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Plenary Presentations

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LOW-DOSE ketamine versus fentanyl as adjunct analgesic to procedural sedation with propofol: a randomized, clinical trial

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Introduction: Opioid analgesics may compound the cardiorespiratory depressant effects of propofol, a popular agent for ED procedural sedation and analgesia (PSA). The use of low-dose ketamine as an adjunct analgesic may cause fewer adverse effects than the propofol-opioid combination. **Methods:** This double-blind, randomized trial enrolled patients aged 14-65 years (ASA Class I or II), requiring PSA for orthopedic reduction or abscess drainage in an academic ED. Subjects received ketamine 0.3 mg/kg or fentanyl 1.5 μg/kg IV, followed by titrated IV propofol to reach deep sedation. The primary outcome was the incidence of cardiorespiratory adverse events, using a novel scoring tool (none, mild, moderate, severe). Secondary outcomes included adverse event frequency, propofol doses required to achieve/maintain sedation, times to sedation/recovery, and physician/patient satisfaction. **Results:** The trial was terminated by the independent data safety monitoring committee after a planned interim analysis. Sixty-three of a planned 124 patients were enrolled. Of patients who received fentanyl, 26/31 (83.9%) had an adverse event, usually reversible hypoxemia, versus 15/32 (46.9%) of those who received ketamine. Moderate or severe adverse events were seen in 16/31 (51.6%) of fentanyl subjects versus 7/32 (21.9%) of ketamine subjects (OR 12.3, $p<0.001$). After adjustment for gender, age and procedure type, fentanyl subjects had 4.6 (95% CI 1.4-15.3) times the odds of having a higher adverse event severity score than ketamine subjects. There were no significant differences in secondary outcomes, apart from higher propofol doses in the ketamine arm. **Conclusions:** This RCT shows that low-dose ketamine is significantly safer than fentanyl for ED PSA with propofol and has similar efficacy, notwithstanding higher propofol doses in the ketamine arm. **Key Words:** Procedural sedation, Propofol, Ketamine, Fentanyl

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MULTICENTER controlled clinical trial to evaluate the impact of advanced life support on children with out-of-hospital respiratory distress

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Introduction: There is little published evidence regarding the optimal EMS management of pediatric respiratory distress. Our study evaluated the impact of advanced life support (ALS) EMS programs on pediatric respiratory patient outcomes. **Methods:** This multicenter before-after controlled clinical trial was conducted in 17 communities as part of the Ontario Prehospital Advanced Life Support (OPALS) Study, which evaluates the impact of EMS programs for multiple conditions. During the before phase, care was provided at the BLS-D level. During the after phase, ALS providers administered nebulized and IV drugs and performed endotracheal intubation.

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Data were collected from ambulance reports, centralized dispatch data, and in-hospital records. Chi-square and Student's t-test analyses were performed. **Results:** The 1,257 patients enrolled during the two 24-month BLS and ALS phases were well matched for clinical and demographic features and had these characteristics: mean age 4.9 (0-15), male 56.1%, mean RR 31, chronic asthma 35.2%, chronic respiratory medications 34.5%. Bag valve mask ventilation was provided to 10 (1.6%) in the BLS phase and 9 (1.4%) in the ALS phase (P=.74). During the ALS phase, patients received these EMS interventions: nebulized salbutamol 39.6%, IV epinephrine 0.9%, intubation 1 (0.16%), IV access attempted 33 (5.1%), IV successful 24 (3.7%). There was no significant reduction from the BLS to the ALS phase in overall mortality (0.5% vs 0.2%; P=.30) or admission to hospital (26.0% vs 22.2%; P=.16). There was however a significant difference from the BLS to the ALS phase in admission to ICU (3.3% vs 1.4%; P=.046). **Conclusions:** This large controlled trial of children with respiratory distress shows that the addition of a system-wide EMS ALS program did not significantly improve patient survival or hospital admission but may decrease ICU admission. Few children transported with respiratory distress received assisted ventilation or advanced airway maneuvers. **Key Words:** EMS, Pediatric respiratory distress, ALS, BLS.

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ANTIBIOTIC selection reduces relapse following emergency department discharge in patients with exacerbations of chronic obstructive pulmonary disease

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Introduction: While antibiotics are recommended in patients discharged from the Emergency Department (ED) with chronic obstructive pulmonary disease (COPD) exacerbations, most comparisons have not involved concomitant systemic corticosteroids and the use of newer agents is increasing. This study compared a first line treatment to a newer more potent macrolide in acute COPD. **Methods:** This randomized, double-blind, double-dummy controlled clinical trial enrolled 159 patients with COPD exacerbation discharged from the ED. Patients were randomly assigned to treatment with oral doxycycline or clarithromycin for 10 days. All patients also received oral prednisone (40 mg once daily) for 10 days, plus as needed inhaled bronchodilators. All other COPD medications being taken by the patients at the time of enrollment were continued throughout the duration of the study in both treatment groups. The primary endpoint was relapse within 30 days of randomization, defined as an unscheduled visit to a physician's office, or a return to the ED, because of worsening dyspnea. **Results:** Patient demographics were similar in both groups; most patients were elderly (mean age = 68.2), male (54%), with > 40 pack years of smoking. The overall rate of 30-day relapse was significantly lower in the doxycycline-treated group compared to the clarithromycin group (19% vs 34%, P= 0.035); all cause (p=0.004) and respiratory-related (p=0.007) hospitalizations also favoured the doxycycline group. Both groups demonstrated improved 30-day FEV1 measures; however, there were no differences between the groups. Improvements in health-related quality of life were not significantly greater for those treated with doxycycline compared to clarithromycin (p>0.05). Side effects were uncommon and similar between groups. **Conclusions:** When combined with corticosteroid treatment, outpatient treatment with oral doxycycline offers a small advantage over clarithromycin in treating patients with COPD exacerbation who are discharged from the emergency department. **Key Words:** AECOPD, Relapse, Doxycycline, Clarithromycin

Oral Presentations

1

BETA-BLOCKERS post acute myocardial infarction: systematic review and meta-analysis

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Introduction: Acute myocardial infarction (AMI) remains a major cause of death. We wished to determine the mortality benefit of very early intervention of beta blockers compared to control group in patients surviving AMI. **Methods:** We conducted a systematic review of randomized controlled clinical trials that assessed short term mortality and compared beta-blockers to a control group in patients within 72 hours post AMI. We searched these databases: MEDLINE (1966-2006), EMBASE (1980-2006), Cochrane Central Register Of Controlled Trials, Health Star (1966-2006),Cochrane Database for Systematic Reviews, ACP Journal Club (1991-2006), Database of Abstracts of Reviews Of Effect (<1st quarter 2006), and Conference Papers Index (1984-2006). Two blinded reviewers extracted the data and assessed 4 quality components (randomization, double blinding, reporting of withdrawals and allocation concealment). We calculated Pooled odds ratios using a random effect model, and performed sensitivity analyses to explore the stability of the overall treatment effect. **Results:** We included 18 studies (13 met the high quality score) which enrolled 74,643 participants and had 5,095 deaths. Compared to control group, beta-blockers did not result in a statistically significant decrease in short term mortality when added to other interventions in the acute phase post AMI (OR=0.95, 95% CI 0.90 to 1.01). Six weeks OR for mortality including studies with high quality score was 0.96 (95% CI 0.91 to 1.02). We found similar results including studies which enrolled patients within 24 hours post AMI only. A subgroup analysis, excluding high risk patients with Killip class II and above, showed beta-blockers resulted in a significant reduction in short term mortality with OR=0.93 (95% CI 0.88 to 0.99). **Conclusions:** Acute intervention with beta-blockers does not result in a statistically significant short term survival benefit post AMI. Beta-blockers should be optional in AMI patients who do not have signs of heart failure. **Key Words:** Myocardial infarction, Beta blockers

2

TELEVISION public service announcements improve bystander CPR rates

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Introduction: Television public service announcements (PSA) are commonly used to promote CPR classes to a large number of viewers at once, but they may lack the educational content to actually teach CPR to viewers. This study prospectively evaluated the impact of CPR education PSAs on bystander CPR rates for out-of-hospital cardiac arrest victims. **Methods:** This before-after controlled trial took place over 3 phases in a city with population 750,000, EMS with ALS and BLS-D paramedics, and dispatch-assisted CPR instructions. We collected patient and system data for out-of-hospital cardiac arrest using the Utstein style. We measured bystander CPR rates for 6 months before and 6 months after a 3-month period of CPR education PSAs. The 30-sec PSAs were aired 174 times by two television networks during prime time, each PSA reaching audiences up to 167,000. In addition to promoting CPR classes, our 30-sec PSAs demonstrated when to call 9-1-1 and how to perform CPR on a cardiac arrest victim. Analyses included

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Chi-Square, logistic regression, and descriptive statistics with 95% CIs. **Results:** Patients in phase 1 n=108, 2 n=52, and 3 n=104 had similar characteristics: mean age 67.7 (range 30-97), male 71.2%, witnessed arrest 48.9%, initial rhythm asystole 50.2%, VF/VT 32.3%, PEA 17.5%, 9-1-1 call to vehicle at scene 5min:34sec, survival to hospital discharge 4.9%. Bystander CPR rate was 14.6% during the 12-month control period compared to 28.9% during the 3-month PSAs intervention (Chi-Square 5.9, p=0.02). We adjusted the effect of PSAs on bystander CPR rates for the victim's age, gender, witnessed status, initial rhythm, and EMS time intervals. The adjusted Odds Ratio was 2.9, 95%CI 1.2-7.0, p=0.02, Goodness-of-Fit=0.62. We were underpowered to study the effect of PSAs on survival: OR 0.3, 95%CI 0.04-2.6. **Conclusions:** We urge all cities to introduce CPR education PSAs as means to improving bystander CPR rates. The impact of PSAs on survival to hospital discharge requires further studies. **Key Words:** Cardiac arrest, CPR, Education, Public health

3

THE Ottawa aggressive protocol for ED management of acute atrial fibrillation

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Introduction: There is no consensus as to the optimal emergency department (ED) management of acute atrial fibrillation (AAF) or atrial flutter (AAFL). Our objective was to examine the efficacy and safety of the Ottawa Aggressive Protocol to convert and discharge ED patients with AAF/AAFL. **Methods:** This 5-year cohort study included consecutive visits to a university hospital ED for adults presenting with acute-onset AAF/AAFL and who were managed with the Ottawa Aggressive Protocol. Patients were identified from the National Ambulatory Care Reporting System (NACRS) database. The Aggressive Protocol was overseen by the attending emergency physicians and included: 1) IV procainamide as infusion of 1 gram over 1 hour; 2) electrical cardioversion if necessary, by ED staff; 3) discharge from the ED with outpatient cardiology follow-up. Outcomes included conversion, adverse events, and relapse. We conducted descriptive data analyses with 95% CIs. **Results:** Characteristics of the 660 eligible patient visits were mean age 64.5 years, mean heart rate 113.4, mean duration symptoms 8.9 hours, AAF 95.2%, AAFL 4.9%. Overall, 96.8% of patients were discharged home from the ED and 90.3% were discharged in normal sinus rhythm. The respective discharge rates were 97.0% and 93.5% for those in AAF and 93.8% and 87.5% for those in AAFL. All patients received procainamide with a conversion rate of 58.3% (AAF 59.9%, AAFL 28.1%). Electrical cardioversion was attempted in 36.8% of visits with a success rate of 91.7% (AAF 91.0%, AAFL 100%). Adverse events occurred in 7.6% of cases: hypotension 6.7%, bradycardia 0.3%, AAF relapse within 7 days 8.6%, Torsades de Pointes 0%, cerebrovascular accident 0%, mortality 0%. **Conclusions:** This is the largest reported study of AAF/AAFL in the ED and demonstrates that the Ottawa Aggressive Protocol is extremely effective for the rapid cardioversion and discharge of patients by ED physicians. This protocol is safe and could lead to a significant decrease in hospital admissions. **Key Words:** Atrial fibrillation, Atrial flutter, Cardioversion, Procainamide

4

FATIGUE and quality of CPR by older bystanders using the new 30:2 chest compression to ventilation guidelines: a randomized cross-over trial

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Introduction: The 2005 International Consensus on CPR changed the chest compression:ventilation ratio from 15:2 to 30:2 to minimize interruptions and increase the number of compressions. We sought to measure bystander fatigue and CPR quality after 5 minutes of CPR using the new and the old CPR ratios in a population of older lay persons. **Methods:** This randomized cross-over study took place at a senior's center and a tertiary care hospital. Participants were aged 55 or greater with no significant physical limitation (Frailty score ≤3/7). Participants completed two 5-min CPR sessions (using 30:2 and 15:2 ratios) on a recording manikin, separated by a 5-min rest. We used concealed-blocked randomization to determine the order of ratio. Metronome feedback maintained a compression rate of 100/min. We measured changes in heart rate (HR), mean arterial pressure (MAP), venous lactate (VL), and Borg Exertion Scale (range 6-20). CPR quality measures were number of chest compressions and number of good compressions (fully-released, depth≥38mm). Analyses included Paired t-Test, mixed-effect regression, and descriptive statistics with 95% CIs. **Results:** The 42 enrolled participants were: mean age 66.0 (range 55-84), female 69.0%, past CPR training 66.7%, and mean initial HR 70.4, MAP 91.3, VL 1.5, and Borg score 9. Bystander fatigue was similar for each CPR ratio: mean difference between groups in increased HR 1.5 (95% CI -1.5-4.5), MAP 1.5 (-1.8-4.8), VL 0.2 (-1.1-1.4), Borg 0.2 (-0.2-0.8). Participants attempted more chest compressions per session using the 30:2 vs the 15:2 ratio (382.2 vs 303.6, mean diff. 78.6; p<0.0001), but completed a similar number of good compressions (128.5 vs 126.6, mean diff. 2.0; p=0.85). The number of good compressions/min declined significantly more rapidly over time for the 30:2 ratio; p=0.02. **Conclusions:** In a population likely to perform CPR, the new 30:2 ratio resulted in significantly more rapid CPR quality decline and no additional benefit over the old ratio. **Key Words:** CPR, Public health

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PROSPECTIVE multicenter study of admissions to Canadian hospitals for acute COPD

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Introduction: Hospitalization rates after ED treatment of acute COPD vary across jurisdictions, and the limited previous research has involved health systems with universal access and high use of preventive medications. Our objective was to determine the factors associated with hospitalization after ED treatment for COPD in Canada. **Methods:** 19 Canadian EDs enrolled patients (pts) over the study period. Enrolled pts underwent a structured ED interview and telephone interview 2 weeks later. Inclusion criteria were MD diagnosis of COPD, age >35, and no evidence of asthma. Admission was defined as an acute visit that resulted in a formal admission to that hospital. Data were analyzed using chi-square, t-test, M-W test, and logistic regression. **Results:** Of 501 subjects, 242 (48%) were admitted to the hospital; site admission proportions ranged from 20-80%. Pts who were admitted did not differ from those discharged in age or gender. Longer ED length of stay (LOS) increased the chances of hospital admission (p<.001) and LOS for admitted patients varied (median: 5.85 days; IQR: 3.97, 8.50). Significant predictors of admission in multivariate testing were ED usual site for problem COPD care (OR=0.33; 95% CI: 0.12-0.95), ever taken corticosteroid for COPD (OR=0.26; 95% CI: 0.08-0.9), diabetes (OR=4.2; 95% CI: 1.05-16.92), activity limitations in past 2 weeks (OR=1.92, 95% CI: 1.17-3.16), pCO2, mmHg (OR=1.1; 95% CI: 1.03 1.170) and ED length of stay (OR=1.07 per hour; 95% CI: 1.02-1.13). **Conclusions:** Admission to these Canadian hospitals for acute COPD from the ED varies dramatically. COPD admissions con-

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tribute to ED overcrowding through event frequency and prolonged in-ED care. Admission is associated with a variety of pre-treatment factors, and efforts to reduce admissions seem warranted. **Key Words:** COPD, Overcrowding

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WHICH alarms first during procedural sedation: the pulse oximeter or the capnograph?

