Poster Presentations

045 Attitude of emergency department patients with minor problems towards being treated by a nurse practitioner.
Moser MS, Abu-Laban RB, van Beek CA. University of British Columbia, Vancouver, British Columbia.

OBJECTIVES: Recently there has been increasing interest in alternate methods of health care delivery, including a possible role for nurse practitioners (NPs) in emergency departments (EDs). We sought to determine the attitude of ED patients with minor problems towards being treated by a NP and the characteristics of this population. METHODS: The study operated weekdays between 8am and 4pm from April 4, 2000, to July 13, 2000. Adults presenting to a tertiary ED with 1 or more of the following were eligible unless precluded by pain or language barriers: minor abrasion, laceration, bite, burn or extremity trauma; cast check; earache; superficial foreign body; lice/pinworms; morning after pill request; body fluid exposure; prescription refill; puncture wound; sore throat; subconjunctival hemorrhage; suture removal/check; tetanus immunization request; toothache; or female urinary tract infection (UTI). Consenting patients were provided background information and completed a brief survey prior to physician assessment. RESULTS: 213 patients were enrolled (86% of those eligible) and 6 surveys were excluded due to coding errors. The mean age of those studied was 34 years, and 58% were male. When asked about willingness to be treated by a NP for their problem, 72.5% of patients selected "Yes" (150/207: 95% confidence interval [CI] 65.8%–78.4%), 15.5% "uncertain" (32/207: 95% CI 10.8%–21.1%) and 12.1% "No" (25/207: 95% CI 8.0%–17.3%). Of those who selected "Yes," 21% indicated they would also still expect to see an emergency physician during their ED visit, while 67% indicated this was not essential. A logistic regression analysis run for secondary purposes found that willingness to be treated by a NP was independent of age, gender, or educational status. CONCLUSIONS: The majority of ED patients with minor problems indicate a willingness to be treated by a NP, often without any superimposed physician assessment. Whether this should lead to policy recommendations requires evaluation of many other factors including impact, logistics, cost and quality of care.
Key words: nurse practitioner

046 Comparison of pediatric triage assessment between registered nurses and emergency physicians.
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OBJECTIVES: To compare triage level assignment, using case scenarios, in a pediatric emergency department (ED) between registered nurses (RNs) and pediatric emergency physicians (PEPs). To compare triage level assignment by RNs and the PEPs to a consensus agreement gold standard. METHODS: Cross-sectional questionnaire survey sent to all RNs and PEPs working in the ED. The survey included 55 case scenarios providing details of the patient's symptoms, signs and mode of arrival. Participants were instructed to assign triage level on each case, using the following scale: resuscitation/emergent, urgent, less urgent, non-urgent. A priori, all cases were assigned a triage level by a consensus agreement using established triage guidelines. Kappa statistics and the mean number (±1 standard deviation [SD]) of correct responses were calculated. RESULTS: A response rate of 100% was achieved (39 RNs, 24 PEPs). The kappa level of agreement (± 1 SD) amongst the RNs was 0.445 ± 0.003 and amongst the PEPs was 0.419 ± 0.005 ($p < 0.0001$). The mean number of correct responses (± 1 SD) for the RNs was 64.2% ± 8.0% and for the PEPs was 53.5% ± 8.1% ($p < 0.0001$). There were no significant differences by stratifying the RNs and the PEPs by experience level (<10 vs. >10 years) or by the type of shift work (day vs. evening vs. overnight). CONCLUSIONS: The level of agreement and accuracy of triage categorization was only moderate for both RNs and PEPs. Triage, a crucial step in emergency care, requires improved measurement.
Key words: triage, reliability

047 Paramedic rationale for non-compliance with peak expiratory flow measurements.
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OBJECTIVES: Paramedics function on ambulance runs without direct medical supervision and therefore, compliance to medical protocols and standing orders is essential. A focused audit of paramedic compliance to peak expiratory flow (PEF) collection in a dyspnea protocol revealed compliance persistently below 20%. The objective for this study was to determine paramedic rationale for non-compliance. METHODS: A brief survey was developed and administered to paramedics in an urban Advanced Life Support service. The survey included paramedic demographics, questions to establish level of compliance to PEF collection and beliefs toward the impact of PEF collection on patient care, hypothesized rationale for non-compliance to PEF collection, and a section for additional comments. RESULTS: All mean scores were independent of age, gender and years of experience. The majority of respondents answered they "never" or "seldom" collected PEF pretreatment or post-treatment. Over 65% believed PEF "never" or "seldom" influenced field treatment. When paramedics chose not to collect PEF, the majority stated they "agreed" or "strongly agreed" it aggravated the patient's shortness of breath, it delayed treatment, and did not influence field treatment. Close to 80% "disagreed" or "strongly disagreed" with the statement "I am not properly trained" and equally disagreed with "the equipment is too complicated for patient and/or paramedic." CONCLUSIONS: The study results supported the hypothesis that paramedics did not believe PEF influenced patient treatment and delayed treatment and were therefore unwilling to collect PEF measurements from dyspnea patients. Without evidence to support the use of PEF as a better tool than those traditionally used by paramedics, it is unlikely PEF will be collected.
Key words: asthma, emergency medical services

048 Assessment of decision-making capacity: implications for refusal of care in the emergency department.
Gillis AE, Pauls M. Dalhousie University, Halifax, Nova Scotia.

OBJECTIVES: An elderly, homeless patient presents to the emergency department with an acute exacerbation of chronic obstructive pulmonary disease (COPD). She demands to leave before receiving treatment and the attending physician must decide if she should be permitted to leave. Emergency physicians need to respect patient autonomy but still provide an ethically and legally appropriate standard of care. They must understand the concepts of informed consent and decision-making capacity (DMC) and be able to determine

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when a patient's DMC is impaired. Various approaches have been proposed to aid physicians in this task, but currently, no standardized method exists. Moreover, it is unclear how useful these approaches are in the emergency setting. METHODS: A MEDLINE search was conducted and a literature review performed to identify the available tools for assessment of DMC and to establish the relevance of these tools to the emergency medicine setting. RESULTS: The approaches of Applebaum and Grisso (1990, 1998) and Thewes, Fitzgerald and Sulmasy (1996) are the most widely accepted. Both encourage a global assessment of DMC, including complete physical and psychiatric assessment, and offer a concise series of questions to guide the clinician in an objective assessment of DMC. No tools designed specifically for the emergency medicine setting were found. CONCLUSIONS: Emergency physicians must be able to assess a patient's DMC in an effective and efficient manner. Good assessment tools exist, although each one has its limitations and none has been designed specifically with the time restraints or acute nature of the emergency department in mind. These tools offer a strong framework for objective measure of DMC that may be adapted to different clinical scenarios. A need exists to formulate a standardized assessment tool specifically for emergency physicians.
Key words: ethics, refusal of care

049 Patients who leave without being seen in the emergency department.
Bullard M, Holroyd B, Craig W, Klassen T, Yiannakoulias N, Johnson D, et al. University of Alberta, Edmonton, Alberta.

OBJECTIVES: Patients who leave without being seen (LWBS) constitute a problem for emergency departments (EDs) due to their potential for increased morbidity and dissatisfaction. Few jurisdictions can accurately evaluate the pattern of LWBS for a large population; this study examines this ED subgroup using a provincial database. METHODS: All patients presenting to Alberta EDs were eligible for inclusion. Data were derived from a sample of ED patients treated in 17 health regions over 1 year (fiscal 98/99) with a specific disposition code of LWBS. Data were extracted from the Ambulatory Care Classification System (ACCS) database, computerized abstracts coded similarly across all regions. Diagnostic categories were recorded using ICD-9 coding by medical record nosologists and represented the primary physician discharge diagnostic code. Descriptive statistics and crude presentation rates are reported. RESULTS: Over 1 year, 1,493,659 ED visits were recorded; LWBS cases represented 18,672 (1.3%) cases during that period. Young children (ages: <5; 14%) and adults (ages: 20–29; 23%) represent the largest percentage of cases. The elderly (>64 years) represent <5% of the overall LWBS sample. Males (9,332; 50%) and females are similarly represented. Wide seasonal variation (34%) was observed, and December rates were highest (9.7%). LWBS occur most frequently on Mondays (18%) and hourly trends demonstrate a bimodal pattern (peaks in the late morning and early evening hours). Most (16,460 [95%]) patients who LWBS do not repeat this behaviour, but 0.5% of individuals in the province have up to 4 LWBS events per year. The crude rates provincially are 5.7/1000 ED visits; higher than average rates occurred in 1 of the 2 largest urban areas (population >500,000). CONCLUSIONS: This study characterizes annual LWBS cases across a large population. These data suggest further detailed evaluation of LWBS may be fruitful, especially using linkages to other databases to determine eventual outcomes and subsequent health services utilization.
Key words: refusal of care, emergency

050 Compliance with discharge instructions in patients discharged from the emergency department after presenting with chest pain or shortness of breath.
Perng J, Leach J, Ackroyd S, Campbell SG, Smith D. Dalhousie University, Halifax, Nova Scotia.

OBJECTIVES: To assess the follow-up compliance of patients discharged from the emergency department after presenting with the complaint of chest pain or shortness of breath and to assess the agreement between initial diagnosis and follow-up diagnosis. METHODS: A retrospective chart review was performed for patients presenting with chest pain or shortness of breath in the months of February 1998 and 1999. Of 420 patients identified, consent could be obtained for interview in 213 (50.7%). Patients were questioned with regard to initial diagnosis, follow-up instructions and compliance therewith, and diagnosis at follow-up visit. These data were compared to those obtained at chart review. RESULTS: Of the patients that completed follow-up visits 17/89 (19%) reported that a different diagnosis had been made at a subsequent visit. 89/115 (77%) of the patients that reported being told to follow-up with another doctor had done so. 102/213 (48%) records showed documentation of instructions for follow-up. 67/115 (58%) of patients that had reported receiving follow-up instructions had instructions documented in the charts. 43/102 (42%) of patients that reported receiving no instructions had follow-up instructions documented in the charts. CONCLUSIONS: Considerable inconsistencies exist between what a patient perceives as discharge instructions and actual documentation in the chart records. Discharge instructions are complied with in the majority of cases. Initial emergency department diagnoses of patients presenting with chest pain or shortness of breath is commonly in disagreement with subsequent diagnoses.
Key words: compliance, discharge instructions

051 Refusal of transport by hypoglycemic patients following prehospital intravenous dextrose.
Carter AJE, Keane PS, Dreyer JF. University of Western Ontario, London, Ontario.

OBJECTIVES: The prehospital administration of intravenous (IV) dextrose to hypoglycemic patients is one of the advanced life support skills delegated to advanced care paramedics in Ontario. Following a quality assurance review which revealed that 47% of patients were refusing transport after receiving IV dextrose, we conducted a telephone survey to determine if patients had sought additional care in the 2-week period after their refusal of transport. We also questioned all those contacted regarding their level of satisfaction with the care provided by paramedics. METHODS: We reviewed ambulance call report forms of 157 sequential patients who met emergency medical services (EMS) criteria for on-scene treatment of hypoglycemia and attempted to contact all who met study inclusion criteria. Those contacted were asked a standard set of questions regarding the incident. RESULTS: 100 patient follow-up contacts were made over a 12-month period, from April 1999 to March 2000. The population receiving IV dextrose ranged in age from 11 to 93, with a mean of 54.5. Average score on the Glasgow Coma Scale on presentation was 8.96 +/– 3.24, and average blood glucose before dextrose was 2.14 +/– 0.71. Eighty-eight of 157 (56.05%) patients refused transport. Significant differences between the transported group and the refusal group were age (transported 63.5, refused 47.6, $p < 0.001$), and blood glucose (transported 2.34, refused 1.96, $p = 0.001$). There was no difference between the 2 groups in terms of repeat access to the health care system (6 in each group), or in satisfaction with the care provided by paramedics. CONCLUSIONS: We

concluded that the practice of treating patients for symptomatic hypoglycemia, and leaving them at the scene, appears to be safe. All patients treated were satisfied with the treatment they received. Further study of this group of patients is required to be certain that leaving patients at the scene is a safe procedure.
Key words: emergency medical services, hypoglycemia

052 Air medical transport of non-traumatic aortic disasters.
Mitchell A, Tallon J. Dalhousie University, Halifax, Nova Scotia.

