May 1996, the emergency department (ED) at Vancouver General Hospital reported 56,988 visits. Patients presenting with headache accounted for 1.95% of this total. Although several studies in the past have looked at treatment strategies, there is limited information on other aspects of patient care — namely, discerning why people choose to come to the ED to manage their headaches. The "Headache Audit" was the first in a series of studies aimed at answering this question. METHODS: Data was collected over a 25-day period using a survey that was administered to patients presenting with 'headache' as a chief complaint. Information collected included demographic features, headache severity on the visual analogue scale, and treatment rendered. In total, 58 patients presented with headache of which 34 met the inclusion criteria: headache conforming to migraine or tension in character. RESULTS: Average time from ED presentation to treatment was 90.5 minutes. If subsequent treatment was required, the average time was 46.4 minutes from the initial dose. The majority of patients (73.5%) received metoclopramide 10 mg IV, with benztropine 2 mg IV. Finally, 20 of 21 patients surveyed (95%) reported clinically significant improvement in their symptoms upon discharge. CONCLUSION: This study demonstrated that headache is a common presentation to the ED, and one that is managed effectively. In addition, results showed that a majority of the study patients had a prior history of headaches. An unexpected finding was a trend showing women were more likely to receive a diagnosis of "migraine," despite presenting with the same symptoms as men. Future studies should address why patients present with headache and how these patients differ from those who are able to manage their condition outside of an ED setting.

064 A new, non-invasive method for the rapid determination of central venous pressure.
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OBJECTIVE: Rapidly assessing a patient's fluid status is an important adjunct in treating many emergency room patients. This study

attempts to validate a simple means of assessing the external jugular venous pressure (JVP) as an indicator of normal or elevated central venous pressure (CVP). METHODS: ICU patients having CVP monitoring were examined by the author. With patients in bed approximately 45" head-up, the external jugular vein (JV) was occluded at the base of the neck (above the clavicle) and observed to distend. The occlusion was then removed and the vein observed for collapse at end expiration. Complete collapse was hypothesized to indicate a normal CVP (≤8 cm of water). In those patients whose JV collapsed incompletely or who had had distension prior to examination, the vein was then occluded with the finger near the angle of the jaw. With the occlusion maintained, the vein was milked downwards with the other hand in order to cause its emptying and was then observed for filling from below. Filling from below was hypothesized to indicate an elevated CVP (>8 cm of water). RESULTS: 40 patients were assessed. In 12 patients the external JV could not be easily identified. Of the remaining 28, 12 had a CVP higher than 8 cm of water while 16 had a CVP of 8 or less. External jugular vein assessment was 100% accurate in predicting whether or not a patient's CVP was greater or less than 8 cm of water in these patients. CONCLUSIONS: External jugular vein assessment as described in this paper is a useful, rapid and accurate way to clinically assess a patient's CVP. These exceptional results are so far only applicable in the hands of the author and therefore further studies should be done to see if they are reproducible in the hands of other observers.

065 Are pre-reduction radiographs necessary in clinically evident anterior shoulder dislocation?

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OBJECTIVES: To determine if experienced emergency physicians can accurately identify a subgroup of patients with anterior shoulder dislocation for whom pre-reduction radiographs do not alter patient management. To determine if pre-reduction radiographs, when obtained on the identified subgroup, significantly delay time to reduction. To determine if experienced physicians can identify and successfully reduce anterior shoulder dislocation when pre-reduction radiographs are not immediately available. METHODS: Prospective evaluation of patients who presented with possible shoulder dislocation to 1 of 2 ski hill clinics or to a rural emergency department (ED) over a 6-month period. All patients who presented to the ED received standard treatment, including pre- and post-reduction radiographs (unless refused). Patients who presented to a ski hill clinic received standard treatment as determined by the attending physician. Prior to obtaining pre- and post-reduction radiographs, appropriate sections of a questionnaire were completed by the treating physician. Questions included details of therapy as well as visual analogue scale (VAS) rating of confidence of dislocation and successful reduction. RESULTS: 97 patients were studied. Emergency physicians were certain of shoulder dislocation by clinical examination alone in 40 of 59 cases (67.8%) of possible dislocation. All 40 cases were found to have a dislocation (100%; 95% CI, 91% to 100%) and the pre-reduction radiograph did not affect management of the injury. Pre-reduction radiographs added 29.6 ± 12.7 minutes to treatment. Ski hill physicians were certain of shoulder dislocation in 29 of 36 cases (80.6%; 95% CI, 64.0% to 91.8%) of possible dislocation and were able to perform reduction without radiograph in all cases. (100%; 95% CI, 88.1% to 100%) CONCLUSION: Shoulder dislocation is usually readily apparent from history and physical examination. When the experienced emergency physician is certain of the diagnosis of shoulder dislocation, pre-reduction radiography delays treatment and does not alter management.