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Introduction: The role of end-tidal CO2 (ETCO2) monitoring during procedural sedation and analgesia (PSA) in the emergency department (ED) is unclear. Many EDs lack such monitors. Proponents claim capnography detects respiratory depression before pulse oximetry. We tested this claim during a randomized clinical trial of low-dose ketamine versus fentanyl during ED PSA with propofol. **Methods:** A planned secondary analysis of a trial involving titrated propofol for orthopedic reduction or abscess drainage in ASA class I or II adults. All subjects were monitored by continuous pulse oximetry and combined oral/nasal sampled CO2 (Smart Capnoline Oral Nasal Cannula, Nellcor, Pleasanton, (CA) via a Lifepak 12 (Medtronic, Redmond, (WA). By protocol, supplemental oxygen was withheld unless hypoxemia (SaO2 < 92%) developed. Hypercapnia was defined as a 10 mmHg rise in ETCO2, an absolute ETCO2 >50 mmHg, or a 30s loss of waveform. **Results:** Of 63 subjects enrolled (31 male, age 39±18 yr), 36 developed hypoxemia and 17 hypercapnia (12 due to loss of waveform). In 12 of these 17 hypercapnic patients, hypoxemia detected by pulse oximetry preceded hypercapnia by a median of 187s. Of the remaining 5, 3 had isolated loss of waveform, and none received specific intervention. All hypoxemic patients responded quickly to supplemental oxygen, interruption of propofol administration, and/or stimulation, with only 1 patient requiring brief bag-valve-mask ventilation. Satisfaction with level of sedation was very high among both subjects and physicians. **Conclusions:** As ED PSA becomes widely accepted and practiced, safety concerns remain paramount. In selected, low-risk patients breathing room air, oxygen desaturation usually precedes changes in capnography and is readily reversible. The use of continuous capnography during PSA with propofol did not affect the management of these patients. These conclusions should not be extrapolated to patients pretreated with supplemental oxygen, or other settings/monitoring configurations. **Key Words:** Procedural sedation, Capnography, Oximetry, Propofol

7

CHALLENGING the dogma: topical proparacaine is safe and effective for the outpatient management of acute traumatic corneal injuries

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Introduction: Acute traumatic corneal injuries cause significant patient discomfort. The dogma forbids prolonged use of topical anesthetic agents in this patient population. There is little or no evidence for such an approach. Recent studies in the ophthalmology literature show that dilute topical Proparacaine is safe and effective as an analgesic when used in the post-operative setting. Our goal was to evaluate the safety and efficacy of dilute topical Proparacaine when prescribed in the emergency department for outpatient management of acute traumatic corneal injuries. **Methods:** A convenience sample of patients seen in two tertiary care emergency departments were randomized by a computer generated table of random numbers to either 0.05% Proparacaine drops or to placebo. Emergency department physicians, patients and the ophthalmologist were blinded to treatment allocation. Patients were instructed to use 1-2 drops PRN for 5 days. They recorded their pain on a visual analog scale 5 minutes prior to and 5 minutes after "study drug" administration. All patients were provided with topical antibiotics. They were also prescribed oral Acetaminophen with Codeine for breakthrough pain. Patients were followed in an ophthalmology outpatient clinic on days 1, 3 and 5 post-injury to ensure adequate wound healing. The study was powered to detect a 20% improvement in analgesia. Our primary endpoint was mean pain reduction. Secondary endpoints included patient satisfaction and wound complications. **Results:** Thirty-four patients were randomized and completed the trial. The results were analyzed with the Mann-Whitney U Test. There was a statistically significant improvement in both pain reduction 3.5 vs 1.4 (P= 0.007) and patient satisfaction 7.2 vs 3.8 (P= 0.027) in the treatment group versus the control group. There were no wound complications in any patient studied. **Conclusions:** Dilute topical Proparacaine is safe and effective for outpatient analgesia of acute traumatic corneal injuries when prescribed in the emergency department. **Key Words:** Corneal abrasion, Analgesia, Proparacaine

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YOUTH violence secondary prevention initiatives in emergency departments: a systematic review

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Introduction: Youth violence continues to trouble Canadians. We hypothesized that effective secondary violence prevention interventions exist for injured youth in the emergency department (ED), and conducted a systematic review to identify 1) outcome measures used for ED based interventions, and 2) success rates of interventions. **Methods:** Eight databases (MEDLINE, EMBASE, PUBMED, CINAHL, COCH, ACP, DARE and CENTRAL) were searched. Search terms included combinations and synonyms of "Youth", "Violence", "Interventions" and "Emergency" or "Hospital". Studies were included if they: 1) described and evaluated an intervention, 2) were healthcare-based and 3) targeted youth injured by violence. **Results:** Thirteen articles were selected by two blinded investigators from 171 abstracts. After full text review, 5 articles with 3 intervention programs were included in the review. Eight articles were excluded: adults only (n=1); primary preventions only, (n=6); and no evaluations performed (n=1). All interventions included involved case management programs in the ED with the violently-injured patient. A randomized control trial demonstrated a significant reduction in re-injury rates (cases 8.1% vs. controls 20.3%, Chi2 = 3.87, p=0.05). A retrospective cas-condemonstrated a 70% relative risk reduction in re-arrest. A retrospective observational study enrolled 72% of potential pediatric patients injured due to violence with only 1% of these youth returning for injuries due to violence (vs. historically reported 44% recidivism rates). **Conclusions:** All three studies reviewed were positive, although they had limited sample size and lacked intention to treat analyses. These consistently promising preliminary findings support continued development and investigation of ED-based programs to reduce the terrible toll of youth violence. **Key Words:** Youth, Violence, Injury prevention

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THE acceptability of clinical decision rules: validation of the Ottawa acceptability of decision rules scale (OADRS)

Brehaut JC, Graham I, Eagles D, Stiell IG. Department of Emergency Medicine, University of Ottawa, Ottawa, ON

Introduction: To develop a scale measuring the acceptability of a

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clinical decision rule (CDR). Development of high-quality CDRs is extremely resource-intensive, with no guarantee of widespread use. A tool to examine acceptability of early-stage CDRs would be useful. **Methods:** A 12-item scale (6-point Likert responses) was developed, pilot-tested, and included in larger surveys of practicing emergency physicians from four countries (AUS, CAN, UK, US; total n = 1290), for two CDRs: the Canadian C-Spine Rule (CS) and the Canadian CT-Head Rule (CT). In addition to typical item and internal consistency analyses, construct validity was measured in part by testing 4 hypotheses: 1) Scale scores should vary predictably by country, the highest scores coming from Canada; 2) CDR users should give higher scores than non-users; 3) Among users, OADRS scores should be higher for consistent users; 4) Among non-users, scores should be higher for those who would consider using the rules in the future. **Results:** Internal consistency was high, ranging from 0.79 to 0.83 for CS, and from 0.81 to 0.87 for CT. Multi-factor ANOVAs with scale scores as the outcome showed 1) Canada scored highest on overall scale scores (range 0-5; Mean scores: AUS 3.36, CAN 3.91, UK 3.52, US 3.38; $p < .001$); 2) Scores were higher among users than non-users (CS means: 3.83 vs. 2.96, $p<.001$; CT means 3.77 vs. 3.01, $p <.001$); 3) Scores were higher among consistent users (CS means: Always 4.30; Most of the time 3.93, Some of the time 3.23; CT means: Always 4.34; Most of the time 3.92, Some of the time 3.36; $p < .001$ in both cases); and 4) Among non-users, scores were higher for those who would consider use (CS means: Yes 3.40; No 2.57; CT means: Yes 3.45; No 2.64, $p < .001$). Interactions were generally small or non-significant. **Conclusions:** The OADRS might serve as an 'early-warning system' for CDR producers wanting to know whether a CDR will be considered acceptable by the target audience. **Key Words:** Decision rules, Head injury, Cervical spine injury

10

THE epidemiology of suicide post emergency department visit

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Introduction: Existing studies on suicide have a lack of specificity for emergency health care providers because they focus on data from all patient populations rather than on data for emergency department visits. The study objective was to characterize the epidemiology of suicide in patients presenting to the ED. **Methods:** A retrospective study in an urban, academic emergency department with an annual census of +60,000 visits. We reviewed all patients presenting to the ED between January 1, 2000 and November 1, 2005. Using the emergency administrative database, we linked with provincial vital statistics data and the regional emergency visit database from the same time period to ascertain which patients presenting to the ED had committed suicide and whether or not there were other related patient encounters at other local emergency departments. **Results:** There were 130,619 patients who made 300,625 visits to the ED. 8327 patients had 15,412 visits (5.1%) related to mental health. There were 127 (0.97%) deaths attributable to suicide in patients with previous ED visits. There were 35 suicides in 3,501 patients (5,547 visits) with a presenting complaint of suicidal ideation or attempt (1%). 93 of the 127 (73.2%) were male. Average age for this cohort was 42.0 (SD 14.0). Only 74 (58.2%) of these deaths had a presenting complaint or ED discharge diagnosis related to mental health and/or substance misuse including alcohol. 36 of the 127 patients made visits to other regional hospitals. 42 of 127 (33.7%) patients committed suicide within 30 days of an ED encounter and 55 (43.3%) within 60 days. 42 of 127 (33.1%) had a previous psychiatric related admission and 38 (30%) had only a single ED encounter with no other regional ED visits. **Conclusions:** This represents one of the first reports of suicide in an emergency department population. Although the overall percentage of patients committing suicide is low, there is still about one patient a month committing suicide within 60 days of an ED visit. **Key Words:** Suicide, Population health

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IDENTIFICATION and classification of drug-related problems in the emergency department

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Introduction: Clinical pharmacy services and the practice of pharmaceutical care is directed at identifying and resolving drug-related problems (DRPs) to achieve optimal patient outcomes. The Emergency Department (ED) is an area with a patient population at risk for many DRPs both prior to presentation and within the ED. Our objective was to determine the incidence and type of DRPs identified in the ED of a large tertiary-care, Canadian teaching hospital which provides clinical pharmacy services, and to describe the proportion of DRPs in the ED relative to the remainder of the hospital. **Methods:** A prospective, observational study was conducted on a population of adults presenting to hospital over an 18-month period. Clinical pharmacists utilized a PDA-based tool for documenting DRPs and pharmacist interventions during routine patient care practice and documentation was based on the pharmaceutical care model. DRPs were categorized according to one of eight established categories as defined by Hepler and Strand. Primary outcomes were reported as proportions presented as percentages with 95% confidence intervals. **Results:** 39,874 DRPs were documented throughout the institution over the 18-month evaluation period. The intensive care unit identified the most DRPs at 20.7% (95%CI 20.3-21.1%) followed by the bone marrow transplant service at 17.3% (95%CI 16.9-17.6%) and ED at 16.5% (95%CI 16.1-16.8%). The most common types of DRPs in the ED were need to add drug 53.3% (95%CI 52.0-54.5%), unnecessary drug 10.1% (95%CI 9.4-10.8%), high dose 9.3% (95%CI 8.6-10.0%) and adverse drug reaction 7.2% (95%CI 6.6-7.9%), wrong/suboptimal drug 6.6% (95%CI 6.0-7.2), low dose 6.5% (95%CI 6.0-7.2%) and non-compliance 3.2% (95%CI 2.8-3.7%). **Conclusions:** Pharmacist identified DRPs are common in the ED with a volume of DRPs comparable to other priority areas for clinical hospital pharmacists. Hospitals without clinical pharmacy services in the ED should consider implementation to address this high risk patient population. **Key Words:** Pharmacy, Pharmacist, Adverse drug effects, Drug related problem, Hospital care

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NATIONAL survey of CCFP(EM) program directors regarding emergency medicine ultrasonography

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Introduction: Emergency medicine ultrasonography (EMUS) is used by emergency physicians in Canada. The purpose of this study was to survey CCFP(EM) program directors regarding current and future EMUS training. **Methods:** We conducted a web-based survey of all CCFP(EM) residency training directors in Canada using a modified Dillman technique. Two academic emergency physicians reviewed the validity and reliability of the survey. The survey was pilot tested by another academic CCFP(EM) residency trained emergency physician. Research ethics approval was obtained. The web based questionnaire consisted of 17 yes/no and open questions designed to assess perceptions regarding current and future EMUS education. Descriptive statistics with 95% CIs were used. **Results:** The survey response rate was 100% (18/18). Currently 84.2% of

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respondents use EMUS in their program. Of those, 68.8% offer an introductory EMUS course of which 54.6% are mandatory. All programs recommend attending an introductory EMUS course. 37.5% of the programs have over 90% of their attending staff using EMUS, while 43.8% of programs have less than 30% of staff using EMUS. 77.8% of directors think that an introductory course in EMUS should be mandatory. 64.7% believe that residents are able to acquire sufficient experience to use EMUS independently to make practice decisions prior to the completion of their residency. 88.9% believe that EMUS should be a part of the scope of practice for emergency physicians. Only 61.1% believed that questions about EMUS should be on the CCFP(EM) exam. Open responses indicated that funding, resources, and standardization were issues that needed to be addressed. **Conclusions:** Formal EMUS training for CCFP(EM) programs is being introduced in Canada. The majority of directors think that an introductory course in EMUS should be mandatory. However, fewer directors believe EMUS should be on the CCFP(EM) certification exam until further funding, resources, and standardization of EMUS programs are in place. **Key Words:** Ultrasonography, Education and training, Curriculum

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DEVELOPMENT of an emergency based curriculum on homelessness: what do medical trainees need to know?

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Introduction: Exposure alone to homelessness may negatively impact attitudes of medical trainees (MTs). Many homeless persons (HPs) will seek routine care in the emergency department (ED) as a result of barriers to access to care. Previous work has shown that HPs perceive attitudes of health care workers to be a significant barrier to care. **Objectives:** To define and develop an ED-based curriculum in the care of homeless persons. **Methods:** The study was conducted at an urban Canadian ED (55,000 visits/yr; 15% HPs). 2 focus groups (N=19) were conducted with adult and youth community service providers (CSPs) and 3 (N=15) with medical trainees and ED staff (MT-ED). At the suggestion of focus group participants, further interviews were conducted at drop-in centers and shelters, with HPs(N=6) who seek care from many sources. CSPs (N=5) who could not attend sessions provided written comments. Participants discussed experiences, expectations, and curriculum needs. Focus groups were transcribed verbatim, coded and recoded using an iterative process to define common themes corresponding to key objectives. **Results:** Codes were grouped as: 1) attitudinal issues, 2) resource/system challenges, 3) curriculum needs. CSPs were concerned about perceptions of pathways to homelessness and issues of substance abuse. Major system issues included ED wait times, lack of follow-up, discharge planning, and feedback to CSPs. Curriculum goals cited lack of general knowledge about homelessness, associated medical and psychosocial problems. MT-ED described addressing homeless issues in the ED as opening "Pandora's Box". Trainees felt ill-equipped and uncomfortable asking social history. MT-ED requested curriculum on continuum of care and discharge planning, and approaches to history and physical. **Conclusions:** Homeless curriculum needs to include pathways to homelessness, approaches to medical and psychosocial problems, with a greater emphasis on continuum of care and discharge planning. **Key Words:** Homelessness, Education, Trainees, Curriculum

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ESSENTIAL dimensions of performance for emergency medicine residents

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Introduction: Personal interviews are regarded as the most important screening tool in resident selection. Interrater reliability is significantly greater for structured interviews than for unstructured ones. The content of structured interviews is most often developed based on performance dimensions felt to be important to succeed in a particular line of work. The dimensions of performance essential to succeed as a resident in Emergency Medicine have not yet been studied. This project aims at determining the dimensions of performance necessary to succeed as a resident in an Emergency Medicine program. **Methods:** This is a prospective study. A focus group of 5 representative members of the Emergency Medicine department at Queen's University used the 'critical incident technique' to generate scenarios of poor and excellent resident performances. The 5 members compose 20% of the department workforce. As recommended in the critical incident literature, 2 faculty members, different than the initial 5, independently reviewed each scenario and labeled the performance dimensions that they felt were reflected in each. These 2 faculty members provided their own labels. All labels assigned to a particular scenario were pooled and reviewed by the 2 faculty members until consensus was reached. For analysis purposes, only labels applying to at least 2 scenarios were considered. **Results:** The focus group generated 51 critical incidents. Twelve dimensions of performance applied to at least 2 scenarios. The four main dimensions most frequently reflected by the scenarios were (1) professionalism, 24% of scenarios, (2) insight, 11%, (3) humanity, 9%, and (4) reliability, 9%. **Conclusions:** The main performance dimensions considered essential to succeed as a resident in the Emergency Medicine program at Queen's University are presented. These dimensions reflect the values sought by this specific program. As an initial step in structuring admission interviews, other programs should identify the dimensions of particular importance to them. **Key Words:** Residency, Selection criteria, Performance

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DESIGNING advanced EMS subspecialty training: a survey of Canadian EMS directors

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Introduction: Prehospital care is an emerging subspecialty for Emergency Medicine. While EMS fellowships are well developed elsewhere, they are nascent in Canada. We conducted a systematic needs assessment survey to define the essential elements for a Canadian EMS subspecialty training curriculum. **Methods:** We developed a questionnaire from a review of literature and existing EMS program documents. This was validated and pilot tested by EMS experts. Using Dillman methods we conducted a phone and email survey of all Ontario Base Hospital EMS Directors (n=30). Directors were asked to rate essential competencies for Base Hospital physicians from a list of 18 domains, as well as the degree of need for EMS fellowships in Canada. Results were analyzed using descriptive statistics. **Results:** Response rate was 66.7% (20/30). Ninety-five percent were male, and 50% served small urban environments. Most were certified in EM as CCFP-EM (50%), or FRCPC EM (20%). Only 30% of Directors had formal training for their role. They were responsible for an average of 355 paramedics (87-1000), and 6 supervised aeromedical services. Six domains of competence were rated as specifically important for EMS directors: quality control, human resource management, finance, legal issues, EMS system design, and history of EMS in Canada. Twelve other domains were rated essential for all Emergency physicians: paramedic levels, dispatch and triage, disaster preparedness, WMD, HAZMAT, injury prevention, community education, aeromedical issues, telemedicine, research methods, medical control, and therapies used by EMS. Small urban Directors were less likely to en-

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dorse the need for formal EMS fellowships (2.4/5) than urban Directors (3.1/5) (p>0.05). Ninety percent suggested EMS training should be 1 year or less. **Conclusions:** This needs assessment identifies 6 essential domains of competence exclusive to EMS directors and 12 essential for all EM physicians. These can be used to guide future Canadian EMS fellowship development. **Key Words:** Prehospital care, Emergency medical services, Administration

16

EXAMINERS' assessments of resident performance on in-training examinations agree moderately with written examination results and with each other

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Introduction: Residents in Canadian residency programs undergo in-training exams to assess progress and prepare them for the certification exam. Little is known about the inter-rater reliability of the current format of oral in-training exam, or about the concurrent validity of examiners' assessments of residents' knowledge as measured by written exam. Program directors are challenged with providing reliable in-training assessments of their residents, while resource constraints favour minimizing resources and faculty time. We sought to determine the degree to which examiners' scores agree with each other and with a concurrent written exam. **Methods:** Residents in one FRCP(EM) program underwent four sets of in-training examinations over two years. Exams included two oral exams with two examiners each, a bellringer exam, and a three hour short answer question written exam. Each examiner used a 5-point scale to independently assign each resident a separate score for knowledge base, patient management, and examsmanship. Correlations between examiners' assessments (interrater reliability) and between residents' knowledge base marks on the oral exam and their written exam marks were measured using a Pearson correlation coefficient. Examiner's agreement on pass/fail decisions were measured using Cohen's kappa. All exams were standardized and a template was used for marking purposes. **Results:** Fifty-seven sets of exam scores were reviewed. The average correlation between examiners for all marks was 0.66. The average kappa for pass/fail decisions was 0.61. The average correlation between exam scores and examiners' assessments of knowledge base was 0.43. **Conclusions:** Examiners demonstrate reasonable agreement on pass/fail decisions, but do not agree closely enough to support the use of only one examiner. Oral and written exams appear to measure different forms of knowledge supporting the continued use of both formats. Sources of variance among scores is worthy of further study. **Key Words:** Emergency medicine training, Education

17

CLINICAL problems and procedures encountered by fourth year medical students during their emergency medicine clerkship