OBJECTIVES: To review and describe 4 years of experience with non-traumatic aortic disasters (dissections/ruptures) transported by a new rotor wing, provincially dedicated air medical program. METHODS: Retrospective 4-year review of air medical programs mission records, and review of related hospital records. Patients listed as suspected aortic disaster (non-traumatic) in the air medical records were included. Mission records were reviewed for emergency medical services (EMS) diagnosis, blood pressures pre/post transport, transport times, and mortality. Hospital records were reviewed for diagnosis, interventions/treatment, and mortality. Blood pressures below 80 mm Hg systolic are considered hemodynamically unstable. RESULTS: A cohort of 34 patients were identified. Three deaths occurred within the transport period, 31 (91%) patients arrived at hospital alive. Twenty-five patients (73.5%) arrived at hospital hemodynamically stable, mean out of hospital time was 60 minutes. Nine patients (26.5%) arrived hemodynamically unstable, mean out of hospital time was 54 minutes. There was no significant difference in times between these 2 groups ($p = 0.16$). Overall mortality was 53% (18). Differences in transport time between survivors and deaths was not statistically significant ($p = 0.93$). The diagnoses on admission to hospital: 14 (41%) were RAAA, 5 (15%) AAA no rupture, 8 (24%) aortic dissections, and 4 (12%) had no aortic pathology. Fourteen patients (41%) received emergent surgical intervention. The EMS diagnosis contained the correct diagnosis in 76% of cases. CONCLUSIONS: Our program transported 34 suspected aortic disasters of which 14 were immediate surgical candidates upon arrival. Aortic disaster is not infrequent within our air medical program. There were several patients who did not warrant transport under the context of aortic disaster. Specific policies and procedures based on continuing quality review should be in place to optimize the transport and care of these patients.
Key words: aortic aneurysm, aortic dissection, emergency medical services

053 The pre-hospital use of adenosine for the treatment of supraventricular tachycardia.
Rabin EA, Sosnowski T, Antoniuk J, Rowe BH. University of Alberta, Edmonton, Alberta.

OBJECTIVES: Adenosine is an accepted therapy to abort supraventricular tachycardia (SVT) in the emergency department. Given its ease of use and excellent safety profile, the pre-hospital use of adenosine seems reasonable. This project is the first known report of adenosine use by emergency medical services (EMS) in Canada. METHODS: An SVT protocol incorporating adenosine was developed, implemented and evaluated during 1998–99 in a large Canadian EMS system. Recorded cases of adenosine use were obtained from the records management system, a computerized database of all the patient care reports maintained by this EMS program. Cases from Jan. 1, 1999, to Dec. 12, 1999, were examined in this retrospective chart audit of patients with SVT who received adenosine. RESULTS: Of 57 charts initially identified, 13 were miscoded and adenosine was not actually given, leaving 44 (77%) for full review. In 40 (91%) cases, paramedics followed the SVT treatment protocol for the administration of adenosine. Of the 4 (9%) cases where the protocol was not followed, 2 had tachycardia secondary to an underlying drug overdose and 2 had SVT with vital signs outside of the protocol's definitions. Adenosine was successful in converting the SVT in 33 (75%) cases and was well tolerated by the patients. One (2%) patient deteriorated after administration of adenosine; upon review, this patient had evidence of a more complex underlying cardiac problem. CONCLUSIONS: The administration of adenosine appears safe in the pre-hospital setting. Adenosine was administered by EMS appropriately in most patients and was successful in converting the majority of SVT cases. Adenosine was well tolerated by the patients. Further evaluation is required to determine the accuracy of emergency medical responders' ECG skills to diagnose SVT and to investigate secondary clinical benefits to patients as a result of prompt SVT cessation.
Key words: supraventricular tachycardia, adenosine, emergency medical services

054 Use of Rh prophylaxis in the emergency department for first trimester bleeding: a retrospective review.
Allan RJ, Regan K. University of Western Ontario, London, Ontario.

OBJECTIVES: The use of Rh prophylaxis in the first trimester remains a controversial issue. To date, there has been little published comparing the rate of transplacental hemorrhage in threatened abortion versus a control group; however, it has been shown that completed spontaneous abortion carries an increased rate of sensitization compared to normal pregnancies. Several prominent authorities suggest the use of prophylaxis regardless of gestational age; however, others have argued that the amount of transplacental hemorrhage only becomes a risk at greater than 10–12 weeks. METHODS: This study retrospectively reviews emergency department visits in London, Ontario, during the period of 1990 to the present day, in order to assess current investigation and management of vaginal bleeding in the first trimester. Inclusions were women presenting to the emergency department during the first trimester with vaginal bleeding or abdominal trauma. RESULTS: A total of 408 visits were reviewed, with 297 inclusions. Discharge diagnoses included threatened abortions in 178 (60%), ectopic pregnancy in 40 (13%), and first trimester trauma in 2 (<1%). Of 275 women with Rh status documented on the hospital chart, only 176 (64%) had Rh status documented on the emergency chart. Using hospital chart data, 43 of 275 (14%) with documented blood type were Rh negative. Out of 43 Rh negative females, 25 (58%) cases resulted in loss of the pregnancy. Of these 25, 11 (44%) received Rhogam in the emergency department, leaving 14 (56%) potential isoimmunizing events untreated. Of the 11 treated with Rhogam, 6 were greater than or equal to 10 weeks gestational age, while 5 were less. Using hospital chart data, 43 of 275 (14%) were Rh negative. The number of Rh negative females whose final outcome was spontaneous abortion or ectopic pregnancy was 25 of 43 (58%). Of these 25, 11 (44%) received Rhogam in the emergency department, leaving 14 (56%) potential isoimmunizing events untreated. CONCLUSIONS: The results of this review suggest the need for consensus and a physician education initiative on the management of first trimester vaginal bleeding.
Key words: threatened abortion, ectopic pregnancy

055 Evaluation of controlled-release oxycodone (OxyContin) q12h in the treatment of acute traumatic pain.
Ducharme J, Eisenhoffer J, Quigley P, Harsanyi Z, Darke AC. Saint John Regional Hospital, Saint John, New Brunswick.

OBJECTIVES: Pain is the most common presenting complaint in emer-

gency departments (EDs) but may be under-evaluated and under-treated. The purpose of this study was to evaluate controlled-release (CR) oxycodone (OxyContin, Purdue Pharma) in the control of pain following acute trauma, using a fixed or variable 12 hourly dose for 5 days. METHODS: Eighteen evaluable patients presented in the ED within 48 hours of sustaining a single impact injury caused by acute deceleration or flexion. Patients were given an initial dose of 20 mg and then randomly assigned to take CR oxycodone 20 mg q12h or 10–30 mg q12h for the next 5 days. Since the mean doses (40.0 ± 0.00 and 40.1 ± 9.7 mg/day) and pain scores ($p = 0.3393$) across 5 days were not different between the treatments, the groups were combined. RESULTS: The mean baseline pain score was 64.7 ± 24.0 mm (100 mm VAS). Pain scores decreased to 50.0 ± 25.5 ($p = 0.0344$) and 31.6 ± 25.6 mm ($p = 0.0003$) during the first 30 minutes and 7 hours, respectively. The average daily pain score decreased to 20.0 ± 24.6 ($p < 0.0001$) by day 5. Difficulty in falling asleep (100 mm VAS) and nighttime and morning awakening (100 mm VAS) due to pain, improved throughout the study period (18.1 to 8.0, $p = 0.0180$; 17.7 to 3.8, $p = 0.2249$; and 19.5 to 6.1 $p = 0.3479$; respectively). Average nausea and drowsiness scores (100 mm VAS) were 10.23 ± 12.60 and 18.87 ± 15.40 respectively. CR oxycodone was rated moderately or highly effective by 94% of patients. The most commonly reported adverse events were somnolence, nausea, and constipation. CONCLUSIONS: Oxycodone is an effective and rapidly acting agent for the treatment of pain following acute traumatic injury. A 12 hourly dosing schedule, using a fixed or patient-determined dose is feasible for the treatment of acute traumatic pain.
Key words: pain, analgesia, oxycodone

056 Underdosing of acetaminophen by parents.
Goldman RD, Scolnik D. The Hospital for Sick Children, University of Toronto, Toronto, Ontario.

OBJECTIVES: Acetaminophen is widely used for antipyresis in pediatrics. We conducted this study to find the rate of underdosing of this drug in a pediatric emergency department (PED) and whether visits would have been avoided if fever had subsided at home after antipyretic treatment. METHODS: We interviewed 90 randomly selected parents of children >28 days old with fever >38ºC in the previous 24 hours and visiting the PED because of the fever. Parents were shown pictures of acetaminophen packages and were asked the dose of the medication given to their child and if they had checked the recommended dosage on the box before giving that dose. RESULTS: 80 questionnaires were suitable for enrollment. Mean age was 35 months (standard deviation [SD] 32) and 38.8% had had fever for less than 24 hours. Half (48.1%) of the parents administered an underdose of acetaminophen (<10 mg/kg), 35.4% gave the recommended dose (10–15 mg/kg) and 16.5% administered an ovedose. Almost all (96.3%) of the parents had read the package before administrating the medication. English was the language spoken at home in 64.5%. 58.2% of parents would not have come to the PED if fever had subsided at home. Parents underdosed significantly more in children over 2 years of age ($p = 0.024$). We found no correlation between dosage given and parental age, education, decision not to come to the PED if the fever declined or whether English was the primary language spoken at home. CONCLUSIONS: In our study population, many PED visits could have been prevented if optimal acetaminophen dosages had been administered. This was especially true in children >2 years old. Health care professionals should inquire about acetaminophen dosage given at home as part of their history taking, and efforts should be made to educate parents regarding the recommended dose of acetaminophen.
Key words: acetaminophen, fever, pediatric

057 Emergency department treatment of paroxysmal atrial fibrillation.
Kapur AK. University of Ottawa, Ottawa, Ontario.

OBJECTIVES: Atrial fibrillation is the most common arrhythmia managed in emergency departments. There is no consensus on the safest and most efficacious emergency department treatment of clinically stable paroxysmal atrial fibrillation: rate control only, pharmacologic cardioversion, or primary electrical cardioversion. METHODS: This prospective observational cohort study reviewed all adult patients with clinically stable paroxysmal atrial fibrillation presenting to an emergency department of either of the 2 participating hospitals. Patients with either new-onset or recurrent paroxysmal atrial fibrillation were eligible. Exclusion criteria included current episode of fibrillation lasting more than 48 hours or an unknown length of time, pregnancy, or previous inclusion in this study. Demographic information and medical history were collected on each patient, as well as information on the treatment received during the emergency department visit, including rate control medications, any attempts at cardioversion, their success rate, and any complications. Patients were contacted 4 weeks after their visit and interviewed regarding recurrence of atrial fibrillation and further medical treatment received. A quality of life survey (SF-36) was also administered. Data collection started in September 2000 and will continue until February 2001. RESULTS: Descriptive data will be presented on the outcomes of the different treatment approaches including success rate of cardioversion (proportion of patients in sinus rhythm at emergency department discharge and at 4-week follow-up), complication rate, recurrence of fibrillation, and patient preference as determined by the quality of life score. Comparisons will be made after controlling for variables other than treatment approach. CONCLUSIONS: This is the first prospective study of emergency department treatment of stable paroxysmal atrial fibrillation. The information provided on the outcome of the different treatment approaches and on patient preferences will be useful to guide physician practice and will allow determination of the feasibility of a randomized trial.
Key words: atrial fibrillation, therapy, emergency department

058 SLiC: Stat lactate in chest pain for the early detection of acute myocardial infarction.
Lee J, Gatien M, Stiell I, Ooi D, Wielgosz A. The Ottawa Hospital, Ottawa, Ontario.