066 Is body temperature maintained effectively during aeromedical transport? An interim analysis.

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BACKGROUND: Aeromedical transport of critically ill patients is common in Alberta, due to the large number of rural and small hospital services provided throughout the province. Due to temperature extremes, patients are at risk of hypothermia. The objective of this study is to determine whether significant hypothermia (T < 35°C using an esophageal thermometer) occurs during aeromedical transport in Northern Alberta. METHODS: In a prospective cohort study, we determined whether significant hypothermia occurs during rotary wing aeromedical transport. All intubated adult patients (>16 years of age) had esophageal thermometers placed and core body temperature measurements taken at 10-minute intervals during their aeromedical transport. Conventional means of maintaining body temperature (cabin heater, Doctor Down blankets) were employed. RESULTS: To date 82 patients have been entered into the study and 41 (50%) have had esophageal thermometers inserted. There was no statistical difference between patients followed prospectively and those whose temperatures were determined retrospectively through standard thermometry done by ED staff on arrival at the receiving hospital. The mean temperature dropped approximately 0.40°C (95% CI: −1.04, 0.27). There was no difference in body temperature between trauma and non-trauma transports. There was no statistical difference in body temperature between on scene and interhospital transport (p = 0.084). CONCLUSIONS: There appears to be no statistical or clinical difference in body temperature during aeromedical transport. Thus, we can state based on our current statistics the body temperature is maintained using conventional passive means during transport.

067 Obtaining consensus for a definition of "clinically important cervical spine injury" in the Canadian CT Head and Cervical Spine (CCC) study.

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OBJECTIVES: The Canadian CT Head and Cervical Spine (CCC) Study is designed to develop clinical decision rules for the use of imaging in head and neck trauma. This methodological sub-study was essential in order to a) define, and b) obtain consensus for a criterion outcome measure, "clinically important cervical spine injury." METHODS: This prospective cohort survey involved the review by the investigators of radiographic and CT films of 148 cervical spine injury cases from 8,015 CCC study patients. "Clinically unimportant" injuries were defined as fractures not requiring immobilization, not requiring follow-up by a spine surgeon, and not expected to lead to chronic disability. A formal survey was then sent to 164 academic emergency physicians, neurosurgeons, spine surgeons, and neuroradiologists at the 8 Canadian university hospital study sites. Descriptive statistics with 95% CIs were calculated. RESULTS: Based upon 4 criteria, 23 of 8,015 CCC Study cases reviewed were considered to have "clinically unimportant" fractures, including: i) avulsion of osteophyte (4 cases), ii) transverse process (4), iii) spinous process (11), and iv) simple compression fractures <25% of body height (1). Surveys were returned by 129 of 164

Physician Type	No.	Osteophyte Avulsion	Transverse Process	Spinous Process	Compression < 25% Body
Emergency	93	97.8%	94.6%	92.4%	60.9%
Neuro Specialist	36	100%	97.2%	97.2%	75.0%
Total	129	98.4%	95.3%	93.8%	65.0%
95% CI	129	94–99%	90–98%	88–97%	56–73%

physicians (79.0%) and showed the following percent agreement with the proposed criteria:
CONCLUSIONS: All physicians showed excellent consensus for the first 3 criteria and "neuro" specialists showed good support for the 4th. The criterion outcome measure for the CCC Study cervical spine radiography decision rule will be "clinically important cervical spine injury" as developed by this sub-study.