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Introduction: In order to fulfill the Liaison Committee on Medical Education (LCME) accreditation standards, the emergency medicine (EM) clerkship at the University of Toronto piloted an electronic procedural logging application using handheld computers. The purpose of this study was to determine what clinical problems and procedures were encountered by fourth year medical students during their emergency medicine clerkship rotation. **Methods:** Fourth year medical students (n=199) at University of Toronto were expected to participate in the electronic logging project during their 4 week EM clerkship between September 2005 to April 2006. Novel software was designed for handheld computers. Following each clinical encounter, students entered data on their handheld computer utilizing check boxes and drop-down menus. Following synchronization of their handheld computers, data was transmitted to a central server. **Results:** A total of 46 medical students (23%) participated in the pilot electronic logging project. A total of 2930 encounters with a mean 63.7 per student were entered. Students logged an average of 8.3 different patients per shift. The majority of patients encountered (49%) were between the ages of 17-49 years. There was a wide range of patient acuity encountered. The majority of students encountered patients with problems/diagnoses from all major categories. Twenty-eight percent of students encountered patients in the category of resuscitation. The most common problems encountered were lacerations, fractures, sprains, chest pain and abdominal pain. The most common procedures performed were suturing, splinting and slit lamp use. **Conclusions:** Fourth year medical students during their emergency medicine rotation are encountering a wide variety of clinical problems and performing procedures with large variability as demonstrated by electronic logs. More standardization of their clinical encounters in emergency medicine will need to be addressed in order to meet the LCME accreditation standards. **Key Words:** Emergency medicine training, Education, Procedures

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EFFICACY and impact of intravenous morphine before surgical consult in children with right lower quadrant pain suggestive of appendicitis: randomized controlled trial

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Introduction: The evidence supporting the use of analgesia in children with abdominal pain suggestive of appendicitis is limited. **Methods:** All children between the age of 8 and 18 years presenting to a paediatric emergency department with a significant right lower quadrant abdominal pain and a presumptive diagnosis of appendicitis were eligible to be enrolled in a randomized double-blind placebo controlled trial if the initial pain was at least 5/10 on a verbal numeric scale. Patients received either 0.1 mg/kg of morphine (maximum 5 mg) or placebo. The primary outcomes were: 1) the difference in pain using a visual analog scale at baseline and 30 minutes after the completion of the intervention, and 2) the time delay between arrival in the emergency department and the final surgical decision (surgery or discharge from surgery care). **Results:** Ninety patients with a suspected diagnosis of appendicitis were randomized to receive either morphine or placebo. Of these, 58/87 (67%) had a final diagnosis of appendicitis. Both groups were similar in terms of demographic, history, physical findings, probability of appendicitis, and initial pain score. There was no difference in the decrease of pain between the morphine and placebo groups: 24 ± 23 mm and 20 ± 18 mm, respectively (difference 4 mm [95% CI -5, 12]). There was also no difference in the time delay between arrival in the emergency department and the surgical decision: median of 269 minutes (95% CI 240 to 355) for morphine, and of 307 minutes (95% CI 239 to 415) for placebo (difference -34 minutes [95% CI -105 to 40]). **Conclusions:** The use of morphine in children with right lower quadrant abdominal pain with a presumptive diagnosis of appendicitis did not delay the surgical decision. In our group of patients, however, morphine was not more effective than placebo in diminishing their pain. **Key Words:** Paediatrics, Abdominal pain, Analgesia, Appendicitis, Morphine

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EVALUATION of a rapid nucleic acid hybridization test in detecting Group A streptococcal pharyngitis and comparison to throat culture in a pediatric emergency department

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Introduction: The sensitivity of rapid antigen detection test based on latex agglutination or ELISA varies and may be poor in some cases. Newer rapid streptococcal tests using nucleic acid hybridization appear promising and may eventually replace the throat culture. The objective of this study was to compare the validity of the Gen-Probe® Group A Streptococcus Direct Test (GADST) to the throat culture in detecting Group A streptococcal pharyngitis in a pediatric emergency department (PED). **Methods:** Children (<18 years) presenting to the PED of a tertiary care hospital were eligible to be included in the study if a throat culture was deemed clinically required for pharyngitis from 03/05 to 07/05 and from 10/05 to 06/06. Two throat swabs were collected simultaneously; one for culture and the other for GADST. In case of discrepancy, a Todd-Hewitt broth was performed and the result of this was considered the true result. Sensitivity (Sn), specificity (Sp), positive predictive value (PPV), negative predictive value (NPV), positive likelihood ratio (LR+), negative likelihood ratio (LR-) and their 95% confidence interval were calculated. **Results:** A total of 399 children aged 6.3 +/- 5.0 years were included. Clinical symptoms and signs were: sore throat (73%), fever (65%), exudate (33%), adenopathy (51%), and absence of cough (50%). The rate of positive throat culture was 39%. For all children, Sn of GADST in our study was 92% (87, 96); Sp 75% (69, 80); PPV 71% (64, 77); NPV 94% (89, 96); LR+ 3.71 (2.97, 4.64) and LR- 0.10 (0.06, 0.18). After distribution of discordant results, the Sn of the GADST was 99% (96, 99), Sp 83% (78, 88), PPV 81% (75, 86), NPV 99.5% (95% CI 97.0, 99.9), LR+ 6.04 (4.48, 8.15), and LR- 0.008 (0.001, 0.055). **Conclusions:** GADST in our study did not perform as well as anticipated. The numbers of false positives preclude us from recommending its use instead of standard throat culture within our population. This confirms the need to evaluate the performance of a new diagnostic test in one's setting before adopting it. **Key Words:** Paediatrics, Emergency medicine, Strep pharynigitis, Diagnostic testing

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WHAT is the impact of advanced life support on the management and outcomes of out-of-hospital seizures in children?

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Introduction: The Ontario Prehospital Advanced Life Support (OPALS) Study is designed to evaluate EMS interventions for critically ill patients. The OPALS Pediatric Study tested the impact on children with out-of-hospital seizures of adding a full ALS program to existing BLS-D EMS systems. **Methods:** This multicenter before-after controlled clinical trial was conducted in 17 communities and enrolled all children (<16 years old) with out-of-hospital generalized seizures who were seizing during EMS attendance during the 36-month BLS-D phase and the subsequent 36-month ALS phase. Paramedics were fully trained to ALS standards including endotracheal intubation and administration of IV drugs. Chi-square and t-test analyses were performed. **Results:** There were 417 children enrolled during the BLS-D (N=183) and ALS (N=234) phases. The groups were well matched for gender (52.5% male) but the BLS group was younger (mean age 4.2 vs 5.6 years), had more febrile seizures (35.5% vs 22.2%; P=.02) and less chronic non-febrile seizures (39.3% vs 49.6%; P=.02). During the ALS phase, intubation was attempted for 5 children with 40% success; intravenous access was attempted for 123 (52.6%) children with 65% success; and anticonvulsants were given to 124 (53.0%) children (rectal diazepam 33.8%; IV diazepam 19.2%). No anticonvulsants were used during the BLS-D phase. From the BLS-D to the ALS phase, there was a decrease in number of patients still seizing on arrival to the ED (44.8% vs 32.1, P=0.008) and an increase in the use of bag valve mask ventilation (6.7% vs 19.2%, P=.0002). There was no difference in any other outcome including hospital discharge (98.9%% vs 99.1%; P=.85), hospital admission (45.0% vs 42.2%; P=.59), or ICU admission (16.9% vs 11.6%; P=.34). **Conclusions:** This first controlled trial to evaluate full ALS programs for out-of-hospital seizures in children shows a substantial number of children receiving prehospital anticonvulsants and fewer children still seizing on arrival to the ED. **Key Words:** Emergency medical services, Paediatrics, Seizures, Advanced life support, Diazepam, Anticonvulsants

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COMPARISON of two clinical scores in the evaluation of acute asthma in pre-school children

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Introduction: To evaluate the accuracy and responsiveness of two clinical asthma scores: the Preschool Respiratory Assessment Measure (PRAM) and the Pediatric Asthma Severity Score (PASS), during acute asthma. **Methods:** A prospective cohort study was conducted in a pediatric Emergency Department (ED). All the patients between the age of 18 months to 7 years who presented for an exacerbation of asthma while one of the research assistants was available (Feb-Dec 06), were approached. The exclusion criteria were: chronic cardio-respiratory problems, clinical diagnosis of bronchiolitis, pneumonia, laryngitis, varicella, whooping cough and transfer of a patient. The variables of interest were: length of stay ≥ 6 hours in the ED or admission, oxygen saturation, physician's judgment of severity, admission rate, utilization of systemic corticosteroid and > 5 bronchodilator treatments. Clinical findings were assessed at the start of the ED visit, after 90 minutes of treatment, and at the time of physician's decision regarding patient disposition. **Results:** During the study period, 1853 patients were seen in the ED for an asthma exacerbation. Of these patients, 213 were approached and 5 refused to participate. The mean age was 3.3 years (SD 1.4) and 63% were boys. Significant correlations were seen between the physician's judgment of severity and PRAM (r = 0.42-0.65) and PASS (r = 0.43-0.65). Moderate correlations were found between a length of stay ≥ 6 hours or admission and PRAM (AUC 0.69, 0.59-0.79) and PASS (AUC 0.70, 0.60-0.80) calculated at the start of the ED visit. When the scores were recalculated after 90 minutes of treatment, the correlation increased for PRAM (AUC 0.81, 0.73-0.90) but remained similar for PASS (AUC 0.72, 0.62-0.82). The scores were shown to be responsive, with a 26.7% relative improvement in score from start to 90 minutes of treatment for the PRAM and 26.9% for the PASS. **Conclusions:** The PRAM and PASS scores are valid measures of asthma severity in children and show both discriminative and responsive properties. **Key Words:** Paediatrics, Asthma, Clinical severity scores

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CLINICAL and laboratory assessment of dehydration severity in the emergency department: diagnostic test properties

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Introduction: We have previously described the development of a

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clinical dehydration scale which includes the following 4 clinical characteristics: general appearance, eyes, mucous membranes, and tears. The objective was to evaluate the diagnostic test properties of the scale and laboratory measures in the ED. **Methods:** Percent dehydration was calculated (weight change from pre- to post-rehydration) for 93 children (1-36 months) with acute gastroenteritis. The clinical score and laboratory tests (pH and bicarbonate) were obtained. Sensitivity and specificity for each clinical score (0 to 8) was calculated, and receiver operating characteristics (ROC) curves were used to obtain cutoffs for no dehydration (<3%), mild dehydration (>3%) and moderate to severe dehydration (>6%). Likelihood ratios (LR) were calculated for each of the 3 dehydration categories and for laboratory tests for dehydration >6%. **Results:** ROC curve analysis resulted in the following dehydration severity categories: score = 0 (none); score = 1 to 4 (mild); score = 5 to 8 (moderate to severe). The final diagnostic test properties are shown in the table. **Conclusions:** The clinical dehydration scale,

Table 1, Abstract 22

Variable	N	Severity	Predictor	LR+	LR-
Clinical score = 0	24/93	None	<3%	2.2	0.79
Clinical score = 1 to 4	56/93	Mild	>3% to <6%	1.3	0.67
Clinical score = 5 to 8	13/93	Moderate to severe	>6%	5.2	0.55
pH < 7.32	9/61	Moderate to severe	>6%	7.2	0.48
Bicarbonate < 18 mmol/L	9/61	Moderate to severe	>6%	11.6	0.35

pH and bicarbonate demonstrate meaningful likelihood ratios for severity of dehydration. Children with a clinical score of 0 may be considered to have no dehydration; children with a clinical score of 1 to 4 may have mild dehydration; children with a clinical score of 5 to 8, pH < 7.32, or bicarbonate < 18 mmol/L may have moderate to severe dehydration. These variables may be added to a decision making algorithm to guide management (oral or intravenous fluid rehydration) and disposition decision (discharge home, short stay unit, hospitalization). **Key Words:** Paediatrics, Dehydration, Disposition, Gastroenteritis

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EVALUATION of the validity of a computerized version of the Canadian Triage and Acuity Scale in a paediatric emergency department

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Introduction: The use of a standardized triage tool like the Paediatric Canadian Triage and Acuity Scale (paedCTAS) allows better comparison of patients. The use of a computerized version of the tool (Staturg from Statdev) could theoretically improve its validity. The objective of the study was to evaluate the inter-rater agreement among nurses using Staturg in comparison to the traditional paedCTAS. **Methods:** A two phases experimental study was conducted to compare the inter-rater correlation between nurses assigning triage level to written case scenarios using either the traditional paedCTAS or Staturg. Participants were nurses with at least 1 year of experience in paediatric emergency and they had to be trained and evaluated at triage. Each of the 54 scenarios was evaluated by each nurse first using either one of the strategies (CTAS or i-paedCTAS). Two to four weeks later, they evaluated the same scenarios using the other tool (crossover). The primary outcome was the inter-rater correlation measured using the weighted Kappa score. **Results:** Eighteen of the 29 approached nurses participated in the study. They all evaluated the 54 clinical scenarios. The computerized triage tool showed a better inter-rater correlation (Staturg kappa score of 0.54 (95% CI 0.54-0.56) vs. CTAS Kappa score 0.51 (95% CI 0.49-0.52)). The computerized version was associated with a better correlation for the scenarios describing patients with the highest severity of triage (kappa 0.72 vs. 0.55 for triage priority 1 and kappa 0.70 vs. 0.50 for triage level 2). Both triage tools had similar accuracies as measured by the agreement between nurses and an expert panel (concordance in 57% for paedCTAS vs. 55% i-paedCTAS). **Conclusions:** A computerized version of the paedCTAS showed a statistically significant improvement in the inter-rater correlation for nurses evaluating triage level of 54 clinical scenarios but this difference has small clinical significance. **Key Words:** Paediatrics, Triage, Computerized decision support

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A cluster randomized knowledge transfer trial in 4,457 minor head injury patients

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Introduction: The Canadian CT Head Rule (CCHR) for imaging in minor head injury was previously derived (N=3,121) and validated (N=2,707). This knowledge transfer study sought to evaluate the effectiveness and safety of implementing the CCHR in multiple EDs. **Methods:** This matched-pair cluster randomized trial compared 12-month 'before' and 'after' periods at 6 'intervention' and 6 'control' EDs, stratified by teaching or community hospital status. We enrolled adults presenting with GCS 13-15 after acute head trauma and transient neurological impairment. We randomly allocated sites to intervention or control groups. During the after period at the intervention sites, we introduced active strategies to implement the CCHR, including education, policy, and CT requisition reminders. Outcomes included CT imaging rates and missed injuries. Chi-square procedures were used for cluster data analysis. **Results:** We enrolled 4,457 patients with mean age 38.9 years, male 70.5%, brain injury 5.7%, neurosurgical intervention 0.7%. Cases were similar, comparing control (N=1,932) to intervention (N=2,525) sites. Baseline CT rates ranged from 22.5% to 80.0%. From the before to after periods, the CT rate increased at the intervention sites (from 61.4% to 76.2%; P<0.01) and at the control sites (from 67.3% to 74.3%; P<0.01). There were no missed cases of important brain injury. Comparing before to after periods at the intervention and control sites, there was an increase in total minor head injury cases from 1003 to 1522 vs from 872 to 1060 (relative increase 51.7% vs 21.6%; P<0.01). There was also an increase in the total brain injury cases from 50 to 89 vs a decrease from 60 to 53 (78.0% vs -11.7%; P<0.01). **Conclusions:** This knowledge transfer trial failed to demonstrate an impact of the previously validated CCHR on CT imaging rates. Issues included physician compliance and a change in patient demographics. Future studies should identify implementation barriers and explore strategies to deal with them. **Key Words:** Head injury, Diagnosis, CT scan, Decision rules, Knowledge transfer

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IS D-dimer testing appropriately used in the management of emergency department patients with suspected venous thrombo embolisms?

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Introduction: The d-dimer is the most commonly ordered diagnostic test for suspected pulmonary embolus or deep venous thrombosis. In order for its results to be applied appropriately, a pre-test probability (PTP) must be performed. Without this, the test results can be misinterpreted and lead to unnecessary diagnostic imaging or inappropriate discharge. Therefore, we sought to determine if PTP was documented for emergency department (ED) patients on whom a d-dimer was performed for suspected venous thrombo embolism (VTE). **Methods:** In this medical record review, we used a random number generator to select 100 of 760 charts of patients at three EDs who had a SimpliRED d-dimer performed during a three-month period. Trained data abstractors, blinded to the study hypothesis, abstracted explicitly defined data from the ED chart. An independent abstractor assessed reliability of 15% of the charts. **Results:** Suspicion of VTE was documented in 97/100 charts. There was no documentation of PTP assessment for 62/97 (64%) cases. Of 10/62 (16%) without documented PTP and with positive d-dimers, 5/10 (50%) had no diagnostic imaging. Of 52/62 (84%) without documented PTP and with a negative d-dimer, 47/52 (90%) had no imaging. **Conclusions:** PTP is not documented in a majority of ED patients with suspected VTE. This, and the finding that 50% of patients with a positive D-dimer had no further testing, suggested that D-dimer testing is being used inappropriately. **Key Words:** D-dimer, DVT, Diagnostic test

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The prehospital validation of the Canadian C-Spine Rule by paramedics

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Introduction: The Canadian C-Spine Rule (CCR) for radiography in alert and stable trauma patients was previously validated in a cohort of 8,283 patients. The CCR calls for evaluation of active neck rotation if patients have none of 3 high-risk criteria and at least 1 of 5 low-risk criteria. This study prospectively evaluated the accuracy, reliability, and clinical sensibility of the CCR when used by paramedics in the prehospital setting. **Methods:** This prospective cohort study took place in seven Canadian prehospital Emergency Medical Services and involved alert (GCS 15) and stable adult trauma patients at risk for neck injury. Advanced and basic care paramedics completed 15-item data forms and interpreted the CCR status for all patients who then underwent immobilization and radiography to determine the outcome, clinically important c-spine injury. 149 patients were independently examined by a 2nd paramedic. Patients were followed by a 14-day telephone interview. Analyses included sensitivity, specificity, kappa coefficient, and descriptive statistics with 95% CIs. **Results:** The 2,397 patients enrolled over 50 months had these characteristics: mean age 40.7 (range 16-103), female 51.7%, motor vehicle collision 62.7%, fall 19.6%, admitted to the hospital 9.9%, clinically important c-spine injury 0.5%, unimportant injury 0.2%, internal fixation 0.3%. The CCR classified patients for 12 important injuries with sensitivity 100% (95% CI 74-100), specificity 38.2% (36-40). The kappa value for paramedic interpretation of the CCR was 0.94 (0.96-0.98). Paramedics misinterpreted the rule in 6.0% of cases, did not evaluate range of motion when indicated in 3.3%, were comfortable applying the rule in 81.5%. 916 prehospital immobilizations could have been avoided using the CCR. **Conclusions:** Paramedics can apply the CCR with accuracy and identified all important cervical-spine injuries. The adoption of the CCR by paramedics could have a significant impact on the number of prehospital immobilizations. **Key Words:** Canadian C-Spine rule, EMS, Cervical-spine

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CAN ED triage nurses reliably clear the c-spine in minor trauma?