OBJECTIVES: Current biochemical markers are not sensitive for acute myocardial infarction (AMI) until 6 hours after the onset of chest pain. The objective of this study was to determine the sensitivity of venous lactate drawn at the time of presentation for AMI in ED chest pain patients. METHODS: We prospectively enrolled patients >25 years of age presenting with non-traumatic chest pain where the emergency physician (EP) ordered an electrocardiogram and any bloodwork as part of their investigation. A cutoff of >1.5 mmol/L was used for venous lactates. The charts of all admitted patients where reviewed at discharge to determine whether they met WHO criteria for AMI. Both the treating EPs and the investigator determining outcomes were blinded to lactate levels. Discharged patients were followed by telephone 3 to 4 weeks after discharge. RESULTS: We report the results of the first 299 patients enrolled. The mean age was 64 years, 160 patients (54%) were male, and 169 (57%) were discharged. No discharged patient reported a subsequent MI at phone follow-up, with 14 (4.7%) lost to follow-up. Serum lactates were elevated on presentation in 27/29 patients with AMI (sensitivity 93%, 95% confidence interval [CI] 90%–96%). Specificity was 45%, and

the negative predictive value 98%. By comparison, the troponin (TnT) was positive at the time of presentation in only 12/29 patients (sensitivity 41%, 95% CI 34%–49%) with AMI. Although stat lactate missed 2 patients with AMI, 1 of these patients had no elevation in CK or TnT until 7 hours after presentation. CONCLUSIONS: Serum lactate shows promise as a rapidly available and inexpensive marker for AMI. Further study should be undertaken to define high risk groups based on clinical variables to maximize the sensitivity and specificity.
Key words: myocardial infarction, lactate

059 Atenolol overdose successfully treated with calcium chloride.
O'Grady JP, Anderson S, Pringle D. University of Western Ontario, London, Ontario.

OBJECTIVES: Atenolol, a selective $beta_1$-adrenergic antagonist, as well as other beta blockers are used for their efficacy in the treatment of hypertension, ischemic heart disease and certain arrhythmias. Only a few severe atenolol intoxications have been reported and only 1 that we know of has used calcium chloride in its treatment. However, this was 48 hours post ingestion and levels of atenolol at that time where most likely negligible. Also, only 1 case of propranolol, a non-selective $beta_1$-adrenergic antagonist, describes the use of calcium chloride as a possible treatment. METHODS: We present a case of atenolol overdose and successful treatment with calcium chloride in a 50-year-old woman. Upon arrival to the emergency department, the patient's blood pressure was in the 50–60 systolic range and her rhythm strip showed a first degree heart block. Conventional treatment proved unsuccessful and the patient was given calcium chloride to which she responded dramatically. RESULTS: A review of the literature using MEDLINE and the bibliographies of all journal articles found, as stated previously, that calcium chloride is not the usual agent of choice for the treatment of beta blocker overdoses. The pharmacokinetics of atenolol, the signs and symptoms of beta blocker overdosage as well as the main method of cardiotoxicity of $beta_1$-adrenergic antagonists are discussed. Furthermore, the 2 reported cases of beta blocker overdoses treated with calcium chloride are reviewed. Finally, treatment options for atenolol and other beta blocker overdoses are presented and the scientific data supporting the treatment of atenolol intoxications with calcium chloride are examined. CONCLUSIONS: The results of our case, as well as the examination of other cases and the review of relevant literature, has led us to conclude that calcium chloride should be part of the arsenal of therapies used for treatment of beta blocker overdoses and, more specifically, atenolol. This being said, treatment of beta blocker overdoses and other drugs should be done in contact with the local poison control centre.
Key words: atenolol, beta blocker, intoxication

060 Comparison of emergency room asthma care to current Canadian asthma guidelines.
Thompson D, McCauley W. University of Western Ontario, London, Ontario.

OBJECTIVES: The emergency department (ED) management of asthma is challenging to the physician owing to the spectrum of illness severity, the variable response to treatment, and the need for the safe disposition of patients. In 1999, the *Canadian Asthma Consensus Report* issued guidelines for the diagnosis and management of asthma in the ED. The objective of this study is to compare the documented care given in our department with the Level I recommendations for asthma management proposed in these guidelines. METHODS: Two hundred and fifty ED records with the discharge diagnosis of asthma were randomly selected from those charts presenting between Jan. 1, 1999, and Dec. 31, 1999. One hundred and ninety eligible charts were reviewed for documentation of practice pertaining to the Level I recommendations published in the *Canadian Asthma Consensus Report* (1999). RESULTS: The use of B_2-agonists was documented almost universally (98%), but compliance with metered dose inhaler (MDI) delivery was documented in only 6% of cases. Systemic steroids were given to 61% of patients, with 52% being administered within 1 hour of presentation. Steroids were continued after discharge in 64% of eligible patients, with only 20% receiving the recommended 7–14 day course. Nineteen percent of eligible patients were started de novo on inhaled steroid therapy from the ED. CONCLUSIONS: There are significant differences in the ED management and treatment of asthmatic patients when compared to Level I recommendations for asthmatic care in the *Canadian Asthma Consensus Report*. Notable lack of compliance exists in our use of MDI, rapid administration of systemic steroids, initiation of inhaled steroids from the ED and duration of oral steroid therapy at discharge. Future plans include the prospective collection of data, which will include patient outcomes.
Key words: asthma, therapy

061 Proton pump inhibitors in acute upper gastrointestinal bleeding peptic ulcers: a meta-analysis.
Zed PJ, Loewen PS, Slavik RS, Marra CA. CSU Pharmaceutical Sciences, Vancouver Hospital, University of British Columbia, Vancouver, British Columbia.

OBJECTIVES: To evaluate the efficacy of proton pump inhibitors (PPIs) compared to placebo and histamine receptor antagonists (H_2RA) for reducing the incidence of rebleeding, surgery and death in acute gastrointestinal bleeding (GIB) associated with peptic ulcer disease. METHODS: A systematic search of the English-language literature using MEDLINE, EMBASE, and Pre-MEDLINE and a manual search of references. Selected prospective, randomized, controlled trials evaluating any PPI for acute GIB in adults with the endpoints of rebleeding, surgery or death. Data synthesis: 9 trials (1,829 patients) were included. RESULTS: The relative odds of rebleeding indicated a 50% reduction in the PPI-treated group (OR 0.50 [95% CI 0.33–0.77], p = 0.002, NNT = 9, [95% CI NNT 6–13]). The relative odds of surgery indicated a 53% reduction in the PPI-treated group (OR 0.47 [95% CI, 0.29–0.77], p = 0.003, NNT = 17 [95% CI 12–35]). The relative odds for mortality indicated a non-significant 8% decrease in the odds of death in the PPI-treated group (OR 0.92 [95% CI, 0.46–1.83], p = 0.26). CONCLUSIONS: PPIs are superior to H_2-blockers and placebo in preventing rebleeding and the need for surgery in patients with GIB although do not appear to reduce mortality.
Key words: proton pump inhibitors, peptic ulcer, gastrointestinal bleeding

062 Efficacy of once daily cefazolin/probenecid for the outpatient management of skin and soft tissue infections.
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OBJECTIVES: To evaluate the efficacy of once daily cefazolin/probenecid for an emergency department (ED) based outpatient treatment program for the management of skin and soft tissue infections (SSTIs). METHODS: A retrospective chart review of all patients treated with cefazolin 2 g IV daily in combination with probenecid

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1 g PO daily for treatment of SSTI over a 1-year period in the ED--based outpatient program were evaluated. The primary outcome was clinical treatment success defined as discharge from the outpatient program on either no therapy or on oral antibiotics alone following improvements or resolution of the infection. Patients who required hospitalization, failed to return to the program for follow-up or were enrolled in the home IV antibiotic program for longer treatment duration were deemed to have failed on the cefazolin/probenecid regimen in the outpatient program. RESULTS: 346 patients received cefazolin/probenecid for SSTI over a 1-year period for a mean treatment duration of 3.5 days (standard deviation [SD] = 1.9 days). Mean age of patients was 44.8 years (SD = 17.5 years) and 67% were male. Overall, treatment success was achieved in 304 (87.9%) of patients who were discharged from the outpatient program. Treatment failures occurred in 42 (12%) patients. Twenty-eight (8.1%) patients failed to return for follow-up to the outpatient program and 14 (4.0%) required hospitalization for failure to improve in the outpatient program. Overall, 1225 hospital days of admission were avoided by treating these patients in the outpatient program. CONCLUSIONS: Once daily cefazolin/probenecid is an effective regimen for the outpatient treatment of SSTI in the ED. These data suggest that many patients with uncomplicated SSTI can be treated as outpatients, avoiding a more costly hospitalization.

Key words: cellulitis, cefazolin

063 Prevalence and prognosis of traumatic intraventricular hemorrhage in blunt head injury patients.

Atzema C, Mower WR. UCLA, Los Angeles, California.

OBJECTIVES: Traumatic intraventricular hemorrhage (tIVH) has received limited attention in the medical literature, with the largest study containing only 43 cases. Knowledge of the prevalence and prognosis of tIVH could improve our ability to treat affected patients, potentially decreasing the morbidity and mortality of tIVH. METHODS: As part of the NEXUS II study we prospectively enrolled all blunt trauma patients undergoing computed tomography (CT) at 8 trauma centres. Age, sex, presence of coagulopathy, and CT diagnosis were recorded for each patient. Long-term follow-up was obtained for patients from 3 sites. The data was analyzed for prevalence of tIVH, associated intracranial injuries, coagulopathies, hydrocephalus, and outcomes. RESULTS: Of 492 patients having CT findings, 70 (14%) exhibited tIVH, including 13 (19%) who exhibited isolated tIVH. Patients ranged in age from 1 to 95 years, and 70% were male. Of 21 cases with long-term follow-up, 9 (43%) were discharged to home with minimal or no disability, 7 (33%)went to long-term rehabilitation facilities, and 5 (24%) died. Six of the 9 patients discharged to home had only minor additional injuries on CT. Four of the 7 patients sent to rehabilitation facilities and 1 of the 5 patients who died exhibited only minor associated injuries on CT (relative risk [RR] 0.65; 95% confidence interval [CI] 0.30–1.39). Three of the 21 patients had isolated tIVH, and 1 required long-term rehabilitation (RR 0.55; CI 0.11–2.82). Three patients had coagulopathies, including 2 with tIVH as their only finding (RR 4.06; CI 1.55–10.66). Six patients developed hydrocephalus (9%), 3 of whom had only minor associated CT findings (RR 2.18; CI 0.48–9.96). CONCLUSIONS: tIVH is found in 14% of blunt head injury patients with CT abnormalities. Isolated tIVH is common and is associated with a better prognosis. Coagulopathy may be an antecedent factor in many cases of isolated tIVH.