068 The international diffusion of the Ottawa ankle and knee rules.
Graham I, Stiell IG, McAuley L, Laupacis A, Wells GA, O'Connor A, Durieux P, Simon N, Clancy M, Howell M, Emparanza JI, Aginaga JR. Division of Emergency Medicine and Clinical Epidemiology Unit, University of Ottawa, Ottawa, Ont.

OBJECTIVES: Results of studies to derive, validate and implement the Ottawa Ankle Rule (OAR) and Knee (OKR) Rules have been published in emergency medicine and general medical journals. This study assessed the awareness and use of these decision rules by emergency physicians in North America and Europe. METHODS: A confidential mail survey was sent to a random sample of 500 members each of the respective national emergency physician associations in Canada (CAEP), U.S. (ACEP), U.K. (BAAEP), Spain (SSEP), and France (all 1350 members of FSEP). Questions were translated into French and Spanish and included demographic data as well as specific and general attitudes towards clinical decision rules. Surveys were preceded by a pre-notification letter and followed by second and third mailings for a total of 4 mailings. Analyses included descriptive statistics with 95% CIs, as well as univariate and logistic regression measurement of associations. RESULTS: 1,769 responses were received:

Survey Question	Canada	U.S.A.	U.K.	France	Spain
Response rate	79.1%	48.7%	61.8%	49.1%	60.0%
Mean age	38	41	42	40	39
Mean hrs/week in ED	29	39	29	34	43
Comfortable with word "rule"	61%	38%	43%	51%	45%
Aware of OAR	99%	96%	91%	69%	21%
Use OAR "most of the time"	89%	31%	73%	31%	9%
Aware of OKR	63%	53%	29%	12%	8%
Use OKR "most of the time"	17%	9%	10%	3%	4%

CONCLUSIONS: This constitutes the largest international survey of decision rule use by emergency physicians. Striking differences are apparent among countries with regards to knowledge and use of decision rules. Despite similar awareness in Canada and the US, US physicians appear to be much less likely to use the OAR and OKR. Future research should investigate reasons for differences in rates of diffusion among countries and address strategies to enhance implementation of such rules in the ED.

069 Retrospective evaluation of the Pittsburgh criteria for knee radiography.
Stiell IG, Vandemheen K, Clement C, Wells GA, Mcknight RD, Greenberg GH. Division of Emergency Medicine and Clinical Epidemiology Unit, University of Ottawa, Ottawa, Ont.

OBJECTIVES: To evaluate the performance of the Pittsburgh criteria for the use of knee radiography, when applied to the Ottawa Knee Rule database. METHODS: This study employed a secondary data analysis of the Ottawa database which was developed from 3 large prospective cohort studies to derive, validate, and implement the Ottawa Knee Rule. Physicians were trained to complete a data collection form and explicitly interpret the Ottawa Knee Rule for each eligible adult presenting with acute knee injuries at 1 of 3 Canadian teaching and community hospital EDs from 1993 to 1997. Interobserver assessments were performed where feasible. The criterion standard, clinically important knee fracture, was determined from standard radiography and from structured telephone interviews. In the current study, 3 investigators retrospectively evaluated each original case for the one Pittsburgh variable, "fall to ground," which was not in the database. Analyses included calculation, with 95% CIs, of classification characteristics, kappa coefficient, physician accuracy, and the potential relative reduction in use of radiography from a baseline rate of 70%. RESULTS: The 3,115 patients were evaluated by 150 different physicians and included 189 (6.1%) fracture cases.

Rule	Sensitivity (95% CI)	Specificity (95% CI)	MD kappa	Accuracy	Potential Reduction
Pittsburgh	.99 (.96–1.0)	.19 (.17–.20)	–	–	(–) 17.9%
Ottawa	1.0 (.98–1.0)	.51 (.49–.52)	.84	97%	24.9%

CONCLUSIONS: The Pittsburgh criteria showed high sensitivity but very low specificity and appeared to have the potential to increase radiography use. Reproducibility and accuracy could not be assessed. Future studies should incorporate: a) a prospective methodology, and b) explicit interpretation of the Pittsburgh criteria by emergency physicians.