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Introduction: Having ED triage nurses clinically clear the c-spine of minor trauma patients would avoid prolonged and unnecessary immobilizations. This validation study evaluated the reliability of ED nurse neck assessments using the Canadian C-Spine Rule (CCR). **Methods:** We conducted a prospective cohort study at 6 EDs (2 teaching and 4 community hospitals) and enrolled alert and stable, adult, trauma patients who presented with neck pain or on an ambulance backboard. Triage nurses were trained to use the CCR by means of a 1-hour interactive CD and 1-hour practical session and underwent a written test. Nurses evaluated each patient for the CCR, including assessment of neck tenderness and rotation (where applicable) and recorded findings on a data form. A second clinician (nurse or MD) performed interobserver assessments of the patients independently. Data analyses included the kappa coefficient and 95% CIs, with kappa > 0.60 considered to indicate substantial agreement. **Results:** Overall, 112 nurses enrolled 345 patients with mean age 42.4 years (range 16-100), female 60.3%, ambulance arrival 73.0%, MVC 59.4%, admitted 8.1%, c-spine injury 1.2%. According to the CCR interpretations, 47.5% of patients could have had their c-spine cleared. Interobserver assessments (61.7% by MDs) for overall need for immobilization by CCR showed simple agreement of 90.5% and a kappa of 0.81 (95% CI 0.74-0.88). Results did not change regardless of whether the second observer was a nurse or MD. The agreement for assessing the 9 CCR component findings had these kappas:

Age 65 - 0.97
Dangerous mechanism - 0.79
Paresthesias - 0.71
Rearend MVC - 0.76
Upright position - 0.78
Ambulatory - 0.71
Delayed neck pain - 0.66
Midline tenderness - 0.54
Able to rotate - 0.81

Conclusions: This highly successful validation study found that nurses can reliably assess the CCR and its components. Future studies should test the effectiveness and safety of a strategy of having triage nurses clear the c-spine of low-risk trauma patients. **Key Words:** Canadian C-Spine rule, Nurse, Cervical-spine

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SENSITIVITY and specificity of the Canadian CT head rule and the New Orleans criteria in a US trauma center

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Introduction: CT ordering rate for minor head injury in the US is high. This study compared the clinical performance of both Canadian CT Head Rule (CCHR) and New Orleans Criteria (NOC) decision rules for detecting the need for neurosurgical intervention and

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clinically important brain injury in a set of patients in the US. **Methods:** Prospective cohort study in a single US university Level I trauma center comparing the CCHR and NOC among minor head injury patients who presented to the ED with blunt trauma to the head resulting in witnessed loss of consciousness, disorientation or definite amnesia, and a GCS score of 15. The CCHR was also evaluated in all patients with GCS 13–15. The primary outcome measures were "need for neurosurgical intervention" and "clinically important brain injury" on CT. Data were analyzed using appropriate univariate measures as well as sensitivity and specificity with 95% CIs. **Results:** Among 314 patients with GCS 15, 3 (0.9%) required neurosurgical intervention and 11 (3.5%) had clinically important brain injury. As compared with the NOC, the CCHR had the same sensitivity (100 vs 100%; 95% CI 29-100%) but was more specific (80.7% vs 9.6%) for predicting need for neurosurgical intervention. For clinically important brain injury, the CCHR had similar sensitivity to the NOC (100 vs 100%; 95% CI 72-100%) but was more specific (34% vs 9.9%), and would result in lower CT rates (66.2% vs 90.4%). Among all 413 patients with GCS 13-15 the sensitivity and specificity of CCHR for neurosurgical intervention for 5 cases was 100% and 66.7% respectively and for 27 cases of clinically important brain injury it was 100% and 28.2% respectively. **Conclusions:** In a US sample of minor head injury patients with GCS 15, the CCHR and the NOC have equivalent high sensitivities for need for neurosurgical intervention and clinically important brain injury. The CCHR, however, has much higher specificity for important clinical outcomes and could result in much lower imaging rates. **Key Words:** Minor head injury, Canadian CT Head rule, New Orleans criteria

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IMPACT of an electronic prescription writer on emergency department narcotic prescribing practice

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Introduction: BC physicians use special and time consuming duplicate prescriptions pads to prescribe narcotics. We built an electronic prescription writer (e-Rx writer) that also automatically creates narcotic prescriptions on the special duplicate pads and reduces physician prescribing time. Our objective was to determine whether the use of the e-Rx writer increased the number of narcotic prescriptions dispensed. **Methods:** A before and after study in an urban, academic emergency department. We obtained the records of prescribed controlled substances for each emergency physician (EP) from the College of Physicians and Surgeons for a 5 month period (June – October 2005) and the corresponding period one year later when the e-Rx writer was used. We included EPs who were half time clinical or greater and who did not write prescriptions outside the department. Only prescriptions that were presented to a pharmacy were included. Prescribing practices for controlled substances that do not require duplicate prescriptions (benzodiazepines and Tylenol #3) were also compared. We identified all patients with a potentially painful condition (PPC) seen by these physicians in the pre and post narcotic prescription writer period. **Results:** There were 25 EPs included in the analysis. Based on repeated measures analysis of covariance (using Tylenol #3 prescriptions in the pre and post period as the covariate) there was a significant increase in narcotic prescriptions per 100 patients with a PPC provided in the post e-Rx writer period (mean = 4.2 pre and 6.5 post $F_{1,24} = 20.3$; $P < 0.001$) . There was no difference in the number of Tylenol #3 or benzodiazepine prescriptions pre and post e-Rx writer. **Conclusions:** The e-Rx writer for narcotics significantly increases the number of narcotic prescriptions provided in the ED. **Key Words:** Electronic prescription, Narcotic

Table 1, Abstract 29

Factor	Pre (mean)	Post (mean)	Difference (pre–post)	P-value
Narcotics/100 PPC patients	4.2	6.5	2.3	<0.001
Tylenol #3/100 PPC patients	12.0	12.6	0.6	0.62
Benzodiazepines/100 patients	1.5	1.2	-0.3	0.48

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MULTIPLYING the serum acetaminophen by the aminotransferase to risk-stratify patients following acetaminophen overdose

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Introduction: Early risk prediction following acetaminophen (APAP) overdose is challenging when time of ingestion is unknown. Because serum APAP concentrations fall more slowly and serum aminotransferase (AT) rise more quickly in patients with more severe hepatic injury, we have recently proposed the APAPxAT multiplication product may allow early risk-stratification. We describe this novel measure in patients developing hepatotoxicity following acute APAP overdose. **Methods:** This is a proof-of-concept analysis using an existing dataset, namely the derivation subset of the Canadian Acetaminophen Overdose Study, a large multicenter hospital record review of all admissions for APAP overdose. Only acute overdoses developing an AT>1000 IU/L despite treatment with N-AC were retained for this analysis. At each time point when serum AT was measured (AST or ALT, whichever greater), the corresponding serum APAP was recorded or estimated based on first-order elimination kinetics. **Results:** Of 3500 hospital admissions, 94 developed AT>1000 IU/L following an acute overdose (median time to N-AC 15.5 hr), and 62 did so within 48 hours of the ingestion ("Early Hepatotoxicity"). A total of 707 discrete timed AT were available for calculation. The table below lists the median [IQR] APAPxAT product (in mM x IU/L) at various time intervals relative to the initiation of N-AC. **Conclusions:** The APAPxAT product uses readily available lab tests, is simple to calculate, does not require graphical interpretation or plotting, and remains elevated (usually well above 10 mM x IU/L) during the first 12 to 24 hours of N-AC therapy. Moreover, it does not require certain knowledge of the time of ingestion, nor that the overdose be taken at a single point in time. As such, it has many attractive properties for early risk prediction following APAP overdose. **Key Words:** Acetaminophen overdose, Aminotransferase, Hepatotoxicity

Table 1, Abstract 30

Time post N-AC (hr)	Early hepatotoxicity	Late hepatotoxicity
0±6	113 [61.9, 383]	63.5 [41.6, 126]
12±6	59.0 [18.2, 238]	14.1 [4.42, 29.5]
24±6	23.5 [9.50, 39.4]	12.0 [3.91, 16.2]
36±6	40.0 [20.3, 54.6]	8.16 [5.90, 11.2]

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PATIENT-REPORTED adverse drug related events from emergency department discharge prescriptions

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Introduction: Preventable adverse events (AE) claim the lives of up to 23,750 Canadians annually. Adverse drug related events (ADREs) are the second most common type of preventable AE. Our objective was to quantify and describe patient-reported ADREs from Emergency Department (ED) discharge prescriptions. **Methods:** This prospective study was carried out in a tertiary care center with an annual census of 65,000. Research assistants (RAs) enrolled a convenience sample of patients during shifts which mirrored our ED's discharge pattern. RAs identified discharge prescriptions and made up to 5 attempts to contact patients by phone 2 - 4 weeks after the index visit. Patients were asked to describe any AEs they had experienced and believed were associated with discharge medications. We deemed an ADRE to be present if reported symptoms were consistent with a recognized ADRE, and symptom onset and resolution occurred within a plausible timeframe after commencing and discontinuing the medication. Adherence was determined from a provincial prescription dispensing database and by pill count. **Results:** Of 1965 patients screened, 301 were discharged with a prescription and agreed to participate. Follow-up was successful in 257 patients (85.4%). The most common prescriptions were for acetaminophen with codeine (27.2%), ciprofloxacin (8.2%) and cephalexin (6.2%). Fifty-four patients (20.9%, 95% CI 16.4% to 26.3%) reported ADREs including: constipation (5.8%), nausea (5.8%), drowsiness (4.3%), allergic reactions (1.2%) and diarrhea (1.2%). There was a trend between the occurrence of ADREs and non-adherence to medication (crude OR 1.8; 95% CI 1.0 to 3.3) which persisted with logistic regression modeling (adjusted OR 1.6; 95% CI 0.9 to 3.0), but not between ADREs and ED revisits. **Conclusions:** Patient-reported ADREs to ED discharge medications are common. The presence of an ADRE is associated with a trend towards a higher incidence of non-adherence to discharge medication. **Key Words:** Adverse drug events, Prescriptions

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The Narcotic Overdose Respondent Intervention Survey (NORIS)

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Introduction: Drug use and overdose is an important problem in many Canadian centers. Most overdoses in the community are witnessed and death occurs over several hours, giving ample opportunity for those present to intervene; however, morbidity and mortality remains high. The objective of this study was to document the circumstances surrounding drug overdose in a cohort of opiate and non-opiate users in a major Canadian centre. **Methods:** Clients accessing a needle exchange program were approached for participation in the study. After informed consent was obtained, participants answered a series of questions regarding demographics, personal experience with overdose, emergency medical services (EMS) use, and response to witnessing an overdose. Support for a community based naloxone intervention was also assessed. **Results:** A total of 153 clients participated in the survey. Most respondents were male (74%) and the median age was 40 years (IQR 33.0, 46.0). The most commonly used drugs in the last six months were marijuana (61%), crack cocaine (58%), alcohol (50%) and morphine (49%). The median number of overdoses ever experienced was 1 (IQR 0, 4) and the median number of overdoses ever witnessed was 2 (IQR 1, 10). Over 30% of respondents avoided calling EMS at least some of the time; fear of police involvement and/or thinking they would be blamed for the overdose were cited as main concerns. Support for a community based naloxone program was widespread (> 80%). Regular opiate users were more likely to have experienced an overdose ($p < 0.001$) and to have attempted artificial respiration and chest compressions in an overdose setting than non-opiate users ($p = 0.001$). **Conclusions:** Overdoses are commonly experienced and witnessed by regular drug users; however, significant barriers to EMS activation exist. Community programs should focus on overdose prevention and basic life support training. Community based naloxone programs warrant further consideration and study. **Key Words:** Narcotic overdose, Naloxone, Community

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DEVELOPMENT of a novel adverse events scale for clinical trials of ED procedural sedation

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Introduction: Previously published trials of procedural sedation used adequacy of sedation as the primary outcome, while individual adverse events were represented as secondary outcomes. As procedural sedation becomes routine in the ED, and as clinical trials require more comprehensive primary outcomes, a novel framework is needed to identify both the number and severity of individual adverse events encountered. **Objective:** To evaluate the feasibility and criterion validity of a newly developed adverse events scale. **Methods:** Prior to a clinical trial, a focus group of emergency physicians and anesthesiologists ranked cardiac and respiratory adverse events according to relative severity. By consensus, a four-level, mutually exclusive ordinal scale (none, mild, moderate and severe) was created. Physicians blinded to the scale recorded individual adverse events, and ranked overall severity on a 10-point score. Criterion validity was tested through correlation between the scale and both the 10-point severity score and the total number of observed adverse events using Kendall's tau-b. **Results:** Of 63 patients enrolled, at least one adverse event was experienced by 41(65%): 18 (28.6%) mild, 18 (28.6%) moderate, 5 (7.9%) severe. In all, 123 individual adverse events were observed. All events were rapidly corrected with no morbidity. Correlations between the scale and the severity score (0.74 ± 0.05), and the total number of adverse events (0.78 ± 0.05) were very high ($p<0.001$). Inter-rater reliability of the scale was not tested. **Conclusions:** Our new scale is simple and comprehensive, with high face validity. It performed well in this clinical trial and was very sensitive to a range of cardio-respiratory events. Even minor and transient adverse events can be important markers both for future research and ongoing quality assurance focused on safety. This scale can provide an instrument for clinicians and researchers in this emerging area. **Key Words:** Procedural sedation, Adverse events, Outcomes

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DRUG-RELATED visits to the emergency department of a large Canadian hospital: a prospective study

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Introduction: Few data are available for the rate and characterization of drug-related visits (DRVs) to Canadian emergency departments (EDs). Our objective was to determine incidence, severity, preventability and classification of DRVs in the ED of a large tertiary care Canadian teaching hospital. **Methods:** A prospective, observational study of adults presenting to the ED over 12-weeks in 2006 was conducted. Patients were randomly selected for inclusion

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using a systematic sampling methodology stratified a priori by time of day, day of week and ED treatment location, to ensure a generalizable sample. Pharmacist research assistants assessed subjects to determine if their visit was drug-related according to one of eight categories. Severity and preventability were classified using predefined definitions. Primary outcomes were reported as proportions presented as percentages with 95% confidence intervals (CIs). **Results:** 1017 patients were enrolled (mean age 49.6 ± 20.8 years, 52.1% female). A DRV was identified in 12.0% (95%CI 10.1-14.1%) of which 68.0% (95%CI 59.3-75.6%) were deemed preventable. Severity was classified as mild, moderate and severe in 15.6% (95%CI 10.2-23.1%), 74.6% (95%CI 66.2-81.5%), and 9.8% (95%CI 5.7-16.4%) of cases, respectively. The most common reasons for DRVs were adverse drug reactions 39.3% (95%CI 31.1-48.2%), non-compliance 27.9% (95%CI 20.7-36.4%) and wrong/suboptimal drug 11.5% (95%CI 7.0-18.4%). 96 individual drugs were implicated in 122 DRV cases; 80 patients had 1 drug implicated, 27 had 2 drugs implicated, and 15 had 3 drugs implicated. The most common drug classes associated with DRVs were central nervous system agents (40.8%), cardiovascular agents (18.4%), non-opioid analgesic/anti-inflammatory agents (14.0%), and antibiotics (11.2%). **Conclusions:** A drug-related cause was found in approximately one of every nine ED visits, and over two-thirds were deemed preventable. Drug-related visits to the ED are a significant problem that merit further research and intervention. **Key Words:** Drug related, Adverse events

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ED overcrowding: the perspectives of medical directors in Alberta

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Introduction: Overcrowding of emergency departments (EDs) in Canadian urban hospitals is a well recognized problem; however less is known about ED overcrowding across an entire province. The present study aims to describe the frequency, impact, and factors associated with ED overcrowding in the province of Alberta. **Methods:** A 29-item, paper-based questionnaire was distributed to ED Medical Directors at either hospitals with EDs or Health Care Centres with acute care services (N=102 sites) in the Fall of 2006. ED administrative data were provided by the Alberta Health and Wellness registries. Statistical tests including chi-square and T-tests were applied for data comparison. **Results:** The survey was completed by 85 ED Directors (83% response rate). While 33% reported overcrowding as an overall serious problem during the past year, 94% reported this major problem in regional and urban sites. Many directors reported that ED overcrowding had a major impact on increasing stress among physicians (58%) and nurses (71%) and led to increased patients in the ED waiting for beds (41%). Directors further reported the quality of patient care was severely impacted including increased waiting times (69%), risk of poor patient care outcomes (37%), and medical error (18%). Directors attributed ED overcrowding to a variety of issues including a lack of admitting beds (40%), as well as shortages of medical (42%) and nursing (77%) staff. In rural areas, in particular, ED medical directors perceived a lack of alternatives to the ED to be a significant contributing factor to ED overcrowding. Most ED medical directors perceived access block or an insufficient number of inpatient beds to be the primary cause of overcrowding. **Conclusions:** Most ED Medical Directors admitted ED overcrowding was a serious problem across Alberta, with a variety of perceived consequences. The finding of the present study illustrates the urgent need to develop innovative, system-wide solutions to this medical crisis. **Key Words:** Overcrowding, Canadian urban hospitals

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THE effect of medical students on patient flow in a low acuity area of an academic emergency department