Key words: brain injury, hemorrhage

064 What if the Canadian CT Head Rule derivation had been restricted to cases without the proxy outcome?

Stiell IG, Clement C, Cass D, Schull M, Morrison L, Wells GA, et al, for the CCC Study Group. University of Ottawa, Ottawa, Ontario.

OBJECTIVES: The Canadian CT Head Rule has been criticized because the original derivation determined outcomes with the proxy outcome telephone measure, rather than computed tomography (CT), for 1/3 of cases. This methodological sub-study repeated the derivation analyis using only the sub-set of minor head injury patients who underwent CT. METHODS: This secondary data analysis was based upon a prospective cohort study that enrolled adults with loss of consciousness, amnesia, or confusion and a Glasgow Coma Scale (GCS) score of 13–15 at 10 Canadian emergency departments (EDs). Data collection included a 22-item physician data form, CT reports, ambulance reports, and in-hospital records. The outcome measures were clinically important brain injury and need for neurological intervention. For this study, chi-square recursive partitioning analyses (KnowledgeSEEKER) assessed the sub-set of patients who underwent CT. Sensitivity, specificity, and CT rates were estimated. RESULTS: Comparing patients who underwent CT ($n = 2,078$) to the original CCC Study patient group ($n = 3,121$), respectively: initial GCS score 13%–5.2% vs. 3.5% ($p < 0.01$), initial GCS score 14%–3.6% vs. 16.7% ($p < 0.0001$), arrived by ambulance 79.5% vs. 72.7% ($p < 0.0001$), transferred 17.2% vs. 12.8% ($p < 0.0001$), admitted 36.4% vs. 27.0% ($p < 0.0001$), any acute brain injury on CT 16.6% vs. 11.2% ($p < 0.0001$), important brain injury 12.1% vs. 8.1% ($p < 0.0001$), required neurological intervention 2.1% vs. 1.4% ($p = 0.05$). In the CT only sub-set, the 5 "high-risk" factors from the CT Head Rule predicted need for neurological intervention with sensitivity 100% (95% confidence interval [CI] 92%–100%), specificity 57.5% (55%–60%), and required CT rate 43.7%. The additional 2 "medium-risk" factors predicted important brain injury with sensitivity 98.4% (95% CI 96%–99%), specificity 36.3% (34%–38%), and required CT rate 67.9%. CONCLUSIONS: The patients in the CT only sub-set had more serious characteristics than those in the original study population. The Canadian CT Head Rule performed equally as well in this group as in the original derivation study.

Key words: brain injury, computed tomography, clinical prediction rule

065 How valid is the concept of "clinically unimportant" brain injury in patients with minor head injury?

Stiell IG, Lesiuk H, Brison RJ, Clement C, De Maio VJ, Wells GA, et al, for the CCC Study Group. University of Ottawa, Ottawa, Ontario.

OBJECTIVES: The Canadian CT Head Rule was developed to help physicians predict which minor head injury patients have important brain injury (IBI) on computed tomography (CT). This sub-study evaluated the clinical validity of the concept "clinically unimportant brain injury" (CUBI), as previously endorsed by academic neurosurgeons. METHODS: The prospective cohort study enrolled adults with loss of consciousness, amnesia, or confusion and a Glasgow Coma Scale (GCS) score of 13–15 at 10 Canadian EDs. Data collection included MD dataforms, CT reviews by study neuroradiologists, in-hospital records, and 14-day telephone follow-up. Patients were considered to have CUBI, and therefore require neither admission nor specialized follow-up, if neurologically intact with 1 of these CT lesions: solitary contusion <5 mm in diameter, localized subarachnoid blood <1 mm thick, smear subdural hematoma <4 mm thick, or closed depressed skull fracture not through inner table. This study compared the characteristics of IBI and CUBI patients by chi-square

and Student's t-test analyses. RESULTS: Among the 3,121 patients, there were 254 (8.1%) IBI cases and 94 (3.0%) CUBI cases:

Table 1. Characteristics of the 254 (8.1%) important brain injury (IBI) cases and the 94 (3.0%) clinically unimportant brain injury (CUBI) cases in this study

Characteristic	IBI cases	CUBI cases	*p* value
Age, yr	49.7	40.1	0.01
Linear/Basal #	26%	16%	0.06
CT findings			
Contusion	62%	38%	<0.0001
Subarachnoid	44%	46%	0.83
Subdural	31%	18%	0.02
Epidural	15%	0%	<0.0001
Cer. hematoma	7%	0%	<0.01
Depressed #	6%	2%	0.12
Admitted	94%	63%	<0.0001
Intervention	17%	0%	<0.0001
Craniotomy	11%	0%	<0.001
Elevation #	4%	0%	0.06
Intubation	2%	0%	0.17
Death	2%	0%	0.22
Telephone follow-up			
Moderate headache	47%	29%	0.19
Seizure	3%	0%	0.49
Arm weakness	14%	6%	0.38
Normal activities	19%	47%	0.02

CONCLUSIONS: Patients with CUBI had fewer CT lesions, admissions, and follow-up problems. No patient with CUBI required neurological intervention or died from head injury. This study confirms the validity of the concept of CUBI for minor head injury patients.
Key words: brain injury, computed tomography, clinical prediction rule

066 Comparison of recursive partitioning and logistic regression modelling in the derivation of the Canadian CT Head Rule.
Stiell IG, Wells GA, De Maio VJ, Clement C, Brison RJ, Cass D, et al, for the CCC Study Group. University of Ottawa, Ottawa, Ontario.

OBJECTIVES: The Canadian CT Head Rule for use of CT in minor head injury was derived by recursive partitioning (RP) analysis. This study compared the accuracy of the CT Head Rule to a model developed by an alternate statistical technique, logistic regression (LR). METHODS: This secondary data analysis was based on a prospective cohort study conducted in 10 Canadian emergency departments (EDs) and involved adults with loss of consciousness, amnesia, or confusion and a Glasgow Coma Scale (GCS) score of 13–15. Physicians completed a 22-item data form for all patients who then underwent CT scan. The outcome measures were need for neurological intervention and important brain injury. Variables correlated with these outcomes on univariate analysis and having kappa values >0.6 were then assessed by 2 multivariate statistical techniques. Chi-square RP analysis (KnowledgeSEEKER) was used for the original CT Head Rule derivation and forward stepwise LR (SAS) was used for this analytic study. RESULTS: The CT Head (CCC) Study dataset contained 3,121 minor head injury cases, including 44 (1.4%) requiring neurological intervention and 254 (8.1%) with important brain injury. 27 variables demonstrated univariate p-values <0.05 and 10 had kappa values >0.60. The RP model lost no cases to missing values and contained 7 variables. The LR model lost 80 cases to missing values and contained 8 variables, including the new "drop in GCS score." Comparing the RP to the LR models for identifying important brain injury: area under receiver operating characteristic (ROC) curve 0.893 vs. 0.894 (p = NS), sensitivity 98.4% vs. 98.4% (p = NS), specificity 48.4% vs. 48.2% (p = NS), and required CT rate 55.4% vs. 55.4%. Both models performed with 100% sensitivity for identifying need for neurological intervention. CONCLUSIONS: Both statistical approaches lead to models with very similar measures of performance. As in previous studies, RP provides a more parsimonious model that is likely to be more acceptable to clinicians.
Key words: brain injury, computed tomography, clinical prediction rule

067 Interobserver agreement in the assessment of patients with minor head injury.
Stiell IG, Wells GA, Clement C, Brison R, McKnight RD, Worthington JR, et al, for the CCC Study Group. University of Ottawa, Ottawa, Ontario.

OBJECTIVES: To determine interobserver agreement in the MD assessment of clinical findings in minor head injury patients. This methodological sub-study was an important component in the derivation study for the Canadian CT Head Rule. METHODS: This prospective cohort study was conducted in 10 Canadian EDs and involved adults with loss of consciousness, amnesia, or confusion and a Glasgow Coma Scale (GCS) score of 13–15. MDs evaluated patients for 22 standardized clinical findings before imaging and performed blinded interobserver assessments when feasible. Analyses included the simple or weighted kappa coefficient with 95% confidence intervals (CIs). RESULTS: 202 assessments were conducted on 101 patients who were similar to those of the main study population for: mean age (37.7; range 16–90), male (71.3%), falls (36.6%), motor vehicle collision (MVC) (24.8%), ambulance arrival (72.3%); they had a higher rate of admission (42.6%) and clinically important brain injury (14.9%). Kappa values for the clinical findings were:

Table 1. Kappa values for the clinical findings in this study

Clinical finding	Kappa	95% CI
Loss of consciousness	0.83	0.71–0.94
Any amnesia	0.52	0.25–0.79
Headache	0.61	0.40–0.83
Chronic alcohol abuse	0.71	0.47–0.95
Repeated vomiting*	0.86	0.68–1.0
Glasgow Coma Scale		
Eye opening	0.79	0.51–1.0
Verbal	0.75	0.56–0.94
Total score*	0.84†	0.71–0.97
Pupils equal/reactive	0.66	0.04–1.0
Lateralizing weakness	0.66	0.04–1.0
Possible open skull #*	0.85	0.57–1.0
Signs basal skull #*	0.76	0.53–0.99
Unreliable due to alcohol	0.54	0.21–0.87
Object recall score	0.64†	0.50-0.78

* Component of Canadian CT Head Rule
† Weighted kappa

CONCLUSIONS: Findings with only moderate agreement were "any amnesia" and "unreliable exam due to ETOH." All components of the Canadian CT Head Rule showed excellent interobserver agreement suggesting that physicians should be able to consistently interpret the overall rule. This reliability will be explicitly and prospectively evaluated in ongoing studies.
Key words: brain injury, computed tomography, clinical prediction rule

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068 The Nova Scotia Cellulitis Guidelines: a pilot study.
Campbell SG, Burton-MacLeod R, Pierce S, Ackroyd S, Gerami D. Dalhousie University, Halifax, Nova Scotia.

OBJECTIVES: To assess the safety of a 4-level grading system and algorithm to treat adults with cellulitis and to monitor physician compliance and approval. METHODS: A prospective study observing physician compliance with the algorithm and patient outcome for an 8-week period after introduction of the algorithm was performed. Consenting patients were contacted in 7–10 days to assess outcome. Physician compliance was graded according to the number of elements of the algorithm followed. RESULTS: A total of 146 patients visited the ED during the study period (182 visits). The mean age was 47 years and 63.7% were female. From the visits made, 57.1% were Grade 1, 16.5% Grade 2, 12.9% Grade 3, and 0.6% Grade 4 infections. 12.9% had insufficient information to establish a grade. 51.3% of patients received oral antibiotics, 20.9% received intravenous antibiotics, and 27.8% received both. Of 57 consenting patients, 54 were followed-up. From these patients contacted 90.7% reported improvement in their condition, 5.6% no change, and 3.7% worse. Following the physician questionnaire, 84.6% had relied on the algorithm during the study period. 85.7% felt the algorithm should be permanently implemented in the ED. The chart review showed compliance with the algorithm in 25.4% of evaluable visits. Of compliant visits, 81.8% of the patients followed-up indicated their condition was improved. CONCLUSIONS: This pilot study suggests that the use of a 4-level grading system and algorithm for the ED management of cellulitis is safe for patients, and its use is acceptable to physicians. Further studies are planned.
Key words: cellulitis

069 Vehicle effects on efficacy of salicylate adsorption by activated charcoal in a gastrointestinal tract model.
Dagnone D, Matsui D, Rieder MJ, Freeman DJ. Children's Hospital of Western Ontario, London, Ontario.