070 Potential areas for new clinical decision rules: comparison of North America and Europe.
Graham I, Stiell IG, Mcauley L, Laupacis A, Wells GA, O'Connor A, Durieux P, Simon N, Clancy M, Howell M, Emparanza JI, Aginaga JR. Division of Emergency Medicine and Clinical Epidemiology Unit, University of Ottawa, Ottawa, Ont.

OBJECTIVES: Several clinical decision rules for emergency medicine have been recently developed and disseminated. The objective of this study was to compare the priorities of North American and European emergency physicians for the future development of decision rules. METHODS: We conducted a confidential mail survey of a random sample of members of national emergency physician associations in North America (U.S.A., Canada) and Europe (U.K., France, Spain). A total of 4 mailings, including a personal letter from a national physician, were used to optimize response. Analyses included univariate and descriptive statistics with 95% CIs. RESULTS: 1,769 physicians responded (57.4% response rate), including 623 (63.6%) from North America and 1,146 (54.4) from Europe. Clinical problems most often identified, with % of physicians and ranking, are illustrated in Table. CONCLUSIONS: Emergency physicians on both sides of the Atlantic have a strong interest in decision rules and guidelines for a number of clinical problems. Concerns differ, however, between

North America and Europe. The top priority in North America is a rule for diagnosis of pulmonary embolus and the top priority in Europe is a rule for use of CT/LP in acute headache. These results

Clinical problem	N. America (%)	(Rank)	Europe (%)	(Rank)
R/O pulmonary embolus	50.9%	1st	27.3%	7th
Admission for syncope	47.0%	2nd	50.6%	3rd
CT scan/LP for acute headache	42.6%	3rd	59.9%	1st
LP for children with fever	41.1%	4th	22.2%	10th
Antibiotics for sore throat	5.9%	5th	11.4%	16th
Admission for chest pain	35.8%	6th	55.0%	2nd
Chest x-ray for cough/fever	35.3%	7th	19.0%	12th
Imaging for abdominal pain	32.2%	8th	48.4%	4th
R/O DVT	31.3%	9th	42.4%	5th
U/S for pelvic pain/bleeding	28.3%	10th	14.1%	14th
Enzymes for chest pain	18.6%	11th	25.2%	8th
Admission for asthma	17.5%	12th	33.8%	6th

should help researchers target relevant areas for the future development of clinical decision rules in emergency medicine.

071 Feasibility evaluation of respiratory distress patients for the Ontario Pre-hospital Advanced Life Support (OPALS) study.
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OBJECTIVES: The Ontario Prehospital Advanced Life Support (OPALS) Study will be the largest prehospital study yet conducted and will evaluate the impact of ALS programs on the outcomes of cardiac arrest, trauma, and other patients. The objective of this study was to evaluate feasibility and methodological issues necessary for conducting a clinical trial of ALS in respiratory distress. METHODS: This cohort study was conducted over a 12-month period in a city of 750,000 and involved all adults transported with respiratory distress, defined as shortness of breath and a respiratory rate ≤10 or ≥24. Data was collected from ambulance, dispatch, ED, and hospital records (12 months only) and analyses included descriptive statistics with 95% CIs and univariate associations. RESULTS: 1,661 consecutive patients were enrolled: mean age 71.6 (range 16–107), female 55.6%, required EMS assisted ventilation 4.0%, and treated at 5 hospitals. Of the 1572 (94.6%) cases with hospital records available, ED outcomes were: intubation 4.5%, death 1.2%, ICU admission 9.6%, discharge home 25.9%. Mean lengths of stay, in days, were: hospital 10.9, ICU 3.2, ventilator 1.7. The overall survival rate was 84.5%; 27.8% rated "good" at discharge on the CPC scale; and the ICD9-based final diagnoses were: CHF 27.7%, COPD 19.2%, pneumonia 18.0%, asthma 8.8%, CHF/COPD 5.0%, lung cancer 3.1%. The proposed before–after ALS clinical trial will have a sample size of 8,000 patients and 80% power to detect a 3% difference in the primary outcome, hospital survival. CONCLUSIONS: This unprecedented in-hospital review gives a detailed profile of prehospital respiratory distress patients and was essential for the design and funding of the respiratory component of the OPALS Study. This clinical trial should definitively determine the benefits of prehospital ALS care for respiratory distress patients.