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Introduction: One of the barriers to effective teaching in the ED is the necessity to ensure patient flow in a chaotic and often overcrowded setting. It is not known if students impact on ED physician productivity in a low acuity area. We evaluated the effect of the presence of medical students on the patient flow in an academic ED. **Methods:** This cohort study was approved by the Research Ethics Board and conducted at a tertiary care teaching ED with 60,000 annual patient visits. We used administrative databases to identify the number of patients seen by each attending ED physician per 6-hour shift in the low acuity area over 24 months. Patients seen in this area usually presented with lacerations, minor trauma, minor infections, etc. We then matched these shifts with the master housestaff schedule to compare shift productivity with and without students using paired t-tests. The primary outcome was the number of patients seen per shift per physician with or without trainees. **Results:** There were 21,196 patient registrations in the low acuity area during the study period. We excluded encounters that left without being seen, were incomplete, or involved EPs that never supervised housestaff leaving 16,566 encounters. Only 1,339 cases were seen by learners: 1,190 by 4th year medical students, 74 by 3rd year medical students, and 75 by foreign trainee program housestaff. The mean number of cases seen in the low acuity area per shift was significantly different with students ($p = 0.01$) with means of 11.3 with learners and 14.3 without. This represents a 21.0% relative reduction in patients seen when students were present. **Conclusions:** ED physicians supervising medical students saw 21% fewer patients per shift in the low acuity area. In an era of overcrowding, educators and ED administrators need to carefully consider balancing the education and service missions of the department to ensure flow. **Key Words:** Patient flow, Overcrowding

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VARIABILITY of emergency physician time by triage category

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Introduction: The Canadian Triage and Acuity Scale (CTAS) is a 5 level triage tool used to determine the priority by which patients should be treated in Canadian emergency departments (EDs). Many hospitals in Ontario use a case-mix formula based solely on patient volume at each triage level to determine emergency physician (EP) workload and staffing needs. We sought to accurately determine the time it takes EPs to assess and treat ED patients in each triage category. **Methods:** Twenty hospital-based EDs agreed to participate in this study. Data was collected by research assistants who directly observed EPs for entire shifts and recorded the activities of the EP on a moment-by-moment basis. The individual times of all physician activities associated with a given patient were summed to derive a directly observed estimate of EP time required to treat a patient. **Results:** 17,197 patients were observed in this study over 767 shifts. On average, 1.4% of all patients were categorized as CTAS 1 (range 0.5-3.9%), 13.4% CTAS 2 (range 6.9-26.2%), 47.3% CTAS 3 (range 32.5-61.8%), 34.2% CTAS 4 (range 18.3-52.8%) and 3.7% CTAS 5 (range 0.5-11.2%). Average EP time by triage category was 115.4 minutes for CTAS 1 (range 17.2-274.7 min), 34.4 minutes for CTAS 2 (range 19.6-55.9 min), 21.9 minutes for CTAS 3 (range 12.9-35.1 min), 15.0 minutes for CTAS 4 (range 9.8-25.2 min) and 11.0 minutes for CTAS 5 (range 6.2-24.6 min). **Conclusions:** There was significant variability in the distribution of CTAS scores

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between sites. There was also marked variation in EP time in each triage category. This brings into question the appropriateness of using CTAS alone to determine physician ED staffing levels. CTAS may be an adequate tool to determine patient acuity, but may only be a rough indicator of patient complexity and physician workload. **Key Words:** Triage, Emergency, Physician workload

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PREDICTORS of emergency physician workload

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Introduction: Many hospitals in Ontario use a case-mix formula based solely on patient volume at each triage level, (as determined by the Canadian Triage and Acuity Scale [CTAS]), to establish emergency physician (EP) workload and staffing needs. If CTAS levels are not accurate predictors of EP workload, then the use of CTAS for setting staffing levels may be inappropriate. We sought to determine if CTAS and other factors related to patient demographics, treatments, mode of arrival and disposition status, could predict EP workload. **Methods:** Ten hospital-based EDs agreed to participate in this study. Physician activities were recorded on a moment-by-moment basis by research assistants who directly observed EPs for entire shifts. Times per patient were fit to lognormal survival models to identify predictors of workload. **Results:** Data was collected on 17,197 patient encounters over 797 shifts. CTAS was shown to be a significant predictor of workload, both in univariate and multivariate analysis. Other patient variables that were significant predictors of EP workload included: patient age, mode of arrival, previous visit to the ED within 30 days, laboratory and imaging investigations, mental health, social work and medical/surgical consultations, payor information, presentation to the ED on a weekend, discharge disposition, and the presence of an insurmountable language barrier. **Conclusions:** While CTAS by itself is a significant predictor of EP workload, models that use CTAS as well as other factors achieve a much better fit than those that use CTAS only. We were able to develop a formula to predict EP workload that included CTAS as well as additional variables that are commonly abstracted from patient charts. We believe that such a formula is more accurate in predicting patient complexity and EP workload than CTAS alone. **Key Words:** Triage, Physician workload

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IMPACT of a triage liaison physician on emergency department overcrowding and throughput: a randomized controlled trial

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Introduction: Weak methods and poor reporting of outcomes limit the current evidence base in interventions to address emergency department (ED) overcrowding. Triage liaison physicians (TLP) have previously been employed; however, their effectiveness remains unclear. This study aims to evaluate the implementation of TLP shifts in the ED using valid methods and comprehensive outcomes. **Methods:** A 6-week TLP clinical trial was conducted in a tertiary care Canadian ED in 2005-06. A TLP was deployed from 11:00-20:00 daily to initiate early patient management, assist triage nurses, answer medical calls, and manage ED administration. Within each of three 2-week blocks, seven days were randomized to TLP and the other seven to control (without TLP) shifts. Outcomes included patient length of stay (LOS), proportion of patients who left without complete assessment (LWBS), staff satisfaction and episodes of ambulance diversion. **Results:** TLPs assessed a median of 14 patients/shift (IQR: 13, 17), received 15 telephone calls/shift (IQR: 14, 20), and spent 17-81 minutes/shift consulting on the telephone. The number of patients, their age, gender, and triage score during the TLP and control shifts were similar. Overall LOS in the 24 hours during which included a TLP shift declined by 36 minutes compared with control days (4:21 vs. 4:57; p = 0.001). LOS reduction varied based on triage level; CTAS triage level 3 improved by 39 min. In addition to TLP coverage status, LOS was influenced by sex, triage level, and age. LWBS cases were 20% less common on the days with TLP coverage. The overall ambulance wait time and number of episodes of ambulance diversion were reduced on TLP days; however, this difference did not reach statistical significance. **Conclusions:** The results of this study indicate that a TLP physician provides benefits to an overcrowded ED. The results strongly suggest that the implementation of this intervention could provide significant improvement to the delivery of emergency medical care in a tertiary care ED. **Key Words:** Triage, Liaison physician, Overcrowding

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IMPACT of an overcapacity care protocol on emergency department overcrowding

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Introduction: In 2005, at this tertiary inner city hospital, because of prolonged boarding of admitted patients, 9249 triage level 2 and 3 (emergent and urgent) patients were blocked in ED waiting areas for 3 hours (estimated access gap= 27,750 hrs). Serious adverse events and waiting room deaths led to implementation of the overcapacity protocol (OCP) in February, 2006. The OCP dictates that arriving level 1-3 patients are placed in overcapacity ED care spaces rather than waiting areas. When the ED goes overcapacity by 2 patients, admitted patients boarded in the ED move to overcapacity care spaces on inpatient units. Our objective is to describe OCP impact on EDLOS and patient flow. **Methods:** This before-after analysis uses administrative data to compare the post-OCP period (March through August, 2006) to the corresponding control period in 2005. Outcomes include mean ED LOS for admitted patients as well as EDLOS and hospital LOS for admitted medical, surgical and mental health (MH) patients. **Results:** During the post-OCP period, ED volume rose from 30483 to 30846 (1.2%), CTAS 1-3 volume rose from 13078 to 13828 (5.7%), and daily ambulance arrivals rose from 46.1 to 46.6 per day (1%). Despite this, mean ED LOS for all admitted patients fell from 18.9 to 13.9 hrs ($p<0.001$). EDLOS fell by 9.0 hours, 1.6 hours and 9.2 hours for admitted medical, surgical and MH patients respectively. Similarly, hospital LOS fell by 1.0, 0.8 and 0.8 days for medical, surgical and MH patients ($p<0.001$ for all). After OCP, arriving emergent-urgent patients were rarely left in ED waiting areas. During the post-OCP period, no critical events were reported in ED waiting areas or inpatient OCP care spaces. **Conclusions:** A 5.0 hour mean reduction in EDLOS for 8200 annual admissions provides access to an additional 41,000 hours of ED stretcher and nursing time, more than the access gap estimated prior to OCP implementation. The OCP reduces ED LOS for admitted patients, reduces ED access block and appears to reduce adverse outcomes for ED patients. **Key Words:** Triage, Overcrowding, Overcapacity

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ED overcrowding inflation in a tertiary care teaching hospital

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Introduction: The Emergency Medicine Research Group (EMeRG) at the University of Alberta (U of A) recently completed a "Report on Overcrowding in Emergency Departments in Canada" supported by a grant from the Canadian Agency for Drugs and Technologies in

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Health (CADTH; formerly the Coordinating Office for Health Technology Assessment {CCOHTA}). A number of overcrowding markers were defined through a number of national benchmarking techniques. This study follows the trends of several of these markers in an academic tertiary care ED over the past 6 years. **Methods:** An Emergency Department Information System was introduced in 2000 which automatically time stamps a number of key work activities and tracks CTAS triage scores and dispositions. Using a data programmer, queries of overall and triage level 3 wait times, fractile response times, emergency inpatient (EIP) times, rate of left without being seen (LWBS) patients, and patient acuity were developed. **Results:** From 2000 to 2006 EIP times increased by 169% from 43,395 to 116,891 hours. The overall number of adult LWBS patients increased by 53% while the triage level 2 and 3 LWBS patients increased by 223% (from 531 to 1766). In addition as patient acuity continued to rise (triage level 1, 2, and 3 increased from 48.3% to 63.2%), the number of triage level 3 patients spending more than 2 hours to ED bed placement went up from 6.8 to 22.4%. Despite these changes time from bed placement to be seen by a physician actually dropped over the same period. **Conclusions:** Despite internal efforts at improving ED efficiency, real time data capture shows an alarming increase in ED overcrowding measures, even with a relatively static patient census. This is consistent with reports from EDs across the country. Patient acuity is increasing, minor cases decreasing, and the overriding problem is 'boarded' inpatients in the ED preventing many patients timely access to an emergency stretcher to receive care. **Key Words:** Triage, Overcrowding

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A description of the impact of the long stay patients on hospital beds availability

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Introduction: Lack of hospital beds to admit emergency department (ED) patients is cited as the #1 cause of ED overcrowding. The hospital beds access block is in part accentuated when non-acute patients occupy acute care beds for extended periods. Certain groups of patients occupying acute care beds are known (e.g. long term care, palliative) and there are specific out of hospital resources for them. Nevertheless, there is another group of long stay patients (LSP) whose magnitude on both hospital resources and out of hospital needs are unknown. The goal of this study is to describe the impact of the LSP on hospital beds availability. **Methods:** Administrative data on hospitalized patients' length of stay (LOS) in days from a 637 beds tertiary care hospital (SMBD-Jewish General Hospital) for the years 2004-05 and 2005-06 are described. Mothers and new born babies, long term care patients and palliative patients were excluded. **Results:** 2004-05: 13,014 patients were hospitalized which represents 123,633 patients-days; 65% of patients were hospitalized from the ED; 94% of patients had an in-hospital stay of < 30 days (77,252 patients-days); 4% stayed 30 to 59 days and (23,285 patients-days); 1% stayed 60 to 89 days (8,683 patients-days) and 1% stayed ≥ 90 days (13,860 patients-days). 2005-06: 13,716 patients were hospitalized which represents 126,706 patients-days; 67% of patients were hospitalized from the ED; 94% of patients had an in-hospital stay of < 30 days (82,389 patients-days); 4% stayed 30 to 59 days (23,864 patients-days); 1% stayed 60 to 89 days (10,754 patients-days) and 1% stayed ≥ 90 days (9,699 patients-days). **Conclusions:** Although patients with a LOS ≥ 30 days represent only 6% of hospitalized patients, they occupy 123 beds daily, representing at this hospital 1 out of 5 beds. Thus increasing the turnover of these beds by appropriate out of hospital resources would improve bed accessibility for ED patients. **Key Words:** Overcrowding, Hospital beds

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IMPACT of a prehospital bypass protocol on time to primary percutaneous coronary intervention in acute myocardial infarction

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Introduction: Cardiovascular disease is the leading cause of death in Canada. In ST elevation myocardial infarction (STEMI) time to reperfusion is a key determinant in reducing mortality and morbidity with percutaneous coronary intervention (PCI) being the preferred reperfusion strategy. For the 50% of patients who access health care through emergency medical services (EMS), delays relate to time to EKG diagnosis and to accessing definitive care in a cardiovascular lab. In 2004 the Cardiac Care Network of Ontario recommended implementation of an emergency department (ED) bypass protocol to reduce time to reperfusion by transporting patients with STEMI directly to the nearest catheterization lab. The model was implemented in Frontenac County in April 2005. This study assesses its effectiveness in reducing door-to-balloon times. **Methods:** A before/after design was used assessing two one-year periods ending March 2005 and June 2006 respectively. Data were abstracted from charts of patients with STEMI who were transported by regional EMS and received emergent PCI. The primary outcome measure was time from ED arrival to first balloon inflation. Information on demographic and descriptive variables was also abstracted. Times are presented as medians and interquartile ranges (IQ). Statistical comparisons were made with the Mann Whitney U test and presented graphically with Kaplan-Meier curves. **Results:** Patients transported under the ED bypass protocol (N=40) were compared to historical controls (N=49). Median door to balloon time was reduced from 90 minutes pre-protocol (IQ range 76-107) to 62 minutes (IQ range 40-62) post-protocol ($p<0.0005$). **Conclusions:** Implementation of a prehospital bypass protocol has significantly reduced time to reperfusion for patients with STEMI transported by EMS in our region. **Key Words:** Prehospital Bypass protocol, PCTI, STEMI

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THE adequacy of bag mask and endotracheal tube ventilation by paramedics

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Introduction: The 2005 AHA recommendations call for 6-7 mL/kg tidal volumes in cardiac arrest patients with peak pressures in the unprotected airway of less than 4-5 cm H20. For the perfusing patient, recommended tidal volumes are 7-10 mL/kg with peak pressures of less than 20 cm H20. We measured the ventilation performance of paramedics with bag-valve-mask (BVM) and bag-valve-tube (BVT) in both adult and child manikins and compared these to the AHA recommendations. **Methods:** After giving verbal consent, paramedics (n=794) ventilated a manikin depicting a 60 kg adult for one minute with both a mask and via an endotracheal tube. 532 paramedics similarly ventilated a manikin depicting a 19 kg child. The inflation criterion was observable start of chest-rise. Exhalation volume was blinded to the paramedic, and tidal volume calculated from an instructed rate of 12 for the adult and 20 for the child. Scatter graphing depicted tidal volumes (mL) versus peak airway pressure. Tidal volume was expressed as mL/kg and performance as the percentages that were compliant with the AHA recommendations. **Results:** Tidal volumes delivered by BVM were compliant with the 6-7 mL/kg recommendation in 15% (adult) and 5% (child); 7-10 mL/kg was observed for 30% (adult) and 23% (child). Tidal volume for the intubated manikins (BVT) were in the 6-7 mL/kg range for 17% (adult), 9% (child) and for the 7-10 mL/kg range in 32%

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(adult) and 31% (child). For the unprotected airway, paramedics exceeded 20 cm H20 in 4% (adult) and 19% (child). **Conclusions:** Recommended ventilation ranges for tidal volume were not achieved by the majority of paramedics. As well, there were wide variances in individual performance for tidal volume. Most paramedics controlled peak airway pressures. **Key Words:** Ventilation, Bag-valve, Paramedic

Poster Presentations

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WHICH patients with community-acquired pneumonia are likely to have positive blood cultures? - A case control study of blood cultures in community-acquired pneumonia.