OBJECTIVES: Activated charcoal (AC) is the antidote of choice for therapy of ingestions in children. Charcoal is often given with vehicles to improve palatability. Our hypothesis was that AC can be mixed with flavouring vehicles without altering its ability to adsorb toxic levels of acetylsalicylic acid (ASA) in vitro using a gastrointestinal model. METHODS: The 4 vehicles chosen were water, chocolate milk, orange juice and a cola beverage. ASA was added to 5 ml of human gastric fluid from each of 10 children aged 7 to 15 years. The dose used was calculated from a 10-kg child at a toxic dose of 10 mg/kg. Activated charcoal was mixed with an equal volume of vehicle to achieve a concentration of 1 gm/kg. Incubation was continued for a further 5 hours and aliquots were taken. The pH of the solution was initially adjusted to 3.0 and then increased at 180 minutes to 7.0 to mimic the transit of gastric fluid to the intestine. Concentrations of ASA and total salicylate were determined for the 4 vehicles studied using an HPLC assay system. RESULTS: All 4 vehicles lowered the concentration of salicylates from toxic concentrations (3000 ug/ml) to significantly lower concentrations (18 ± 4% of original concentration, $p > 0.05$) within 30 minutes. There was no significant difference in effect between the 4 vehicles. After the increase in pH at 180 minutes, there was a sharp and significant increase in salicylate concentrations for all 4 vehicles (64 ± 5% of original concentration, $p > 0.01$, at time 300 min). This increase was most marked for chocolate milk (71 ± 3%, $p > 0.05$). CONCLUSIONS: The results of this study suggest that activated charcoal may be less useful in the reduction of toxic concentrations than is currently believed, and that vehicles may have more effects than previously appreciated.
Key words: intoxication, salicylate, activated charcoal

070 Accuracy of prehospital assessment of acute pulmonary edema.
Lett DA, Petrie D, Ackroyd S. Queen's University, Kingston, Ontario.

OBJECTIVES: Acute pulmonary edema (APE) due to congestive heart failure (CHF) is a common and serious reason for emergency medical services (EMS) activation. However, only appropriate interventions will reduce morbidity, mortality and patient discomfort. The purpose of this study was to determine the accuracy of paramedics in determining whether APE was present in the prehospital setting. In addition, we sought to describe and compare patients that used EMS versus those that did not, when presenting with chest pain or respiratory distress. METHODS: The study involved a 5-week prospective review of ED patient records and paramedic records for all 806 patients presenting to the Queen Elizabeth II Health Sciences Centre with chest pain or respiratory distress. A predetermined data abstracting form was used. Data collected for all patients included age, gender, chief complaint, emergency department (ED) diagnosis, and disposition. Several additional variables were collected for patients who came by ambulance with an ED diagnosis or paramedic impression of CHF. Paramedics were not aware that this study was taking place. Data was analyzed using *t*-tests, X^2, and Fisher's exact tests. Significance was achieved if $p < 0.05$. RESULTS: There were 48 cases of ED confirmed CHF, of which 25 came by ambulance. Of the ambulance transports, the paramedics recorded an impression of CHF in 14 cases; 6 of these were later confirmed by ED physicians, 6 were clearly incorrect, and 2 were indeterminant due to a vague recorded impression. The impression of CHF by a paramedic had a specificity of 0.95, a sensitivity of 0.24 and an accuracy of 86%. All of the patients with correct paramedic impressions of CHF were admitted to hospital, versus 66% of those with the incorrect impression. CONCLUSIONS: These findings show that the accuracy of paramedics in recognizing APE could, and should, be improved prior to a randomized controlled evaluation of the effectiveness of prehospital interventions for APE.
Key words: congestive heart failure, pulmonary edema

071 Towards a "No Pain Zone": Does a pain awareness program in triage targeting pediatric musculoskeletal injuries increase pain assessment and intervention?
Duggan L, Vukov I, Littlejohn A, Chu L, Wood C, Bruce E, et al. Hospital for Sick Children, University of Toronto, Toronto, Ontario.

OBJECTIVES: Patients with musculoskeletal injuries may wait for hours to be assessed by a physician, therefore early pain assessment and intervention are essential. The "No Pain Zone" program was created to encourage pain assessment during triage. This study was conducted to compare pain assessment and intervention rates before and after program implementation. METHODS: A prospective, interventional, non-randomized cohort chart review design was used. All patients presenting with musculoskeletal injuries to our tertiary-care pediatric emergency department from July 1 to August 31, 2000, were included. Data was collected for 2 weeks before and 4 weeks after initiating the program. There was a 2-week suspension of data collection midway, during the introduction of the program. It consisted of a general pain awareness campaign and intensive one-on-one teaching of age-appropriate pain scales. Incorporation of pain

scales into triage assessment was encouraged. Appropriate interventions for pain were left to the discretion of the triage nurse. Primary outcomes were frequency of pain assessment, either using pain scales (formal) or subjective clinical assessment (informal), and frequency of interventions. These variables were compared before versus after the program using the 2-tailed chi-square test. RESULTS: There were 567 patients in total, with 233 presenting before, and 334 presenting after the program. Pain assessment, including formal and informal methods, increased from 43.8% to 56.0% ($p = 0.005$). Total interventions increased from 17.6% to 26.9% ($p = 0.011$). Patients assessed by formal pain scale were more than twice as likely to receive an intervention as compared to those assessed informally (48.4% vs. 21.5%, $p < 0.0005$). CONCLUSIONS: The "No Pain Zone" program was associated with an increase in pain assessment and intervention. The use of formal pain assessment was associated with a considerable increase in interventions. This provides support for the addition of formal pain assessment in triage to reduce pain in the emergency department.
Key words: analgesia, pain, pediatric

072 *Canadian Emergency Department Triage and Acuity Scale* triage: reliability for high acuity patients.
Grafstein E, Innes G, Christenson J, Clarke L. St. Paul's Hospital, Vancouver, British Columbia.

OBJECTIVES: The *Canadian Emergency Department Triage and Acuity Scale* (*CTAS*) is a national triage standard. *CTAS* acuity levels correlate with patient morbidity and mortality, nursing workload, admission rate, hospital length-of-stay and diagnostic test use. In future, the *CTAS* will be used to compare acuity and utilization across emergency departments (EDs), but coding variability may limit the validity of such comparisons. Our objective was to determine nurse-assigned acuity levels in a cohort of ED patients with complaints defined in the *CTAS* as Level 1. METHODS: A 1-year retrospective cohort study was performed at St. Paul's Hospital, an urban Vancouver teaching centre. Our triage nurses code patients by selecting the most appropriate presenting complaint from an electronic menu, which then suggests a *CTAS*-based acuity level (1–5). Nurses may override the suggested level and enter their own, based on subjective assessment. We recorded nurse-assigned acuity levels in consecutive patients with the triage complaints below, specifically defined as Level 1 within the *CTAS*. RESULTS: Of 50,406 patients seen, 350 had *CTAS*-defined Level 1 complaints. Of these, 101 (29%) were coded as Level 1, 164 as Level 2 (47%), 75 as Level 3 (21%), and 10 (3%) as Level 4 or 5. Of 50,056 patients with *CTAS* Levels 2–5 complaints, 30 patients were coded as Level 1.

Table 1. Data for the 350 patients who had *CTAS*-defined Level 1 complaints

Triage complaint, *n*	Coded Level 1 (%)	Admit, *n* (%)
Cardiac arrest, 93	54 (58)	77 (82)
GI bleed + shock, 34	1 (3)	28 (82)
Respiratory arrest, 20	6 (30)	14 (70)
GCS <8, 150	16 (11)	70 (47)
Status epilepticus, 25	5 (20)	16 (64)
Major trauma, 28	18 (64)	22 (79)
Total: 350	110 (31)	227 (65)

CONCLUSIONS: Subjective nursing assessments differ substantially from *CTAS*-based acuity recommendations. Nurses often down-triage high acuity patients. A standardized computer algorithm may improve triage reliability and facilitate cross-site case-mix comparisons.
Key words: triage, acuity, case mix

073 Effect of a pneumococcal vaccine program on emergency department presentations.
Grafstein E, Daly P, Buxton J, Thorne A. St. Paul's Hospital and Vancouver Regional Health Board, Vancouver, British Columbia.

OBJECTIVES: Vancouver's Downtown East Side (DTES) is an area with many injection drug users, alcoholics, HIV and poor overall population health. St. Paul's Hospital, an urban, teaching centre, is the primary facility that serves the DTES. In November 1999, the Vancouver regional health board instituted a pneumococcal vaccine program and vaccinated 10,000 DTES residents, only 70% of whom had a permanent address. Our objective was to assess the impact of the pneumococcal vaccine program on the volume of pneumonia seen in our emergency department (ED). METHODS: A retrospective case control study was undertaken comparing the incidence of pneumonia 1 year before (Dec. 1998–Nov. 1999) and 1 year after (Dec. 1999–Nov. 2000) the vaccine campaign. For any patient, only the initial visit was counted as a case. Subsequent visits by the same patient >1 month after initial diagnosis of pneumonia were counted as a new case. Patient records were reviewed using an electronic ED database and linked to the regional immunization database. RESULTS: In the prevaccine period, 863 of 51,825 ED visits (1.67%) were pneumonia cases. In the postvaccine period, 646 of 49,981 ED visits (1.29%) were pneumonia cases ($p < 0.001$). There were fewer cases of pneumonia noted in almost every month and hospital admissions through the ED decreased by 25%. During this time there were no additional community clinics established and ED volumes at other nearby hospital EDs did not increase. In comparison, asthma incidence was 537 in 1999 and 524 in 2000 with a $p = 0.87$ and 95% confidence interval (–0.0014, 0.0010). The percentage of all patients with pneumonia living in the DTES before and after the vaccine program was 25%. There were 41 patients who received pneumococcal vaccine and developed pneumonia. CONCLUSIONS: A pneumococcal vaccination program may have contributed to a decrease in pneumonia seen in our high risk population.
Key words: pneumonia, pneumococcal vaccine

074 Clinical practice guideline (CPG) accessibility and interactivity using an electronic platform.
Meurer DP, Bullard M, Holroyd BR, Rowe BH. University of Alberta, Edmonton, Alberta.

OBJECTIVES: Clinical practice guidelines (CPGs), which are designed to apply results from related research to clinical care, are becoming important tools in reducing emergency medicine diagnostic and treatment practice variation. However, this environment demands that information be rapidly accessible, valid and evidence-based. Information systems that easily access user friendly CPGs, can facilitate this process. METHODS: R/O deep vein thrombosis (DVT) is a common emergency department (ED) presentation where wide diagnostic variability and changing treatments exist. Prospective assessment of R/O DVT patients was completed in the ED over an 18-month period (PRE). ED physicians were surveyed about the utility of a Swollen Limb (SL) CPG. Adobe PDF forms for assessing an SL were developed in 2000 and implemented in 2001 (POST). This form complimented an existing protocol for the treatment of DVT. The assessment is accessed on the desktop PC via an intranet Web site and completed on-line in PDF. RESULTS: Prior to the implementation, paper

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versions of the SL using the Wells' criteria were completed at rates of 60% (220/334) but significant practice variation in diagnostic testing was observed. Consensus from 20 staff was obtained for the SL form, and they requested online interactive fields and radio buttons. Summary scores and an MD estimate of pretest probability for DVT were requested. Some selections allowed for multiple functions to occur with a single click of the mouse (i.e., providing access to the appropriate order set, and providing radiographic recommendations). PRE diagnostic test utilization will be compared to POST. CONCLUSIONS: Recognizing the need for accessible and useful evidence-based tools for the practitioner is the force behind the development of effective electronic work platforms. While these applications have the potential to create efficiencies, formal iterative evaluation is required to document compliance and assess outcomes.
Key words: guideline, deep vein thrombosis

075 Information access by emergency medicine staff and residents.
Rowe BH, Cummings G, Sher A, Hayward R. University of Alberta, Edmonton, Alberta.