072 Acute compartment syndrome: a tissue survival analysis.
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OBJECTIVES: To determine the tissue survival time, risk factors and the causes for operative delays in acute compartment syndrome (ACS). METHODS: We performed a survival analysis (outcome = muscle death) using a historical cohort study of patients who had a fasciotomy within the McGill teaching hospitals between 1989–97. We considered a patient to have ACS if pressure measurements were greater than 30 mm Hg or if a clinical diagnosis was made. All diagnosis of ACS had to be confirmed at the time of fasciotomy. RESULTS: Of the 76 patients with ACS, 37 (49%) suffered some level of muscle necrosis. Among those with muscle necrosis, 11 (30%) lost more than 25% of the muscle belly. More importantly, the survival analysis shows that 72% of those who developed necrosis did so within the first 2 hours. No statistical difference was observed between genders ($p = 0.60$) or the presence/absence of a fracture ($p = 0.65$). In traumatic cases, the longest delays occurred as a result of failure to make the diagnosis early (median = 2 hours 56 min, range = 0 to 99 hours 20 min) and in the ability to mobilize the operating room (median = 2 hours 13 min, range = 15 min to 29 hours 45 min). For non-traumatic cases, delays were primarily due to a late presentation to the hospital (median = 9 hours 19 min, range = 4 min to 289 hours 29 min) and failure to make the diagnosis early (median = 8 hours 18 min, range = 0 to 104 hours 15 min). Although trauma cases were managed significantly faster, diagnosis of ACS was not made earlier ($p = 0.13$). CONCLUSIONS: ACS can induce necrosis within 2 hours of injury. These data also suggest that a higher index of suspicion is needed for both traumatic and non-traumatic ACS in order to prevent permanent disability.

073 Spectrum bias in an espophageal detector device trial.
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OBJECTIVE: To assess whether spectrum bias occurred in a diagnostic test trial to determine the performance characteristics of an esophageal detector device (EDD) compared to a disposable capnometer to detect esophageal placement of an endotracheal tube (ETT) in the out-of-hospital setting. METHODS: A prospective, observational sample of 129 subjects was evaluated as the original cohort. Sample size calculations assumed a "first attempt" intubation success of 70% versus 97% found at the conclusion of this trial. Subsequently, a 4-month retrospective review was completed of all paramedic patient encounters. All subjects who met the inclusion criteria of the original trial were compared to subjects who were actually entered. Similarities between groups were tested by chi square analysis. RESULTS: The retrospective review found 36 subjects who were entered into the EDD trial and 107 additional candidates who were candidates but not entered. Only 25% of eligible subjects were recruited. These 143 subjects (control group) were compared to the 129 subjects (EDD group) who entered the original trial. The control and EDD groups were similar with

respect to the indication for intubation. There was a significant difference in the "first attempt" intubation success between the control and the EDD groups (75% vs. 97%, $p = 0.05$). Spectrum resulted in only 4 cases of esophageal intubation entered into the EDD trial rather than the expected 32 cases. This led to an overestimation of the negative predictive value of the EDD's ability to detect an esophageal intubation. CONCLUSION: Spectrum bias occurred in this diagnostic test trial. Trials using prospective, observational sampling must report how closely entered cases resemble all potential eligible cases to detect and account for spectrum bias.

074 Validity evaluation of the cervical spine injury proxy outcome assessment tool in the Canadian CT Head and Cervical Spine (CCC) study.