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Introduction: Blood cultures (BC) are commonly ordered as part of the initial assessment of patients admitted with community-acquired pneumonia (CAP), yet their yield remains low. Selective use of BC would allow the opportunity to save healthcare resources and avoid patient discomfort. **Objectives:** To determine what demographic and clinical factors predict a greater likelihood of a positive BC result in patients admitted to hospital after being diagnosed with CAP in the emergency department (ED). **Methods:** A structured retrospective systematic chart audit, comparing relevant demographic and clinical details of 83 patients admitted with CAP, in whom BC results were positive, with 169 gender and date-matched controls of patients in whom blood culture results were negative. **Results:** On univariate analysis, eight variables were associated with a positive BC result. These were: WBC<4.5 x 10^9/L, (LR8.96, 95% CI=2.87-27.98), anion gap>16 (LR:4.27, 95% CI=1.04-17.52), systolic BP <90 mmHg (LR:3.87, CI=1.46-10.25), creatinine >106 umol/L(LR:2.87, CI=1.65-5.00), urea>9.3 mmol/L (LR:2.49, CI=1.4-4.42), glucose <6.1 mmol/L (LR:2.18, CI=1.09-4.35), No antibiotic therapy on presentation (LR:2.01, CI=1.02-3.98) and temperature > 38°C (LR:2.00, CI=1.16-3.46). After logistic regression analysis the variables remaining significantly associated with positive BC were: WBC<4.5 x 10^9/L, (LR):7.75, CI=2.89-30.39), creatinine >106 umol/L (LR:3.15, CI= 1.71-5.80) glucose <6.1 mmol/L (LR:2.46, CI=1.14-5.32), and temperature >38°C (LR:2.25, 95% CI=1.21-4.20). A patient with all four of these variables had a LR of having a positive BC of 135.53, (95% CI=25.28-726.68) compared to patients with none of these variables. **Conclusions:** Certain clinical variables in patients admitted to hospital with CAP do appear to be associated with a higher probability of a positive yield of BC, with combinations of these variables increasing this likelihood. We have identified subgroups of patients in whom blood cultures are more likely to be useful in the treatment of CAP. **Key Words:** Infectious disease, Blood culture, Pneumonia

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METHICILLIN-resistant S. aureus associated skin and soft tissue infections in a non-urban Canadian emergency department

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Introduction: Community Acquired Methicillin Resistant Staphylococcus Aureus (CA-MRSA) has recently been recognized as the predominant pathogen in acute purulent skin and soft-tissue infections (SSTI) in urban emergency departments (EDs) in the United States. More recently, CA-MRSA has received attention as a common cause of SSTI in urban Canadian EDs. Very little is known about the prevalence of CA-MRSA as a cause of SSTI in non-urban EDs. This study sought to estimate the prevalence of CA-MRSA as a cause of SSTI in one non-urban ED in southern BC. **Methods:** Patients presenting with purulent skin and soft-tissue infections to a community emergency department in southern BC (catchment area 100 000, ED volume 37 000 visits/yr, distance to nearest urban center approx 100km) between the months of September and December of 2006 were enrolled. For each patient, purulent material was cultured, and clinical information was obtained. Antimicrobial susceptibility testing was performed on all S. aureus isolates. **Results:** MRSA was isolated from 14/19 infection sites (74%). Mixed S. aureus / streptococcal species were isolated from 4/19 sites (21%). The proportion of all S. aureus isolates that were MRSA was 14/18 (78%). All MRSA isolates were susceptible to trimethoprim/sulfamethoxazole, rifampin, vancomycin, and doxycycline. Only 10/14 MRSA isolates were susceptible to clindamycin (71%). **Conclusions:** MRSA is the most common pathogen cultured from patients with SSTI at this community ED. Physicians practicing emergency medicine in non-urban Canadian EDs should consider culturing all purulent SSTI, and should consider modifying empirical antimicrobial therapy to cover CA-MRSA in all life or limb threatening SSTI. Further studies are needed to determine the prevalence of CA-MRSA in other emergency departments and regions across the country. **Key Words:** Infectious disease, Infection control, MRSA

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Psychiatric morbidity is not increased in hospital workers one to two years after SARS

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Introduction: We investigated if working in SARS-affected hospitals (Toronto) was associated with increased incidence of psychiatric diagnoses including posttraumatic stress disorder (PTSD), in the one to two years following the Toronto outbreak compared to working in similar local hospitals not treating SARS (Hamilton). **Methods:** Health care workers (HCW's, RN's in medical/surgical inpatient units, and all staff of ICU's, ED's and SARS isolation units) at 13 academic and community hospitals in Toronto (nine) and Hamilton (four), were surveyed between Oct 23, 2004 and Sept 30, 2005. Participants completed a survey and two structured interviews. Axis 1 diagnoses were determined using the Structured Clinical Interview for DSM-IV (SCID), and categorized as symptoms preceding or following SARS, and/or still present within the past month. PTSD was diagnosed with the Clinician-Administered PTSD Scale (CAPS) for: (1) the most severe past trauma of any kind (including SARS), and (2) for the most recent trauma if different from 1. Symptoms were placed in two time frames (a) ever since the trauma and (b), in the past month. Statistical analysis included T-test's and Chi-squared tests as appropriate. **Results:** A total of 179 HCW's were interviewed between 13 and 25 months (median 19) after the last SARS patient was discharged from hospital. Participants in Toronto experienced more contact with SARS patients (75%) and quarantine (65%) than HCW's Hamilton (0%, 2.5%, p<0.001). The incidence of new onset major depressive or panic disorder and substance abuse/dependence were similar in both cities, and to low for statistical comparison. Only one patient met criteria for current PTSD with SARS as the traumatic event (Toronto). The lifetime prevalence of psychiatric diagnoses among HCW's who participated in the study was similar to that in the Canadian community. **Conclusions:** The results of this

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study suggest that working in a SARS affected hospital did not increase the risk of psychiatric illness. **Key Words:** SARS, Infectious disease, Psychiatric impact of disease

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CLINICAL cure rates associated with appropriate and inappropriate antimicrobial therapy for methicillin resistant Staphylococcus aureus skin and soft tissue infections in the emergency department

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Introduction: The incidence of methicillin resistant staphylococcus aureus (MRSA) skin and soft tissue infection (SSTI) is increasing rapidly in emergency departments. MRSA is resistant to commonly used first line antimicrobials used to treat SSTI. **Objective:** To compare the proportion of patients with MRSA SSTI treated successfully with appropriate or inappropriate antimicrobials. **Methods:** This was a retrospective emergency department (ED) administrative database study done in a urban tertiary care ED. Between January 2003 and December 2004, ED patients with a diagnosis of SSTI (ICD-9 682.9) and a wound culture positive for MRSA, and treated initially with outpatient intravenous (IV) therapy were included. Patients were defined as treatment "clinical cures" (did not return to the ED within 4 weeks with a new SSTI; AND were not admitted to hospital, AND did not have the IV antimicrobial therapy changed) or "clinical failure" (any of the preceding conditions met). Antimicrobials used for IV therapy prescribed were dichotomized as "appropriate" or "inappropriate" based on microbiologic testing. **Results:** Over the 24 month period 982 patients with MRSA SSTI were treated with outpatient IV therapy. 456/984 (46.3%) of MRSA SSTI patients were treated with "appropriate" antimicrobials (vancomycin or clindamycin), and 526/982 (53.7%) were treated with "inappropriate" antibiotics (cephazolin, ciprofloxacin, cloxacillin, or ceftriaxone). Overall clinical cure rate was 730/984 (74.1%). Clinical cure rate was 350/458 (76.4%) for patients receiving "appropriate" antimicrobials versus 370/526 (70.3%) for patients receiving "inappropriate" antimicrobials (chi-square = 2.4; P = 0.11). **Conclusions:** Patients receiving inappropriate antimicrobials for MRSA SSTI have similar clinical cure rate as patients receiving appropriate antimicrobials. **Key Words:** MRSA, Infectious disease, Antibiotic treatment

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ERRORS, near misses, and adverse events in the emergency department: what can patients tell us?

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Introduction: To determine whether patients or their families can identify adverse events in the ED, to characterize patient reports of errors, and to compare patient reports to events recorded by health care providers. **Methods:** Prospective cohort study in downtown teaching hospital. ED patients were recruited for participation in a standardized interview within 24 hours of ED discharge, and a follow-up interview at 3-7 days following discharge. Responses regarding events were characterized and compared with physician and nurse notations in the medical record and institutional error-reporting database. **Results:** Of 292 eligible patients, 201 (69%) were interviewed within 24 hours of ED discharge, and 143 (71% of interviewed) underwent a follow-up interview at 3-7 days post discharge. Interviewees did not differ from the base ED population in terms of age, gender, and language. Patients identified 10 adverse events (5% incident rate), 8 near misses (4%) and 0 medical errors. 6/10 (60%) of adverse events were characterized as preventable (Two raters, kappa +/- SE is 0.7826 +/- 0.2013 (95% CI: 0.3881, 1.0000), p=0.01). Adverse events were primarily related to delayed or inadequate analgesia, and 70% were primarily related to nursing care. Only 4 /8 (50%) near misses were intercepted by hospital personnel. The secondary interview elicited 2/10 adverse events and 3/8 near misses that were not identified in the primary interview. No designation (0/10) of an adverse event was recorded in the ED medical record or in the confidential hospital event reporting system. **Conclusions:** ED patients can identify adverse events affecting their care. Many adverse events are not recorded in the medical record. Engaging patients and their family members in identification of errors may enhance patient safety. **Key Words:** Medical error, Near misses

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Do ED patients need n-acetylcysteine before receiving contrast media?

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Introduction: Contrast-induced nephropathy (CIN) is a complication of contrast media administration, which is associated with significant morbidity. The role of N-acetylcysteine (NAC) as prophylaxis for CIN has been investigated in many controlled trials, however uncertainty persists over its effectiveness. Furthermore, the role of this medication in the emergency department is unclear. This systematic review examines the benefits or harms of NAC prophylaxis for contrast-induced nephropathy among patients with chronic renal failure. **Methods:** The Cochrane Central Register of Controlled Trials (The Cochrane Library Issue 4, 2006), MEDLINE (January 1966 to December 2006), EMBASE (1980 to October 2006) and CINAHL (1982 to Oct Week 1 2006) were searched for randomized trials which examine the effect of NAC versus placebo or hydration, on the development of CIN in adults with chronic renal failure. Clinical outcomes and quality data were extracted from the trials, using pre-specified criteria. **Results:** Twenty-three trials involving 2955 participants were included. The NAC group had significantly lower rates of contrast-induced nephropathy, compared to the controls (fixed RR 0.61, 95% CI 0.49, 0.77). 17 patients must be treated with NAC to avoid one case of CIN (RD -0.06, 95%CI -0.08, -0.03, NNT 17). This outcome included significant statistical heterogeneity (X2 = 35.50, df = 19 (p=0.01), I2 = 46.5%) which may be partly explained by differences among the studies with respect to the severity of baseline renal dysfunction, the dose of NAC administered, and blinding. **Conclusions:** This review demonstrated a beneficial effect of NAC in reducing contrast-induced nephropathy, although there was significant heterogeneity among the included studies. These results must be interpreted within the context of the broader literature, which remains controversial, particularly in the context of the emergency department. Considering the overall risk-benefit ratio, this analysis cautiously supports the use of NAC in appropriate patients. **Key Words:** Systematic review, N-acetlcystine, Contrast induced renal failure

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INTIMATE partner violence: development of an online education course for emergency department workers

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Introduction: Intimate Partner Violence (IPV) is a common and continued problem in Canada. According to Statistics Canada, 7% of women reported abuse in the last five years. In Canada, 13% of women injured by their partners require medical attention. They commonly present to emergency (ED), yet those who work in emergency departments continue to express a lack of comfort in how to approach the issue of IPV in the ED. **Methods:** In September 2005,

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the Ontario Women's Directorate (OWD) commissioned an expert panel to develop a training program for ED personnel. This panel is comprised of ED physicians, nurses, social workers, assault/crisis-workers and primary researchers. **Results:** Through group meetings and an extensive literature review, core competencies were developed and presented to stakeholder groups. Our expert panel then worked with educators and software developers to build an innovative, scenario-based, self-directed, e-learning curriculum to educate and train ED personnel on the issues and clinical care of women injured due to IPV. Twelve sessions, each comprising three sections; an upfront interactive text based learning section, an animated scenario where learning is applied, and a final quiz, were developed. **Conclusions:** This presentation will describe the process of the curriculum development, implementation plans and demonstrate one of the completed modules. **Key Words:** Spousal abuse, Intimate partner violence, Medical education

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DANGER in the shopping malls: epidemiology of escalator related injuries in children in Singapore

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Introduction: To study the epidemiology of escalator related injuries in children in Singapore to determine how we can educate the public on escalator safety and whether enhancements in the safety features of escalators are necessary to prevent such injuries **Methods:** 45 children, aged 0-16 years, who attended the Emergency Departments in the Singapore Health Serivces network for escalator related injuries from Feb 2002 to Jan 2004 were surveyed as part of the Childhood Injury Surveillance Project. Data on demographics, place of injury, host factors, environmental factors and injury particulars were collected via the use of questionnaire forms, review of in-patient records and coroner's reports. Data was recorded using the International Classification of External Causes of Injuries Codes. **Results:** There were 45 escalator related injuries in Singapore during the study period with no deaths. 55.6% of the patients were female and the mean age of the victims was 6.5 years. 60% of the time at least one parent was looking after the child during the incident. 13.3% of the children required hospital admission. Most of the injuries occurred to the upper limb (31.3%), lower limb (29.7%) and head (20.3%). 56.9% of the injuries were caused by falls on or off the escalator and 33.3% were crush injuries that resulted from body parts getting caught in between grooves on the escalator. 34.5% of the children suffered from open wounds and 12.7% had fractures or dislocations. **Conclusions:** Using escalators has become part of the daily lives of most children and the injuries caused by escalators are small but significant. Escalator injuries are preventable and we need to embark on a public education programme to teach parents basic escalator safety. Engineers and technicians also need to ensure that escalators installed are well maintained and meet basic safety requirements. **Key Words:** Injury prevention, Escalator related injuries, Pediatric trauma

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EM training for off-service residents: a systematic needs assessment to guide curriculum design

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Introduction: Non-EM residents may find the EM rotation stressful and variably useful. We evaluated the perceived effectiveness of the EM rotation for off-service residents and conducted a needs assessment for a better EM curriculum. **Methods:** This cross-sectional web survey used Dillman methods and was conducted at 2 university affiliated hospitals with a complete spectrum of 18 residency training programs. Surveyed were all off-service residents, who rotated through the EDs over an 11-month period, and their program directors (PD). We asked about perceptions of shiftwork, aspects of the EM rotation, and priority curricular content, using Likert scale responses. Gap scores were calculated for priority content. **Results:** All 18 PDs (100%) and 86 residents (77.5%) responded. Residents were PGY1 (84.8%), female (56.5%), aged 24-29 (67.1%), family medicine (46.7%), surgical (16.7%), and medical (16.7%). PDs and residents rated the EM rotation similar or better than other rotations (89.5% vs 88.3%). On a series of 5-point scales, both PDs and residents were satisfied with the EM rotation including educational relevance (3.5 vs 3.6), number of shifts (3.7 vs 3.5), meeting academic commitments (3.2 vs 3.2), case variety (3.7 vs 3.9), ACLS learning (3.8 vs 3.7), and tolerance of shiftwork (3.5 vs 3.2) (all $p>0.05$). PDs and residents differed over ideal shift length (3.9 vs 2.3, $p<0.05$), bedside teaching (3.6 vs 3.1, $p<0.05$), exposure to trauma (3.2 vs 2.6, $p>0.05$) and resuscitation (3.4 vs 2.6, $p<0.05$). Cardiac resuscitation, central line insertion, cardioversion, and intubation were of greatest interest for enhancement. Case variety, teaching quality, hands-on role, and procedures were strengths; shorter shifts, more procedures and resuscitation exposure were recommended. **Conclusions:** Off-service residents and their PDs are satisfied with the EM rotation but have suggestions to enhance training. These results can be used to guide the creation of a systematic EM curriculum for these residents. **Key Words:** Medical education, Residency training, EM curriculum

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A needs assessment to define the essential administrative competencies for EM training

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Introduction: Administrative aspects of Emergency Medicine are recognized as an increasing priority for training by educators, department chiefs, and certification bodies such as the Royal College. We set out to conduct the first needs assessment of essential administrative competencies for EM training in Canada. **Methods:** We conducted a cross-sectional mail survey sent to 18 Ontario academic ED chiefs, 5 FRCPC program directors, and 42 PGY4 and 5 FRCPC EM residents, using Dillman's methods. 44 content domains were derived from the curriculum in Salluzzo's text (Emergency Department Management 1996). Participants (n=65) were asked to rate the relevance of each content domain for typical emergency physicians as compared to the relevance for ED chiefs. Results were analyzed using paired t-tests comparing the perceived differences in the importance of each of these domains to physicians and to ED chiefs using two 5 point Likert scales. **Results:** The overall response rate was 42/65 (64.6%). Responses revealed 20 domains that were not identified to be of significantly different in terms of importance for both physicians and chiefs ($p>0.05$). Of the other domains where $p<0.05$, 18 domains favoured incorporation of the administrative content domains into general EM residency training, of which the highest scores were for ED flow (residency mean = 3.8/4, administrator mean = 2.4/4), disposition (3.7, 2.4), death in the ED(3.7, 2.3), and EMS(3.4,2.3). 6 content areas were deemed essential only for chiefs or those interested in senior administrative roles: business models and budgeting(2.2,3.2), meetings and committees(2.3,3.2), strategy and planning(2.3,3.1), ED facility design(2.4,3.1), material management(2.3,3.0), and facility accreditation(2.4,3.0). **Conclusions:** This study is the first to conduct a systematic needs assessment in administrative competencies for Canadian EM training. The results can provide an initial framework to guide the enhancement of both resi-

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dent and administrator education. **Key Words:** Medical education, Residency training, EM curriculum

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CREATING a reliable and valid blueprint for emergency medicine clerkship curriculum design

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Introduction: The University of Calgary currently does not include a rotation in Emergency Medicine among the mandatory rotations for undergraduate medical education. As part of a larger curricular development initiative involving the development of a mandatory Emergency Medicine clerkship, we sought to design an examination blueprint that is congruent with learning objectives and reflecting the perceived importance of clinical presentations from the perspective of expert clinicians. The University of Calgary undergraduate medical education curriculum focuses on a clinical presentation model with 120 +/- 5 cardinal presentations. **Methods:** In this study, 24 specialists in Emergency Medicine (EM) in the Calgary Health Region were asked to score each of the 120 cardinal clinical presentations for 'impact' and 'frequency'. Multi-attribute utility theory was applied to assess the best way of combining the variables of 'impact' and 'frequency'. Statistical tests used were the Pearson's correlation coefficient and the Cronbach's alpha inter-rater reliability statistic. **Results:** 21 of 24 (87.5%) survey instruments were returned during the study period. Combining impact and frequency as a multiplicative function produced a distribution that was positively skewed towards common, high impact presentations such as chest pain. The correlation coefficients amongst high impact, high frequency clinical presentations were high, as were the correlation coefficients between low impact, low frequency presentations. Low impact, low frequency presentations demonstrated divergent validity (poor correlation) to high impact, high frequency clinical presentations. Cronbach's alpha (reliability coefficient) was 0.934 demonstrating very high internal reliability. **Conclusions**: Using previously established examination blueprint design techniques pioneered at our centre, we have created an Emergency Medicine examination blueprint that provides a realistic and objective measure of the relative importance of clinical presentations. This information can now be used in formal EM curriculum design and implementation, including objective writing and evaluation methods. **Key Words:** Medical education, Undergraduate training, EM curriculum

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COMPUTER modeling of patient flow in a pediatric emergency department using discrete event simulation