OBJECTIVES: Accessible to electronic evidence-based medical (EBM) information in emergency medicine (EM) has the potential to improve patient care and to facilitate educational activities. This study examines the reliability and validity as well as the characteristics of resource use recorded by a computer-based health information system. METHODS: CHE/CLINT is a single sign-on, password-protected, desktop application for medical information resource management. An EM-specific desktop was produced consisting of journals, on-line resources, and important links; access was provided to 70 staff and resident EM users at 2 major teaching hospitals affiliated with the University of Alberta. The data for the usage characteristics were derived from user logs and spanned the first 8 months this resource was available. Four investigators completed 50 test logins, recording log-in characteristics and comparing them to the user logs generated by the computer system in a local database. RESULTS: Times, date, location and non-internet applications were reliably recorded by the system during individual sessions (all >80% accurate). There is a spectrum of users, ranging from those who have never used this resource to "super-users" (<10%) who have readily adopted this resource. Most of the 925 logins to the CHE/CLINT program were of short duration (mean = 2 min/login) and accessed few applications (mean = 2 applications/login). The most highly used resources (n =1784) were literature searching applications such as MEDLINE (15%), and reference materials such as MD Consult (9%) or Harrison's Online (6%). ED-based resources (e.g., Micromedex [3%]) and EBM resources such as Cochrane Library (6%) were less often used. CONCLUSIONS: The data collected in CHE/CLINT are reliable and valid and can be used to determine user information access. EM information needs include literature searching and text; clinical applications and EBM resources remain underutilized. Interventions to improve use of EBM resources appear warranted.
Key words: medical informatics, evidence based medicine

076 Are homeless patients satisfied with care received in the emergency department?
Ilk L, Spence J. Department of Medicine, University of Toronto, Toronto, Ontario.

OBJECTIVES: Homelessness is an increasing threat to the health of urban communities and inner city emergency departments (EDs) are playing a major role in the care of this population. A survey, comparing satisfaction with care of homeless and underhoused (H-UH) to housed patients (H), was conducted in a university affiliated ED which services 40% of the lowest income census tracts and is situated in the highest concentration of homeless people in Canada. METHODS: A 12-question patient satisfaction survey was administered over a 4-week period in July and August 2000. Domains of interest included: participant's subjective sense of health, satisfaction with care, perceived quality of care, attention of medical staff, and discharge planning. A retrospective chart review was conducted to compare the H-UH to H patients with respect to demographics, waiting times, number of tests and procedures, and follow-up care. RESULTS: 305 surveys were completed, 113 by H-UH patients. There was no difference in the mean age of the groups. More H-UH patients were male. Urgency, waiting times, time to see an MD, and number of tests and procedures performed were not significantly different between groups. H-UH patients rated their usual health to be poorer and presenting complaints to be more serious. Homeless patients also anticipated greater difficulty in following discharge instructions. Both groups agreed that they would return to the ED, however H-UH patients did not rate their quality of care as highly as H patients. CONCLUSIONS: H-UH patients perceive their health to be poorer and presenting complaints to be more acute than H patients. Overall H-UH population tended to be less satisfied with ED care. Staff working in inner city EDs may require a greater awareness of both social and medical needs in order to better serve H-UH patients.
Key words: satisfaction, quality

077 Initiating the discussion of organ donation: a survey of physician attitudes and practices.
Hall C, Kjerulf M, Cass D. Department of Medicine, University of Toronto, Toronto, Ontario.

OBJECTIVES: One factor that may play a role in improving the rate of organ donation is prior communication between patients and their next-of-kin concerning their attitudes towards organ donation. One potential vehicle for the promotion of these discussions is the family physician, who could encourage patients to discuss the issue with their families. METHODS: A 35-question survey designed to assess attitudes, current practices, and barriers and opportunities regarding organ donation was mailed to each family physician and general practitioner in Toronto. Surveys could be returned either by fax, or by postage pre-paid envelopes. RESULTS: A total of 497 of 2385 surveys were completed, for a return rate of 21%. Sixty percent of respondents indicated that they felt it was appropriate for family physicians to initiate the discussion about organ donation in their office practice. However, only 40% of family physicians had raised the issue of organ or tissue donation with their patients and/or their families in the past year, and 74% indicated that they "seldom or never" introduce the topic during office visits. The 3 greatest barriers to introducing these discussions were identified as: fear of offending patients; personal lack of knowledge about the topic, and; lack of time in the patient encounter. The greatest opportunities to improve the initiation of the discussion of organ donation were identified as being the provision of pamphlets and other materials for the family physician's office and further education for family physicians about organ donation. CONCLUSIONS: While many family physicians support the concept of initiating the discussion about organ donation with patients and their families, the vast majority seldom or never do so. The provision of further educational materials, for both patients and physicians, could increase the likelihood of discussion and, therefore, of donation.
Key words: organ donation

078 Identifying potential organ donors in a university teaching hospital: How good are we?
Hall C, Kjerulf M, Cass D. Department of Medicine, University of Toronto, Toronto, Ontario.

OBJECTIVES: St. Michael's Hospital has identified as a priority the improvement of both quality and quantity in the organ donation process. To aid in quantifying the gap between potential and actual donors, a retrospective chart review was designed to identify all potential organ donors at St. Michael's Hospital in 1999. METHODS: All deaths in critical care settings over a one-year period were screened using "Donor Action" software to identify patients who were potential organ donors, using a set of clinical criteria. Once potential donors were identified, a manual chart review was performed in order to confirm eligibility of the patient, and to identify the reason(s) why donation did not occur. RESULTS: One hundred and fifty-nine charts were reviewed; 15 charts were unable to be reviewed. Fifty-one patients were found to meet the established criteria for potential organ donors. The families of 30 (59%) of these potential organ donors were approached about the possibility of donation; 17 (57%) of these consented to organ donation, of which 15 patients went on to donate organs, 1 to donate tissues only, and 1 to donate their body for research. Nineteen families (37%) were not approached, while 2 families (4%) were unavailable to either give or decline consent. Of the 34 patients who did not go on to become organ donors, over half of the families were not offered the opportunity to donate. CONCLUSIONS: When offered the opportunity to donate, over half of the families of potential donors gave consent for organ and tissue donation. A significant number of families were denied the opportunity to consider donation as part of their end-of-life decisions for their loved ones. Providing all families this opportunity could lead to an improvement in both the rate of organ donation, and in the quality of the end-of-life experience for the families.
Key words: organ donation

079 Why do patients experiencing acute chest pain bypass the nearest hospital to seek care in a tertiary care centre?
Yeung B, Friedman SM, Dubinsky I. University of Toronto, Toronto, Ontario.

OBJECTIVES: To characterize the subpopulation of patients with acute chest pain or palpitations who select a tertiary referral center over closer emergency departments (EDs) to identify patient rationale for hospital selection. METHODS: Four-week prospective cohort pilot study. Patients presenting to the ED of a downtown teaching centre (Toronto General Hospital [TGH]) with a chief complaint of chest pain or palpitations were administered a standardized survey within 72 hours of registering in the ED. The 20% who traveled the longest distance (LD) were compared to the base population (BP). Categorical variables were analyzed using the binomial inference for proportions, and continuous variables using the t-test. RESULTS: Of 106 eligible patients, 84 (79.2 %) completed the survey. The LD group, as well as study nonparticipants, were similar to BP in age and gender. Long distance travelers were more likely than the base population to be aware of a hospital closer than TGH to the point of departure (76.5 % vs. 46.4 %, $p < 0.01$), to have previously attended the closer hospital ($p < 0.10$), and to have attended with a complaint similar to the current problem ($p < 0.08$). LD patients were more likely to select TGH for subjective reasons (i.e., perceptions regarding hospital reputation or courtesy), ($p < 0.10$), and were less likely to select TGH for medical reasons (i.e., past records, physician, or procedure at TGH) ($p < 0.08$). Long distance travelers were less likely than BP to agree that in the event of acute chest pain or palpitations, the best choice of hospital is usually the closest one ($p < 0.03$) CONCLUSIONS: Patient rationale for hospital selection may be related to medical misconception and nonmedical factors, impacts upon distance traveled to seek medical attention, and has potential to adversely affect medical outcome.
Key words: chest pain

080 The incidence of vomiting in a pediatric emergency department and its influence on clinical mnagement.
Kozer E, Razavi H, Goldman R, Shi K, Keays T, Wu D, Scolnik D. Hospital for Sick Children, University of Toronto, Toronto, Ontario.

INTRODUCTION: Vomiting commonly occurs in children, however, the incidence of vomiting in the pediatric emergency department (ED) and its influence on clinical management has not been described. OBJECTIVES: to establish the incidence of vomiting among children presenting to pediatric ED, and to find whether or not vomiting is associated with increased length of stay, more laboratory tests and increased risk of admission to the hospital. DESIGN: A retrospective chart review of patients presenting to the ED of tertiary care pediatric hospital. PATIENTS: all the patients 0–18 years old presented to the ED during 4 randomly selected days. METHODS: Using the hospital electronic database, the charts of all patients who presented to the ED on 4 randomly selected days from the years of 1999–2000 were systematically reviewed by research worker. For each of the charts demographic parameters were recorded along with data regarding the history of the current illness and management in the ED. RESULTS: Of the 439 patients presenting to the ED, 97 (22.1%) reported vomiting. The average age of those who vomited was 3.50 ± 0.87 years, compared to 5.09 ± 0.47 years ($p = 0.0016$) in those without vomiting. Within the subgroup of 329 cases without trauma, 41 reported vomiting twice or more. In this group, 1.37 tests were ordered, compared to 0.825 tests for those vomiting less than twice ($p = 0.056$). In the 197 patients 2 years or younger, 1.02 tests were ordered for vomiting patients, whereas 0.50 tests were ordered for patients without vomiting ($p = 0.026$). There were no trends seen in time spent in ED, triage class or admission rate. CONCLUSIONS: 22% of patients presented with vomiting as a symptom. In patients 2 years of age or younger, significantly more tests were ordered for vomiting patients. A similar trend was seen in non-traumatic patients vomiting multiple times.
Key words: vomiting, pediatric

081 Can we predict which children with clinically suspected pneumonia will have the presence of focal infiltrates on chest radiographs?
Lynch T, Gouin S, Larson C, Patenaude Y. Children's Hospital of Western Ontario, London, Ontario.