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OBJECTIVES: This methodological sub-study assessed the validity of a "Proxy Outcome Assessment Tool," administered to patients in the Canadian CT Head and Cervical Spine (CCC) Study. Approximately 30% of eligible patients do not undergo radiography in the ED and require follow-up to assess outcome. METHODS: The CCC Study is a prospective cohort study conducted in 10 Canadian EDs and includes alert, stable trauma patients at risk for neck injury. This sub-study assessed all patients with abnormal cervical spine radiography and a sample of patients with negative radiography. All patients completed the proxy tool, which consisted of 8 questions administered by telephone at 14 days. Descriptive statistics with 95% CIs were calculated. RESULTS: Of 8,015 CCC Study patients, 389 (4.9%) were entered in this sub-study. Of these, the mean age was 38.9, 282 (72.5%) were MVC victims, 55 (14.1%) fell, 80 (20.6%) had acute cervical spine injury, and 66 (17.0%) had a "clinically important" injury. Performance of individual questions and the tool:

Interview question	Sensitivity	95% CI	Specificity	95% CI
Neck pain "moderate-severe"	52%	39–64%	54%	48–59%
Difficulty turning "moderate-severe"	91%	80–96%	71%	66–76%
Neck collar being used	89%	78–94%	94%	90–96%
Returned to usual activities	95%	86–98%	51%	45–56%
Overall assessment tool				
Acute cervical spine injury	98%	90–95%	60%	54–65%
"Clinically important" injury	100%	94–100%	58%	52–63%

Two "clinically unimportant" injuries not identified by the proxy tool were spinous process fractures that required no specific treatment. CONCLUSIONS: This sub-study confirms the validity of the "Proxy Outcome Assessment Tool" used in the CCC Study and is an essential step in developing a decision rule for cervical spine radiography. This tool could also be incorporated into patient discharge instructions as a guide for further follow-up after neck injury.

075 An evaluation of the sliding pain scale as a valid tool to measure chest pain severity in an emergency department setting.

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OBJECTIVES: Patients with chest pain are commonly seen in the emergency department (ED). The evaluation of pain severity is integral for appropriate therapy. A tool called the "sliding pain scale" (SPS) is often used to circumvent communication barriers in the pediatric population when evaluating pain severity. Preliminary indications have demonstrated the SPS to be useful in the communication of pain in a non-English speaking population as well. The purpose of this study was to validate the SPS in adults presenting with chest pain in a tertiary care, multicultural center. METHODS: 114 patients presenting with "chest pain" were prospectively enrolled during a 10-week period. These patients were asked a series of standardized questions about their chest pain, including questions regarding the severity of their pain. The average of the numerical responses using the SPS was compared to the average of the numerical responses using the "numerical scale" (NS), an already validated tool measuring pain severity. Each tool is based on a 10-point numerical scale. RESULTS: Meaningful data were obtained from 108 patients. The average difference between the 2 scales was 0.93 points. Two of the scores were obviously outlying, measuring a difference between the 2 scales of 6.75 points and 5.25 points respectively. When these 2 scores were removed from the calculation, the difference was reduced to 0.84 points. The reason for this deviation was unclear. CONCLUSIONS: This study demonstrated that the SPS is a valid tool for assessing chest pain severity in adults. In the future we plan to continue to enroll patients with the objective of discerning any differences in chest pain expression amongst different cultures.

076 A prospective study for the validation of performance of urine pregnancy tests in the emergency department.

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Emergency physicians require rapid access to accurate pregnancy testing. Point of Care testing has allowed urine pregnancy testing to be done in the emergency department (ED). Urine pregnancy tests have proven cost effective and accurate when done in traditional hospital laboratories. This study will address the assumption that ED analysis of pregnancy tests is faster and just as accurate as the lab. OBJECTIVES: The primary objective of this study is to prove there is no difference in urine pregnancy test results done in the ED compared to the Calgary Laboratory Service's pregnancy test results. Secondary goal of this study is to show that urine pregnancy tests will be more rapidly available than the lab services urine pregnancy test results. METHODS: Point of Care Testing, with the same urine specimen, was done both in the lab and in the ED. The ED data collection included: the time of the urine collection, the urine beta HCG result, the urine specific gravity, and the time the emergency nurse has a result done in the emergency department. Data from the lab will include: the time the sample was sent to the lab, the time the lab reports the urine beta HCG is being done, the time the emergency department nurses are aware of the lab urine results on the patient's chart, the urine beta HCG results and urine specific gravity. RESULTS: The ED results are available to use for clinical decision making approximately 10-fold sooner than the lab. The ED error rate does not appear to be statistically different from the lab. CONCLUSIONS: This study confirms that point of care technology with urine pregnancy tests in the ED is more rapid and just as accurate as the lab test.