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Introduction: Pressures in pediatric emergency medicine (PEM), such as increasing census and overcrowding, require new strategies to address these concerns. Accurate predictions of patient flow and resource utilization in the pediatric emergency department (PED) are important in determining how PED activity could be modified to improve flow, reduce waiting times, increase efficiency and morale, and effectively direct change. Discrete event simulation (DES) was used to develop a Patient Flow Model (PFM) to test simulation scenarios designed to alleviate PED pressures. A Physician Scheduling Analysis Tool (PSAT) was designed to assist in physician scheduling. **Methods:** Arena DES software was used to develop a model of PED patient flow following interviews with staff and observation of 517 patients. Historical patient arrival information and observed patient flow data provided simulated patient arrival rates for the PFM and the PSAT. Validation of the PFM was performed by comparing simulated patient flow data to actual patient flow data. Previously determined staffing scenarios were applied to the simulation and the resulting patient flow indicator outputs were examined. **Results:** The PFM was validated on model-wide and process specific levels, with excellent validation observed on high acuity patient LOS (length of stay) and for detailed processes such as triage and registration. The simulated addition of a hospital volunteer and a second triage nurse reduced the pre-triage waiting time and the proportion of patients waiting >30-60 minutes pre-triage. Simulation of an extra physician shift to the staff schedule reduced the LOS for all patients. **Conclusions:** The PFM accurately represents patient flow in our PED and provides simulated patient flow data for a variety of scenarios. Based on the findings of the simulator scenarios, the authors' PED decided to make strategic decisions in reallocation of personnel resources. Less well validated aspects of the PFM would be improved by additional observational data. **Key Words:** Medical informatics, ED efficiency, Pediatrics

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MEDICATIONS in the emergency department: lists, interactions, and survey of treatment

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Introduction: Access to a complete patient medication list can be a valuable resource to the treating physician. This study was undertaken to determine what patients remembered about their current medication list, why they were on the medications listed, and how they remembered their medications. **Methods:** A questionnaire was administered between March and September 2006. Patients were asked demographic information and to list their medications, dose, frequency of administration, and reason for taking it. They were also asked how this information was remembered. This information was then confirmed by the patient's pharmacist. **Results:** Fifty-one questionnaires were successfully completed by adult emergency patients and consent was obtained (59% female). Ages ranged from 18 to 93 years old. Overall, 90% of patients could recall all of their medications, 67% knew the correct doses, and 82% could determine why they were on the medications listed. 40% respondents had their medication list memorized, 12% relied on family members to generate the list, and 48% relied on a written list or pill bottles. Males and females were similar in their abilities to remember their medications. 95% of the respondents had a primary care physician, and having a primary care physician did not correlate positively with an accurate medication list. **Conclusions:** Overall, 90% of respondents could accurately list their medications, and almost half could produce a current written list of medications. This did not seem to be affected by the age or sex of the patient. Multiple methods were utilized to remember their medication list. The presence of a listed primary care physician did not seem to allow for easier recollection of medications taken. Patients are most often accurate in their ability to remember their medication lists – often a trait of great value to a treating physician. In this small study, no adverse drug reactions were identified when the treating physician wrote a prescription without having an accurate patient medication list. **Key Words:** Medical informatics, Prescription medication

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ARE there significant calendar cycles that predict emergency department use?

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Introduction: Accurate predictions of daily emergency department

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(ED) usage can be valuable for staffing and resource allocation. While much data have been published correlating specific disease incidence with calendar cycles, only anecdotal evidence of specific weekday, lunar and yearly cycles of daily ED usage exists, and is not proven. We endeavoured to identify significant calendar trends and their contributions to daily ED usage using Fourier Transform Analysis (FTA). FTA is a powerful mathematical tool that can graphically identify trends in periodic data and their relative contribution to the overall data series, without the need for a priori hypotheses required by more traditional statistical methods. **Methods:** Daily ER volumes were recorded from our institution, an urban teaching hospital with yearly ED volumes > 55,000. 1,024 consecutive daily volumes underwent FTA to identify significant contributing calendar cycles. 365-day cycles in ER volume were hypothesized to be dependent on weather, with 30 or 31-day and 7-day cycles representing lunar and weekday effects respectively. Identified cycles were correlated with their hypothesized calendar cause (weather, lunar cycle or weekday) and subject to multivariate regression to create a calendar prediction model for ER volumes. **Results:** The strongest contributing calendar cycle occurred yearly (every 377±18.71 days), signal-to-noise ratio=6.91. The second most significant calendar effects noted were weekly (7.0±0.06 days, S:N=6.18) and twice weekly cycles (3.5±0.01 days, S:N=5.90), corresponding to Monday and Thursday weekdays. Multivariate regression of weather (daily temperature) and weekday as the only independent variables created an ED volume prediction model with a fit of r^2=0.28, F=97.6. **Conclusions:** FTA is a useful analytic tool to identify cyclical data trends. Using FTA in this preliminary study, we identified that weekday and outdoor temperature were substantial predictors of daily ED usage, alone accounting for 28% of daily ER volume fluctuation. **Key Words:** Medical informatics, ED administration, Computer modeling

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SENSIBILITY survey of community acquired pneumonia and neutropenic fever electronic clinical decision support systems

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Introduction: Emergency Department (ED) clinicians are increasingly exposed to guidelines and treatment recommendations. To help access and recall these recommendations, electronic Clinical Decision Support Systems (eCDSS) have been developed. This study examined the use and sensibility of two common eCDSS. **Methods:** eCDDS for community acquired pneumonia (CAP) and febrile neutropenic (NF) were developed by multi-disciplinary teams and have been accessed via an intranet-based homepage (eCPG©) for several years. Sensibility is a term coined by Feinstein that describes common sense aspects of a survey instrument. It was modified by emergency researchers to include four main headings: 1) Appropriateness; 2) Objectivity; 3) Content; and 4) Discriminative Power. Sensibility surveys were developed using an iterative approach for both the CAP and NF eCDSS and distributed to all 25 emergency physicians at one Canadian site. **Results:** The overall response rate was 88%. Respondents were 88% male and 83% were less than 40; all were attending ED physicians with specialty designations. An unexpected number had never used the CAP (21%) or NF (33%) eCDSS; 54% (CAP) and 21% (NF) of respondents had used the eCDSS less than 10 times. Overall, both eCDSS were rated highly by users with a mean response of 4.95 (SD 0.56) for CAP and 5.62 (SD 0.62) for NF on a 7-point Likert Scale. The majority or respondents (CAP 59%, NF 80%) felt that the NF eCDSS was more likely than the CAP eCDSS to decrease the chances of making a medical error in medication dose, antibiotic choice or patient disposition (4.61 vs. 5.81, p = 0.008). **Conclusions:** Despite being in place for several years, eCDSS for CAP and NF are not used by all ED clinicians. Users were generally satisfied with the eCDSS and felt that the NF was more likely than the CAP eCDSS to decrease medical errors. Additional research is required to determine the barriers to eCDSS use. **Key Words:** Medical informatics, Clinical decision support, Guidelines

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THE use of usability engineering methods to define usability problems in emergency department electronic clinical decision support systems

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Introduction: Emergency Department (ED) clinicians are increasingly exposed to electronic Clinical Decision Support Systems (eCDSS). For a health care CDSS to be used, it must not only be factually accurate, but also designed in a way that users will find pleasant to use. Usability refers to how quickly people can learn to use something, its efficiency in use, its memorability, its proneness to error, and its enjoyability. **Methods:** eCDDSs for community acquired pneumonia (CAP) and febrile neutropenia (NF) were developed by a multi-disciplinary team and can be accessed via an intranet-based homepage (eCPG©). One aspect of the usability of CAP and NF eCDSS was examined using the cognitive walkthrough methods described by Neilsen and Kushniruk. All pages of the eCDSS were scrutinized by the researchers, and the actions and system responses required to complete each goal recorded. Actions and responses were examined to specifically look for usability problems, and aspects of the systems that could cause adverse events. **Results:** Assuming all potential fields were filled, the CAP eCDSS had 5 Goals, 37 Sub-goals, 56 Actions to complete all Sub-goals, and 52 Problems. The NF eCDSS had 3 Goals, 44 Sub-Goals, 63 Actions to complete all Sub-goals and 60 problems. Recurring problems were included in the totals. Eight categories of usability problems emerged: 1) Ambiguous Wording; 2) Layout; 3) Defining User Input; 4) Clinical Decision Support; 5) Convenience of Use; 6) Relevance to the ED; and 7) Incomplete or Out of Date Information. **Conclusions:** The interaction of physicians with CDSS is complex and poorly understood. Assessment tools for computer systems have been developed based on cognitive and usability engineering principles. While the cognitive walkthrough does not quantify the seriousness of a problem, its systematic approach can identify previously unnoticed issues, including potential adverse medical events. Usability engineering methods hold promise in characterizing usability problems with CDSS in the ED and elsewhere. **Key Words:** Medical informatics, Clinical decision support, Guidelines

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A retrospective study of patient compliance with emergency department referral to a cardiovascular evaluation and risk assessment clinic

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Introduction: Cardiovascular disease is a leading cause of death among Canadians and has a substantial impact on the health care system. The C-ERA (Cardiac Evaluation and Risk Assessment) clinic is utilized by emergency physicians in Calgary to facilitate the investigation of patients presenting with symptoms of cardiovascular disease. Patient compliance with emergency department (ED) discharge instructions is often poor, resulting in sub-optimal patient care. The primary objective was to determine the proportion of patients compli-

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ant with ED referral to C-ERA. In addition, we examined the diagnoses and outcomes of patients attending C-ERA. **Methods:** The present study was a retrospective review of 385 patients referred to C-ERA between June 1, 2004 and April 7, 2005. Hospital charts and the database at the Medical Examiner's office were reviewed for patients who did not attend or cancel their C-ERA appointment. **Results:** The majority of patients (364/385, 94.5%) were compliant with referral to C-ERA. Included in the compliant group were 20 patients who called to cancel their appointment and 28 who rescheduled and later attended their appointment. Twenty-two patients did not attend or cancel their appointment. One patient was in hospital at the time of their C-ERA appointment. No deaths were reported in hospital records or at the Medical Examiner's office for non-compliant patients. Most patients (315/340, 93%) who attended their appointment completed their recommended investigations. Of these patients, 221 (70%) were diagnosed with non-cardiac or low risk cardiac disease. Ninety-four patients (30%) were diagnosed with a more serious cardiac condition. No patients were diagnosed with an acute coronary syndrome. Four patients required angioplasty and 2 underwent cardiac surgery. **Conclusions:** The majority of patients referred to C-ERA from Calgary EDs were compliant with referral. Other outpatient clinics may be able to improve their rate of compliance with referral by implementing the referral system used by C-ERA. **Key Words:** Coronary artery disease, ED follow-up, Patient compliance

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HYPOTHERMIC modulation of anoxic brain injury: a survey of Canadian emergency physicians

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Introduction: Mild induced hypothermia (IH) for survivors of cardiac arrest has been demonstrated to reduce morbidity and mortality. Despite this, data from other countries has demonstrated that the incorporation of IH into clinical practice is uncommon. The objective of this study is to characterize the use of induced hypothermia (IH) by Canadian emergency physicians. **Methods:** An internet-based survey was distributed to members of the Canadian Association of Emergency Physicians. Participants were asked to provide data on the frequency of use of IH and on the methods employed for IH. In addition, potential barrier to the incorporation of IH into practice were explored. **Results:** In total, 1328 members of CAEP were contacted by email and 247 (18.6%) responded, with the majority working in an academic center (60.3%). Forty-seven percent (47%, 95% CI = 40.8-53.2) of respondents indicated that they have utilized IH in clinical practice and 34.8% (85/247) worked in a department that had a policy or protocol for the use of IH. The presence of a departmental policy or protocol for the use of IH was a strong predictor of the use of IH (chi-square 51.7, $p<0.001$). Barriers against the incorporation of IH included a lack of institutional policies and protocols (39%) and a deficit in resources (29%). Consultant lack of support for IH was relatively uncommon (9%) in Canadian practice. **Conclusions:** Although a substantial proportion of Canadian emergency physicians have incorporated IH into their practice, a large proportion of respondents in this survey have not. Emergency departments should develop policies or protocols for the use of IH in cardiac arrest survivors to optimize patient outcomes. **Key Words:** Cardiac arrest, Hypothermia, Hypoxic brain injury

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IMPACT of first-responder CPR on defibrillation opportunities following the detection of asystole

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Introduction: The updated AHA guidelines for CPR and ECC were published in the fall of 2005 recommending in situations of unwitnessed cardiac arrest (CA), before the application of an automatic external defibrillator (AED), it is reasonable to attempt 5 cycles (about 2 minutes) of CPR prior to rhythm analysis and attempting defibrillation (Class IIb). It is suggested that with effective CPR, one can induce ventricular activity that is more amenable to defibrillation, i.e. ventricular fibrillation (VF) or pulseless ventricular tachycardia (pVT). **Methods:** Global Medical Services (GMS) provides medical oversight for >50 professional and volunteer first-responder (FR) AED programs throughout Canada. Following a CA, AED data is downloaded to a central database in Vancouver, BC. Each download is reviewed by one of two physicians and pre-determined data points, including rhythm analysis, are entered into the database. We performed a retrospective review of the prospectively gathered database for all CA from 19/04/2001-06/25/2006. The primary endpoint was detection of VF/pVT after deliver of FR CPR when the initial rhythm was asystole. The secondary endpoint was time interval between detection of asystole and return of a shockable rhythm. **Results:** From 19/04/2001-06/25/2006 we received AED downloads from 982 prehospital CA. Asystole was the original rhythm detected in 326 of the cases. Of these, VF/pVT was subsequently detected in 20 (6.1%) cases after FR CPR. The average time interval from detection of asystole to the detection of VF/pVT was 07:25 (min:sec) [range: 00:55 to 15:56]. **Conclusions:** Our data suggest that FR CPR could create opportunities for defibrillation in approximately 6 out of 100 cardiac arrests in which the original rhythm is asystole. In light of the updated AHA guidelines for CPR and ECC, this data likely under represents the potential impact of CPR on out-of-hospital CA and underscores the importance of early and effective CPR in conjunction with an AED program. **Key Words:** Coronary artery disease, Cardiac arrest, CPR, Defibrillation

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IMPACT of increased availability of primary angioplasty on reperfusion times for ST-elevation MI in the ED

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Introduction: Current guidelines for the management of uncomplicated ST-elevation MI (STEMI) suggest that primary angioplasty (PCI) is the preferred initial therapy only if it can be performed within 90 minutes of hospital presentation (or 60 minutes from when fibrinolysis could have been delivered). We examined reperfusion times at our institution over the past 8 years, using both treatments, to determine our performance as emphasis has shifted towards PCI. **Methods:** A preliminary medical records search (using ICD-9/10 codes for myocardial infarction) was performed on all patients registered in our ED between April 1998 and August 2006. To be included, patients had to be diagnosed with STEMI within 2 hours of presentation, and treated with reperfusion therapy. We performed a structured chart using predefined criteria for all eligible patients. Statistical analysis included simple descriptive statistics (mean, standard deviation, etc), t-tests, and linear regression analysis. **Results:** 995 charts were reviewed, and 169 charts met criteria for inclusion. The mean (+ SD) age of participants was 61.5 + 13.7 years, and 78% were male. Thirty-seven percent of patients presented between 08:00-17:00 hrs. The mean (+SD), median, lower and upper quartile ranges for door to needle times were 49+34, 40, 26 and 62 minutes. The similar values for door to balloon times were 160+67, 139, 110 and 184 minutes. The mean difference between door to needle and door to balloon time was 110 minutes. Thirty-five percent of thrombolysis, and 3 percent of PCI patients were treated with the recommended time window. There was no overall change in time to lysis or PCI over the study period, how-

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ever there was a significant reduction in door to balloon time during daytime hours. **Conclusions:** Fewer patients were treated within the recommended time with PCI compared to fibrinolysis. Door to needle times have remained unchanged, while door to balloon times are improving for PCI during daytime hours. **Key Words:** Coronary artery disease, Myocardial infarction, Revascularization, Thrombolysis, Time to treatment

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WHY are emergency departments holding back on holding chambers? Facilitators and barriers to change

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Introduction: Best available evidence points to the therapeutic equivalence of portable inhalers and holding chambers for delivery of beta-agonist respiratory medications to children in the Emergency Department (ED). Yet only a minority of pediatric EDs in Canada have made the change. The objective of this study was to explore the perceptions surrounding use of portable inhalers and holding chambers in the ED and the facilitators and barriers to practice change. **Methods:** This was a qualitative study guided by principles of grounded theory. Data were collected through focus groups and individual interviews at two sites in Eastern Canada: Hospital A, where inhalers and holding chambers are used routinely; and Hospital B, where prevailing practice is use of nebulization. Participant encounters were transcribed verbatim and analyzed for emerging themes. **Results:** At Hospital A, 6 physicians and 7 nurses participated in separate focus groups. Four interviews were conducted with physician, nurse, respiratory therapy and pharmacy leaders. At Hospital B, 4 physicians and 3 nurses participated in focus groups while 6 leaders were interviewed. Barriers to adoption of inhalers and holding chambers included: increased workload; increased equipment costs; myths regarding the superiority of nebulization; and inter-professional conflict. **Conclusions:** The most prominent concern for health care professionals, particularly nurses, about administering medications with inhalers and holding chambers was the time demand. This resulted in continued administration of nebulization despite knowledge of evidence to the contrary. Professional territorialism hampered efforts to ameliorate workload issues through use of respiratory therapists in the Emergency Department. Key findings from this study can be used to inform a change program to close the gap between evidence and practice with respect to use of inhalers and holding chambers in the Emergency Department. **Key Words:** Inhalational therapy, Asthma, Aerochamber, Nebulizer

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PROSPECTIVE multicenter study of treatment and relapse following emergency department discharge for acute COPD