OBJECTIVES: To determine predictive factors for the presence of focal infiltrates in children with clinically suspected pneumonia in a pediatric emergency department (ED). METHODS: Prospective cohort study conducted between May 1998 and December 1999 in a pediatric ED. Children (1–16 years) with clinically suspected pneumonia were enrolled. Exclusion criteriae were: chronic cardiac and respiratory disease, concurrent asthma exacerbation, pneumonia confirmed by chest radiograph (CXR) in the previous 8 weeks or antibiotic use in the previous 2 weeks, gastroesophageal reflux, spastic quadriplegia and unstable condition. Data on demographic variables, presenting symptoms and signs were collected upon study enrollment. Frontal and lateral views of the chest were obtained for each

patient. A consensus agreement of 3 radiologists on the presence of focal infiltrates was taken as the gold standard. RESULTS: There were 604 eligible children: 33 families declined to participate. Of the remaining 571 patients, 204 had the presence of focal infiltrates on CXR. No differences were noted between the children with and without focal infiltrates for mean age, sex, mean weight, presence of cough, coryza, bronchial sounds, irritability, poor feeding, mean oxygen saturation and time of the year. Risk factors for the presence of focal infiltrates included: history of fever ($p = 0.001$, odds ratio [OR] = 3.1; 95% confidence interval [CI] = 1.7, 5.3), retractions ($p = 0.047$, OR = 2.8; 95% CI = 1.0, 7.6), grunting ($p = 0.038$, OR = 7.3; 95% CI = 1.1, 48.1), crackles (0.001, OR = 2.0; 95% CI = 1.4, 2.9), and decreased breath sounds ($p = 0.034$, OR = 1.4; 95% CI = 1.0, 2.0). The patients with focal infiltrates were more likely to have an increased temperature (38.2°C vs. 37.8°C, $p = 0.001$, DM = 0.36; 95% CI = 0.15, 0.58), an increased respiratory rate (32/min vs. 29/min, $p = 0.001$, DM = 3.3, 95% CI = 1.4, 5.2) and an increased heart rate (130/min vs.124/min, $p = 0.003$, DM = 6.8, 95% CI = 2.6, 11.1). CONCLUSIONS: Chest radiographs for the detection of focal infiltrates should be limited to children who have an history of fever, increased temperature, increased respiratory rate, increased heart rate, retractions, grunting, crackles or decreased breath sounds.
Key words: pneumonia, pediatric, radiography

082 Communicating clinical information between the emergency department and family physicians: a qualitative analysis of current practices and suggestions for improvement.
Afilalo M, Lang E, Boivin JF, Colacone A, Robitaille C, Rosenthal S, et al. McGill University, Montreal, Quebec.

OBJECTIVES: Accurate and timely bi-directional transmission of clinical information between the emergency department (ED) and family physicians (FPs) is important for rational and informed patient care. The objective of this study was to evaluate current information exchange practices and to query both emergency physicians (EPs) and FPs on the components of an ideal communication tool. METHODS: As part of a larger study aimed at designing, implementing and measuring the impact of a secured electronic communication tool, focus groups were conducted at 3 hospitals where a total of 16 EPs and 13 FPs participated. Three hypothetical cases were presented as a starting point for a series of questions and discussions. All comments were audio-taped/transcribed and physicians were asked to complete questionnaires following each session. RESULTS: EPs rarely sought information from FPs despite the perception that this would be of value. FPs at all 3 sites reported that there was currently little or no clinical information being sent to them regarding their patients' ED visits. EPs ranked the most recent EKG, a list of current medical problems and the past medical history as the most important information to be obtained from FPs. FPs ranked new or changed medications, treatment plan and blood test results as the most valuable information required from the ED. All physicians agreed that enhanced communication would reduce duplication, specialty consultations, and inappropriate ED use. FPs were however concerned about the potential for unsafe discharge from the ED and the need to take on new patients and responsibilities as a result of receiving such data. CONCLUSIONS: The lack of communication of clinical information is a major deficiency in the continuity of care provided for patients who frequent the ED. FPs and ED physicians believe that the provision of specific clinical and lab data will enhance both the quality and efficiency of patient care.
Key words: communication, quality

083 Do pediatric emergency physicians change the management of patients with suspected pneumonia after interpretation of chest radiographs by radiologists?
Lynch T, Gouin S, Larson C, Patenaude Y. Children's Hospital of Western Ontario, University of Western Ontario, London, Ontario.

OBJECTIVES: To measure the levels of confidence of pediatric emergency physicians (PEPs) in their clinical and radiological diagnoses of pneumonia and in the radiologists' chest radiograph (CXR) interpretation. METHODS: Prospective cohort study conducted between May 1998 and December 1999. Children (1–16 years) with clinically suspected pneumonia were enrolled while 1 of the 11 recruiting PEP was attending in the emergency department. Exclusion criteriae were: chronic cardiac or respiratory disease, asthma exacerbation, immunodeficiency gastro-esophageal reflux and unstable patients. Frontal and lateral CXRs were obtained for each patient. RESULTS: 604 children were eligible; 33 families declined to participate. Of the remaining 571 patients, a 100% response rate was achieved amongst the PEPs. Prior to interpreting the CXRs, the PEPs thought that there was clinical evidence of pneumonia in 30.6% of the patients. PEPs would prescribe antibiotics regardless of their CXR interpretation in 30.1% of the patients (18.2% for suspected pneumonia and 11.9% for a different infectious focus). After reviewing the CXRs, 59.0% of patients were suspected by the PEPs to have pneumonia. If the PEPs believed that the CXRs were consistent with pneumonia, they would use antibiotics even if the radiologist's interpretation was negative 86.9% of the time. If the PEPs believed that the CXRs were negative for pneumonia, they would not order antibiotics even if the radiologist's interpretation was positive 22.6% of the time. CONCLUSIONS: The PEPs diagnosis of pneumonia nearly doubled in frequency with the addition of a CXR to the clinical exam. This study demonstrates interesting trends in the level of confidence that the PEPs have in the radiologist`s CXR interpretation.
Key words: pneumonia, pediatric, radiography

084 Can pediatric emergency physicians correctly localize pulmonary infiltrates on chest radiographs?
Lynch T, Gouin S, Larson C, Patenaude Y. Children's Hospital of Western Ontario, University of Western Ontario, London, Ontario.

OBJECTIVES: To compare the accuracy of pediatric emergency physicians (PEPs) with a radiologist in the localization of pulmonary infiltrates on chest radiographs (CXRs). METHODS: Cohort of CXRs ordered for the clinical suspicion of pneumonia in children (1–16 years) who presented to the emergency department between May 1998 and December 1999, while 1 of the 11 recruiting board eligible/certified PEP was present. Exclusion criteriae were: chronic cardiac or respiratory disease, asthma exacerbation, immunodeficiency gastro-esophageal reflux and unstable patients. Following randomization, the PEP had only access to the frontal CXR view for interpretation in half of the cases; otherwise, the frontal and lateral views were available. All the CXRs were reviewed by a single, blinded radiologist who had access to both views. RESULTS: There were 604 eligible patients; 33 families declined to participate. Of the 571 recruited patients, 332 (58.1%) had the presence of pulmonary infiltrates according to the PEPs versus 204 (35.7%) according to the radiologist ($p < 0.05$). The rate of agreement between the radiologist and the PEPs for each location was: right upper lobe = 52.3%, right middle lobe = 29%, right lower lobe = 18%, left upper lobe = 21%, lingula = 23% and left lower lobe = 33%. There was only a statistical difference in the comparison of the rates of agreement for 1 vs. 2 views for the lingular location (12% vs. 50%, $p = 0.016$). CONCLUSIONS: PEPs had a significant

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rate of overcall of pulmonary infiltrates compared to a radiologist. Accurate localization of pulmonary infiltrates by PEPs was suboptimal. Lingular infiltrates appeared to be significantly overcalled if access to only the frontal view was provided.
Key words: pneumonia, pediatric, radiography

085 Regional variations in cycling helmet use in Alberta communities.
Nykolyshyn K, Belton K, Petruk J, Cheung M, Wiebe N, Rowe BH. KIDSAFE Connection, University of Alberta, Edmonton, Alberta.

OBJECTIVES: This study examined the use of helmets in adults and children in 2 major Canadian urban regions and examines regional variation of interest for injury prevention planners. METHODS: A prospective survey of cyclists was performed between 05–09/2000 in 2 major urban areas in Alberta, Canada. Trained research assistants recorded cyclist demographics and helmet wearing patterns in 2 urban and 8 non-urban areas. A random selection of roadways, commuter paths, bicycle paths, parks, schools and campuses were sampled. Schools were over-sampled in order to increase the target population (children) data. Rates are reported with 95% confidence intervals (95% confidence interval [CI]). All variables are compared using univariate and adjusted analyses. RESULTS: From 4,157 cyclist encounters, 4,141 valid helmet observations were made. Overall, 2,259 (55%; 53–56) cyclists were wearing a helmet; however, only 75% (95% CI: 73–77) were wearing their helmet correctly. Patterns of use varied according to age: 74% (95% CI: 72–77) of children, 29% (95% CI: 25–32) of adolescents, and 52% (95% CI: 50–54) of adults were wearing helmets. In addition, location (Calgary 63% vs. Edmonton 45%; $p < 0.001$) and gender (girls vs. boys: 64% vs. 50%; $p < 0.001$) proportions differed. Location of observation (urban vs. non-urban) was not associated with helmet wearing, although non-urban rates were similar to those exhibited by the closest major center. Overall, models predicting helmet use varied based on age grouping. CONCLUSIONS: These results identify large within and between region variation in the use of cycling helmets. Without the successful implementation of mandatory cycling helmet legislation, injury prevention planners need to use these data to implement interventions that are focussed on age groupings, gender and place of residence. Further work is required to understand these variations and design implementation strategies to correct these disparities.
Key words: brain injury, injury preventation

086 Frequent fliers in the emergency department.
Ovens HJ, Chan BTB. Mount Sinai Hospital, Institute for Clinical Evaluative Sciences, Toronto, Ontario.

OBJECTIVES: Heavy users of emergency services (often called "frequent fliers") have been described for at least 25 years. However previous studies were confined to a single institution. Access to a population database allowed us to identify the characteristics of heavy users of emergency department (ED) services, describe their migration patterns and use of services outside the ED across a large number of institutions. METHODS: This was a population-based, observational, cross-sectional study, set in the province of Ontario, Canada, in 1997/98, using the provincial billing database. Frequent fliers, defined as individuals with at least 12 ED physician assessments per year, were compared to those with 1 to 11 per year. The main outcome measures were number of ED assessments and institutions visited; diagnosis at ED visit; and visits to physicians outside the ED. RESULTS: Frequent fliers constituted 0.3% of the patients visiting EDs but accounted for 3.5% of total ED visit volume. They were present in academic, urban and rural EDs. Consistent with past research, they tended to be adults aged 25–64 living in low socioecomic neighbourhoods with a high prevalence of psychosocial conditions. Migraine headache was their most prominent organic condition (9.6% of ED visits vs. 1.0%; $p < 0.001$). Most frequent fliers made the majority of their visits (83%) to the same institution. Frequent fliers had more visits to office-based GPs (19.2 vs. 5.5) and more specialist referrals (4.0 vs. 1.0). CONCLUSIONS: Frequent fliers are ubiquitous, and all EDs are faced with the challenges they present. Their identification can be readily accomplished by individual institutions, and data-sharing between EDs would have limited benefit. Because these patients are heavy users of office-based services, a strategy to manage their care better will require coordination between EDs, GPs and other health providers. Migraine is a previously unrecognized cause of heavy ED use which deserves attention. Research supported by the physicians of Ontario through a Physician Services Incorporated Foundation Grant.
Key words: emergency department, utilization

087 Candidate perspectives on emergency medicine residency programs: using survey feedback to respond to candidate perceptions.
Rosenblum RM, Lund AJ, Spooner CA, Rowe BH. University of Alberta, Edmonton, Alberta.

OBJECTIVES: Graduating MDs face residency decisions sooner than in previous years. This poses challenges to both candidates and resident selection committees. Candidates with less clinical exposure to various specialties must rely more heavily on information gained during the pre-Match "courtship." Our goals were to understand how candidates make their decisions and how they perceived the University of Alberta Emergency Medicine program, to make appropriate changes in our own processes, and to test the impact of those changes. METHODS: The study period was 2 years. All applicants interviewed in 01/1999 ($n = 28$) and 01/2000 ($n = 25$) were surveyed by mail, using a standardized form, after the interview but prior to the final national residency match. Based on initial feedback, between 1999 and 2000, the interview process was changed in several ways, including a series of less formal smaller panels, encouraging questions and increased contact between candidates and current residents. RESULTS: We obtained response rates of 46% (13) and 52% (13) respectively. Candidates judge programs by criteria such as provision of information, resident accessibility, and facilities. They also rely heavily on the interview itself. All programs rated well in some areas and poorly in others. Our program rated poorly in 2 aspects of the interview: the interview format and the chance to ask questions. After interview restructuring, the proportion of candidates who rated the University of Alberta interview highest rose from 7% in 1999 to 67% in 2000 ($p = 0.004$). CONCLUSIONS: Many candidates will share their perspectives on EM program selection processes when asked. Program changes can impact strongly on candidate experience and choices. Obtaining candidate feedback can help programs critically assess the strengths and weaknesses in their selection processes. Programs can then make appropriate formatting changes.
Key words: postgraduate training

088 Wild in the city: piloting a wilderness medicine course for medical students.
Denny CJ, Cheng IS, Schull MJ. University of Toronto, Toronto, Ontario.

OBJECTIVES: Wilderness medicine is a crucial component of emer-

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gency medicine. However, wilderness medicine topics such as prehospital care and environmental emergencies are often not included in medical school core curricula. Our objectives were to pilot a short wilderness medicine course for medical students, to measure student satisfaction, and to estimate the course's effectiveness at improving knowledge. METHODS: This prospective observational study was performed at a university medical school. Medical students in all years were invited to participate. The 2-day course was held over a weekend in October 2000. It combined didactic classroom presentations by emergency medicine residents and attending physicians with interactive outdoor simulations. Participants were asked to complete evaluations of the course. Furthermore, pre and post-course multiple-choice question testing was conducted based upon exams generated by course faculty. All evaluations and tests were optically scanned. The paired-sample *t*-test and 95% confidence intervals (CIs) were used to analyse results. RESULTS: Twenty medical students (years 1 through 4) volunteered to participate in the course. Of the fifteen students who completed evaluations, all fifteen would recommend the course to their colleagues. Moreover, all would have the course offered again next year. The most frequent suggestion ($n = 8$) was to increase the proportion of interactive learning in the curriculum.Of ten medical students who consented to pre and post-course testing, pre-course test mean scores were 51.9% (standard deviation [SD] 11.0); post-course test mean scores were 67.1% (SD 10.2). Post-course test results were significantly improved ($p < 0.006$), with a mean improvement of 16.7% (95% CI 6%–27%). CONCLUSIONS: This is the first study to measure outcomes in a wilderness medicine course for medical students. Our results suggest that medical students respond positively to such an intervention. More importantly, our results demonstrate that medical student knowledge improves with this short, focused intervention.
Key words: wilderness medicine, medical education

089 Enrolment in research studies in emergency medicine.
Scheibel N, Spooner CH, Sukhrani N, Cunningham R, Kelly KD, Holroyd BR, et al. Mayo Clinic, Rochester, Minnesota.

OBJECTIVES: Enrolling patients presenting with common emergency department (ED) problems into prospective cohort studies is an important contribution to clinical research. However, compliance with enrollment is often poor, even in academic centres. This study examines enrollment in a deep vein thrombosis (DVT) study. METHODS: In a prospective fashion, we monitored the use of a DVT clinical model (CM) in patients >18 years who presented to EDs with suspected acute DVT. Physicians were asked to complete the single-page CM sheet and request consent for 3-month telephone follow-up. Consent to conduct the research was agreed to by 3 North American EDs with academic interests. Physicians were made aware of the study through advertising, peer contact and nursing input. To facilitate enrollments, nurses placed forms on the ED charts and incentives were established. This analysis examines the uptake of the clinical model. RESULTS: Overall 1,067 patients presented to the 3 EDs with a diagnosis of rule-out DVT; the CM was completed in 489 patients (46%). Enrollment did not depend on age (57 vs. 59, $p > 0.01$) or gender (male 41% vs. 46%, $p > 0.01$), time (daytime vs. after hours: 49% vs. 53%, $p > 0.05$) or day of presentation (weekday vs. weekend: 46% vs. 42%, $p = 0.26$). Factors significantly influencing enrollment were hospital location (site 1: 60%, site 2: 33%, site 3: 43%, $p = < 0.001$) and individual physician (range of enrollment: 0% to 100%). Follow-up calls were successful in 85% of enrolled cases. DVT was confirmed in the ED in 83 (17%) patients and in a further 13 (3%) patients at follow-up. CONCLUSIONS: Even in academically interested EDs, the enrollment of patients in prospective clinical studies is less than desirable. Enrollment appears most closely related to institutional and physician attitudes. Novel approaches to enhancing enrollments and improving efficiencies in clinical research are required in order to improve the validity of ED research.
Key words: research methodology

090 Medical coverage of Tallships 2000 Festival of Sail, Halifax, Nova Scotia.
Thompson J, Petrie D, Cain E. Dalhousie University, Halifax, Nova Scotia.

OBJECTIVES: Mass gatherings (gatherings of more than 25,000 people) present unique challenges to those responsible for providing medical coverage such as identifying who actually requires help, and access to, and extrication of sick individuals. Despite the relative frequency of, and challenges presented by mass gatherings, little analytical literature exists to guide medical preparation for these events. Instead, the literature discusses different approaches that have been used in providing medical coverage and trends that have emerged. The following is a description of a mass gathering, Tallships 2000 Festival of Sail, Halifax, Nova Scotia. METHODS: Participating Emergency Health Services Nova Scotia (EHSNS) paramedics were briefed on the use of the *Canadian Emergency Department Triage and Acuity Scale* (*CTAS*) and applied these criteria to patients encountered during the event. Data on each patient encounter (demographic, chief complaint, *CTAS*, and disposition) was collected prospectively with *CTAS* 4 and 5 patients being treated and released by paramedics or advised to transport themselves to the emergency department, and *CTAS* 1–3 patients being transported by ambulance to the ED for evaluation. RESULTS: Approximately 1 million people participated in the Tallships Festival over 5 days. Event medical coverage was provided by EHSNS and St. John's Ambulance 18 hours/day. St. John's Ambulance staff collected no data. EHSNS personnel included roving paramedics on bicycles, a paramedic manned tent, and several ambulances dedicated to the event during peak hours. There were 3 patient encounters and 0.36 transports by ambulance per 10,000 spectators. All but 1 of the patients transported to hospital from the event were sent home after ED evaluation. CONCLUSIONS: Paramedics encountered fewer patients at the Tallships Festival than typically reported at similar size events elsewhere (typically 5–20/10,000 spectators), although transport incidence was similar.
Key words: mass gatherings, emergency medical services

091 Cardiopulmonary resuscitation: predicting outcome in Winnipeg using the Prognosis After Resuscitation (PAR) Score.
Young J. University of Manitoba, Winnipeg, Manitoba.

OBJECTIVES: The success of cardiopulmonary resuscitation (CPR) is determined by many factors not the least of which is the patient's baseline health. Many studies have reported different scoring systems to aid with the prognosis of CPR. The aim of this study is to assess the reliability of the Prognosis After Resuscitation (PAR) Score when attempting to predict CPR outcome in Winnipeg. METHODS: A retrospective review of all adult cardiac arrest calls was conducted for the period January 1 to December 31, 1999, at the Health Sciences Centre (HSC), and for the period January 1 to December 31, 1998, at the St. Boniface General Hospital (SBGH), both in Winnipeg, Manitoba. All resuscitation records and patients' charts were reviewed by a single observer to determine each patient's PAR Score. PAR Score variables were defined prior to the review and included age, presence or absence

of sepsis, pneumonia, cancer, renal insufficiency, (creatinine >130 mmol/L), myocardial infarction as the presenting diagnosis, and homeboundness. Dichotomous data was analysed with Chi-squared analysis and the t-test was used to compare means of continuous data. RESULTS: There were 107 patients from HSC, and 47 patients from SBGH included in this review. At both sites, there was no difference between survivors and non-survivors with respect to age or gender. Baseline illness heavily influenced outcome, such that no patient at either site with a PAR Score greater than 8 survived. (Score ranged from –2 to +31.) Regardless of PAR Score, no patient with cancer survived a cardiac arrest at either hospital. CONCLUSIONS: PAR Scores to determine successful outcome, correlated closely with results of other studies. If these scores can be fine tuned with greater specificity, then attempts to resuscitate patients with poor prognostic indicators may be avoided. This information provides a useful framework when discussing resuscitation options with patients.
Key words: resuscitation, cardiac arrest

092 Barriers to effective feedback of trainees in the emergency department.
Ovens HJ, Jowatt J. Mount Sinai Hospital, Toronto, Ontario.

OBJECTIVES: "Inadequate feedback" is a common complaint from residents on emergency department (ED) rotations. Residents were surveyed on their opinions of feedback, their personal experiences and suggestions for improvement. METHODS: A survey was developed through meetings with an educator, literature review, and a focus group with residents. The study population comprised Mt. Sinai PGY1s between July 97 and October 98 and all PGY2s in the University of Toronto Family Medicine in 98/99. Two mailings were done between December 1998 and April 1999. Quantitative replies were entered and analyzed using chi-square analysis in SAS. Qualitative replies were organized by 1 author into themes and independently analyzed by 3 reviewers. RESULTS: The response rate was 44.7% (59/132). Fifteen were from Mt. Sinai residents; 44 from other sites. There were no significant differences by site, gender or year of training. Residents expressed a strong preference for immediate feedback by explicit case review and end-of-shift review as opposed to end of rotation. They felt feedback was impeded because "the ED was too busy" (43%) or "ED staff did not volunteer feedback" (37%). Only 12% felt their ED feedback was better than on other rotations; 31% felt it was worse. 54% felt the process of feedback was different than on other rotations. CONCLUSIONS: Residents wish immediate comments on their case management; they perceive they get more and better feedback on other rotations. ED staff require training in the provision of feedback and strategies to provide it in the busy ED environment.
Key words: medical education, postgraduate training

093 Improving access to acute stroke care in Southeastern Ontario.
Reed A, Jones G, Groll D, Bolton C. Queen's University, Kingston, Ontario.

OBJECTIVES: Southeastern Ontario (SEO) has a population base of 475,000, encompasses an area of 20,000 square kilometers and has 8 hospital corporations and 14 ambulance services. A Regional Acute Stroke Protocol (RASP) for SEO utilizing Kingston General Hospital (KGH) as the Regional Stroke Centre was implemented in 1999. The RASP includes: protocols for paramedics to identify patients who meet criteria for thrombolytic therapy, including hospital by-pass protocols; the formation of a "stroke team"; and arrangements for regional hospitals to emergently transfer patients directly to the stroke team. This is an evaluation of the activity during the first year of the RASP. METHODS: A retrospective chart review was undertaken for all RASP activations during the first 12 months since implementation. RESULTS: Since July 1999, the RASP was activated 191 times. 166 (87%) of patients were diagnosed with a cerebrovascular event, 93 of which were ischemic strokes. 68 (36%) patients bypassed another closer hospital, 35 (18%) were emergently transferred from a peripheral hospital, and 88 (46%) were from the direct KGH catchment area. 42 (22%) of all RASP patients received rtPA (45% of all ischemic strokes). CONCLUSIONS: Thrombolytic therapy can be provided to patients with acute stroke over a large geographic area. Further prospective evaluation is planned.
Key words: stroke, therapy

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