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Introduction: Risk of relapse after ED treatment of COPD exacerbations is uncertain, and previous North American research has included limited data from Canada. Our objective was to determine the treatment and relapse rate after ED treatment for COPD. **Methods:** 19 Canadian EDs enrolled patients (pts) over the study period. Enrolled pts underwent a structured ED interview and telephone interview 2 weeks later. Inclusion criteria were MD diagnosis of COPD, age > 35, and discharge to home. Relapse was defined as an urgent visit to any ED or clinic within 2 weeks of ED discharge; pts lost to follow-up were counted as non-relapses. Data were analyzed using Chi-2, t-test, Mann-Whitney test, and logistic regression. **Results:** Of 501 pts, 259 (51.7%) were discharged from the ED; 445 pts (88.8%) completed the follow-up. Most patients were discharged on oral corticosteroids (83.3%) and antibiotics (74.8%); self-reported compliance rates were 87.9% and 80.8%, respectively. Relapse occurred in 6% (95% CI: 3%-9%) by 1 week, and 13% (95% CI: 9%-17%) by 2 weeks. There was no difference in relapse based on sex (13.5% vs. 12.1%, p=0.74). Pts receiving oxygen at the initial presentation to ED were more likely to relapse (17.5% vs. 8.1%, p=0.03). More pts who relapsed had at least one ED visits for acute COPD during the past 2 years (17.0% vs. 6.6%, p= 0.021). Relapse was associated with higher respiratory rate (p=.005), lower earliest peak flow (p=.002) and oxygen saturation not on room air (28.6% vs. 7.5%, p=.000). Relapse was not associated with discharge medications. Controlling for age and sex, respiratory rate (OR= 1.2; 95% CI: 0.98-1.48) and earliest peak flow (OR= 0.23 per 100 L/min; 95% CI: 0.06-0.92) were associated with relapse. **Conclusions:** Overall, past COPD control (ED visits in past 2 years), ED treatments (oxygen) and initial vital signs (respiratory rate, earliest peak flow and oxygen saturation) but not treatment were associated with COPD relapse. Future research is required to target this high-risk group. **Key Words:** COPD, Outpatient management, Relapse

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DEVELOPMENT of performance measures for emergency department care of patients with chronic obstructive pulmonary disease

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Introduction: Despite the publication of practice guidelines for the management of patients with chronic obstructive pulmonary disease (COPD), there are no published performance indicators for the measurement of emergency department (ED) COPD care. **Methods:** The B.C. Emergency Department Protocol Working Group (EDPWG) is a multi-disciplinary collaborative with a mandate to develop province-wide ED protocol implementation strategies that will facilitate the introduction of ED care protocols in diverse emergency departments. These strategies are expected to incorporate the capture of performance indicators into everyday clinical practice. As part of its mandate, the EDPWG developed a series of COPD performance measures by systematically searching for existing practice guidelines, appraising their quality, selecting recommendations for inclusion in the final document, and obtaining panel feedback and consensus on the proposed measures. **Results:** A total of 23 measures were developed. These include patient-specific indicators (vital signs at triage), process measures (length of stay in the ED, time to medications), and outcome measures (percent with a repeat ED visit, percent with admission). Measures also covered topics such as vaccination, smoking cessation counselling and referral for education. **Conclusions:** The BC EDPWG COPD performance indicators provide a means to standardize measurement of care for patients with COPD in the emergency department. **Key Words:** COPD, ED management, Clinical practice guidelines

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EFFECTIVENESS of a training program for emergency medicine residents in ultrasound-guided central venous catheterization

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Introduction: Central venous catheterization (CVC) is a procedure commonly performed in the Emergency Department and is an essential competency for Emergency physicians. Ultrasound-guided CVC

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insertion is an emerging method that promises greater effectiveness and fewer complications. We developed and evaluated a novel educational training program in CVC using the ultrasound guided (USG) technique. **Methods:** The study was approved by the research ethics board for a pre-post evaluation design. Sixteen Emergency Medicine (EM) residents agreed to volunteer for the study. After determining their prior experience and baseline knowledge, each participant was videotaped inserting CVC in the right internal jugular vein (RIJ) on models using the USG technique. Participants then reviewed a web-based instructional module and had a practical session. Participants were again videotaped inserting CVC in the RIJ of models. The primary outcome was the change in score pre vs. post on an expert-validated performance evaluation tool used to review the video tapes in a blinded fashion. Participants also completed a questionnaire to measure any change in knowledge and perceived competence following the educational session. **Results:** Participants were EM residents ranging from year 1 to 5. 81% (13/16) had never attempted one USG CVC. After taking the course, participants reported that the models were realistic. Comparing pre- and post- assessments, both performance scores (12.0 vs 13.5) and global rating scores (3.5 vs 5.5) improved significantly ($p<0.01$, Cohen's $d = 1.12$ and 1.28 respectively). There was good inter-rater reliability between evaluators of the videotapes regarding performance scores ($r = 0.68$) and global rating scores ($r = 0.75$). All participants felt their confidence and technical skills were improved ($p<0.01$) and all felt satisfied with the course. **Conclusions:** This brief innovative multimodal training program was effective in enhancing EM resident competence in USG CVC insertions. **Key Words:** Medical education, Residency training, EM curriculum, Central line placement

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FACTORS affecting family medicine residents' choices in choosing further training in emergency medicine

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Introduction: Little is known about what influences family medicine (FM) residents to pursue 3rd year training in emergency medicine (EM). We studied the factors affecting FM residents when choosing to pursue EM or other 3rd year residency options. **Methods:** This cross-sectional paper survey was distributed to all Ontario FM residents (years 1 & 2). The instrument was piloted then administered via FM academic sessions at 5 medical schools. Participants were excluded if they were absent the day of the survey, international graduates, already in 3rd year of residency, or funded by the Department of Defense. Participants were asked about their interest in further training and factors known to influence career choice. **Results:** A total of 249 of the 308 residents responded (80.8%). 67.9% were female, and 55.2% were PGY1. Interest in pursuing 3rd year training was 73.0% during medical school and 68.0% during FM residency. Among those interested in further training, 43.6% decided on EM while in medical school. However, only 20.0% actually applied for a PGY3 position. Out of 55 responses, EM was the most popular 3rd year discipline (24 responses), followed by OB (7), Palliative Care (6), and Anesthesia (4). Comparing those who did and did not pursue subspecialty training, only debt load was significantly different ($p=0.03$). Other factors such as desired work hours, satisfaction with clinical teaching, satisfaction with related rotations, exposure during residency, availability of 3rd year positions, future practice setting, or number of days of FM practice per week did not differentiate those that did and did not pursue subspecialty training ($p>0.05$). **Conclusions:** A majority of Ontario FM residents expressed an interest in further training. Debt load was a significant factor in the decision to apply. EM was the most popular 3rd year program among those applied for. These trends have important implications for educators and policy makers concerned about the current crisis in MD supply. **Key Words:** Medical education, Residency training, EM curriculum

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CAN efficiency be learned? a novel workshop to improve physician productivity and emergency department flow

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Introduction: Increasingly, the ED requires physicians to focus on productivity and manage ED through-put. We previously reported on a workshop designed to improve these skills and that had been positively evaluated among EM residents. We sought to measure perceptions related to this same workshop among practicing emergency physicians. **Methods:** Four hands-on workshop stations were designed to simulate key components of ED throughput. These included management of acute and minor care resources, charting/communication skills, and effective/succinct patient sign-overs. Anonymous surveys were completed after the workshop using 5-item Likert scales and qualitative responses. Data is presented with the use of descriptive statistics. **Results:** Fifteen practicing physicians from across Canada participated. Evaluations were completed by 93% (14/15) of participants. Physician experience averaged 13 years (range 3-27 years). 93% (13/14) rated ED productivity skills as an important part of training or professional development whereas only 28% (4/14) felt it had been somewhat taught or well taught during their training. Ratings of "definitely helpful" or "helpful" evaluations were provided by 85% (11/13) for the sign-over and communication station, by 92% (12/13) for the minor care management station, by 85% (11/13) for the acute care management station, and by 66% (8/12) for the effective charting station. Among all participants 86% (12/14) felt the overall workshop experience to be helpful or definitely helpful. Qualitative feedback suggested that more than 30 minutes per station would be preferable and that practice environment should be considered during workshop design. **Conclusions:** ED flow management skills are valued yet under-taught to practicing physicians. A flow workshop designed to improve efficiency skills among practicing physicians yielded positive self-assessed evaluations. Teaching this competency appears feasible and might be considered a valuable compliment to CME and professional development activities. **Key Words:** Administration, Professional development, Training

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DEVELOPMENT of a training program in pediatric emergency medicine (PEM) in Lao People's Democratic Republic (PDR): a learning needs assessment

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Introduction: Lao PDR ranks in the lowest 25% of countries in socioeconomic health status and has only 41 pediatricians for a country of 6 million people. Pediatric Emergency Medicine (PEM) is a priority area for further training. Our objective was to assess the knowledge, confidence and skill of Lao pediatric residents and graduates in caring for acutely ill children with a learning needs assessment tool. **Methods:** A three part tool was developed and included:

1. Multiple Choice Questionnaire (MCQ) to assess knowledge.
2. Survey instrument (SI) to assess confidence using a Likert scale.
3. Standardised Assessment Exercise (SAE) to assess clinical skills of residents with a modified OSCE format (2 cases-shock and coma).

The MCQ and SI were given to 19 graduates and 17 residents; resi-

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dents participated in the SAE. **Results:** Residents and graduates agreed (scores >3.5/5) with 11/14 statements asserting confidence in diagnosing, managing and performing common procedures in children. Both groups were less confident in managing trauma patients and placement of chest tubes, intraosseus (IO) needles and decompression of tension pneumothorax (scores ≤3.5/5). Less than 50% of graduates and residents correctly answered questions on advanced airway, toxicology, respiratory, metabolic, neurological and surgical emergencies. In the SAE 17/17 residents treated shock with IV crystalloid. 3/17 correctly gave a fluid bolus and continued IV hydration.15/17 would place an IO if unable to obtain an IV in a child with shock; 9/17 could demonstrate placement. 2/17 residents demonstrated a jaw thrust and 12/17 selected the correct mask size for the mannequin.17/17 used benzodiazepine as first line treatment for seizure; 1/17 correctly used benzodiazepines for ongoing seizures. 9/17 correctly gave IV glucose. **Conclusions:** Lao physicians may overestimate their knowledge and skill in PEM as many performed poorly in areas where they reported confidence. Information from the needs assessment will be used to develop a PEM training curriculum. **Key Words:** Pediatrics, Training, Skills, Assessment

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ELECTRONIC procedural logging using handheld computers in an emergency medicine clerkship

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Introduction: The use of handheld computers to track medical students' clinical experience is a relatively new technology in medical education. There are many benefits of electronic logs versus traditional paper logs. The purpose of this study was to assess the technical feasibility and student satisfaction of a novel electronic logging and feedback program using handheld computers during emergency medicine (EM) clerkship. **Methods:** Fourth year medical students (n=199) at University of Toronto were expected to participate in the electronic logging project during their 4 week EM clerkship between September 2005 to April 2006. Novel software was designed for handheld computers. Following each clinical encounter, students entered data on their handheld computer utilizing check boxes and drop down menus. Students were encouraged to frequently synchronize their handheld computer to transmit their data to a central server. Students were able to view their cumulative log in comparison to peer averages on a feedback website. They were also encouraged to review their logs with their preceptors. At the completion of their EM rotation, students were surveyed for their satisfaction with an 11 item questionnaire using a 5 point Likert scale. **Results:** Forty-six students (23.1%) participated in the electronic logging project. Twenty-nine students (63%) responded to the survey. Students generally found it easy to complete each encounter (69%) and easy to synchronize their handheld computer with the central server (83%). However, half the students (49%) never viewed the feedback website and most (79%) never reviewed their logs with their preceptors. Overall, only 17% found the logging program beneficial as a learning tool. **Conclusions:** Electronic logging using handheld computers is a feasible and effective way of tracking clinical encounters and procedures performed by medical students. However significant barriers to widespread implementation include user acceptance and technical problems. **Key Words:** Handhelds, Education, Logging

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A web-based lecture series for external resident rotators in the emergency department

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Introduction: Interns from other specialties commonly rotate in academic emergency departments. It is difficult to schedule lectures at our hospital since residents may rotate for a brief time, have other clinical commitments and rotate at various times and dates. We created a web-based curriculum of video recorded lectures including; airway management, toxicology, trauma, wound management and evaluation of chest pain to improve education. Residents took an exam before and after completing the curriculum to assess the effectiveness of the lectures. **Methods:** Thirty interns from specialties including family medicine, internal medicine, orthopedics and anesthesiology rotated through our emergency department over 6 months. They were asked to take a pretest, view web-based, streaming media lectures during their rotation and complete a posttest after finishing their rotation. Exam content was based on the material in the lectures. Scores before and after completing the curriculum were compared using the paired t-test. **Results:** Twenty-six interns completed the pretest. Their average score was 66.4%. Eighteen interns completed testing and were used for data analysis. Pretest scores of the eighteen interns who completed testing was 66.9% (SD 11.8). After completing the curriculum exam scores increased to 81.9% (SD 10.4) with a p-value of 0.001. **Conclusions:** A web-based, steaming media curriculum is effective in increasing knowledge of non-emergency medicine residents rotating through the emergency department. It provides a convenient way to deliver lectures when scheduling formal lectures during intern rotations is not possible or difficult. **Key Words:** Web-based education, Streaming media, Internship.

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GEOGRAHIC patterns of emergency room utilization in a rural Ontario community

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Introduction: Leamington District Memorial Hospital (LDMH) is not unlike many other Ontario rural community hospitals in that it is not too geographically removed from a larger urban or academic medical centre. Emergency Room (ER) staff members have speculated that patients from outside the geographic service area travel to LDMH seeking shorter wait times. Our primary objective was to ascertain patients' perspectives on why they choose to visit the ER and to determine whether patients are 'shopping around' for an ER. **Methods:** Patients presenting to the LDMH ER were offered a paper-based questionnaire, labeled with a unique identification number. A copy of the Triage Record (TR) with identifying information removed was made and coded with the same ID number. **Results:** A total of 171 surveys were collected (response rate 90.5%). Only 6% of respondents were from outside the LDMH service area. The most commonly reported reason for coming to LDMH, chosen by 78.9% of respondents, was because it was the closest ER. Mean distances from reported home communities were shorter to LDMH than to alternative ERs (p=0.0001). Patients do not rate their illness severity accurately as there is poor correlation between their self-reported severity and their assigned Canadian Triage and Acuity Scale (CTAS) level (r=0.141). **Conclusions:** The initial hypothesis that patients in rural areas who have access to two or more Emergency Departments will 'shop around' seeking shorter wait times cannot be substantiated by the pilot data collected in the test area of Leamington, Ontario. This finding is supported by both patient reports, which favour proximity as a primary reason for choosing a particular ER, and by distance measures which confirm that LDMH was statistically significantly closer than alternative ERs in Windsor for respondents to travel to. No previous attempt has been made to correlate patient-rated illness severity with CTAS score. **Key Words:** ED utilization, Geographic patterns, Rural

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THE consent and prescription compliance (COPRECO) study - does obtaining consent in the ED affect study results in a telephone follow-up study of medication compliance?

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Introduction: Patient compliance with a prescription made in the ED would be expected to result in a better patient outcome than non-compliance. The level of compliance is therefore an important area for research. Research ethics boards commonly prohibit follow up calls to patients without consent being obtained at the time of treatment. The act of consent taken at the time of prescription might, however, be expected to affect the results of a follow survey up for a number of reasons. Primary objective: To determine whether patient-reported compliance with ED prescriptions is affected by the acquisition of consent in the ED for the follow up call. Secondary objectives: To ascertain the level of compliance with ED prescriptions and to find out the degree of displeasure expressed by patients called without prior consent. **Methods:** Patients given prescriptions in the ED were randomized to having consent obtained during their ED visit, or at the time of follow-up call. Patients were called 7-10 days after their ED visit to determine their compliance with the prescription. Compliance rates between the two groups were compared, as was the level of displeasure expressed by patients called without prior consent. **Results:** Of 430 patients enrolled, 221 were randomized to consented in the ED (group 1), and 209 were called without prior consent (group 2). Of 169 (76.5%) evaluable patients in group 1, 39.64% were considered 'non-compliant' compared to 49.66% 'non-compliance' in the 149 (71.3%) evaluable patients in group 2 (p= 0.07). Overall, 44.34% of patients did not fill the prescription or took it incorrectly. Of patients called without prior consent only 0.67% (1/149) expressed displeasure at the call. **Conclusions:** Non-compliance is a significant issue for patients discharged from the ED. Although there was a definite trend toward greater compliance in patients that consented to the follow-up call, this did not reach statistical significance. Most patients do not appear to object to being called without prior consent. **Key Words:** Consent, Ethics, Compliance

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ATTITUDES of medical trainees towards homeless persons presenting for care in the emergency department

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Introduction: Many homeless persons (HPs) use emergency departments (EDs) for care due to barriers to access. Negative attitudes of healthcare workers have been identified as a major theme when HPs are asked about difficult aspects of being homeless. Exposure alone to homeless patients may negatively impact attitudes of medical trainees (MTs). **Objectives:** To describe the attitudes of MTs towards HPs pre and post-completion of an ED rotation. **Methods:** The study was conducted in an urban Canadian ED (55,000 visits/yr; 15% HPs). Using a validated 11-question survey, MTs assigned to the ED, were surveyed, before and after rotations, regarding their attitudes towards homelessness. Included were 4 additional questions regarding comfort level providing care. **Results:** 160 MTs completed rotations. 131 (82%) pre-ED and 113 post-ED surveys were collected. 18 (16%) were lost to follow-up. Mean age was 27 years and 47% were male. 73% had 1 parent with a professional/associate professional occupation. Baseline data showed most had an affiliation with HP: 64% comfortable eating with and 67% comfortable meeting with HP. Cutbacks in housing assistance, low minimum wage and welfare were identified as social causes of homelessness by 51%, 49% and 92% respectively. Substance abuse was identified with homelessness by 66% of MTs. Most (84%) disagreed that little can be done. 77% were comfortable dealing with homeless mental health patients. However, 55% felt overwhelmed by the complexity of problems. The majority (92%) felt care should address medical and social needs. Overall scores did not change after the rotation (Mean pre-rotation score: 45.8; post-rotation: 46.1: p=0.59). Significant differences were found for 2 questions: increased comfort meeting HP (67% vs 74%; p=0.05), and the impact of low wages on homelessness (49% vs 39%; p=0.008). **Conclusions:** MTs have strong affiliation with homeless persons. Exposure to homeless persons alone during an ED rotation did not impact overall scores. **Key Words:** Homeless, Attitudes, Survey

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ARE CTAS level V: non-urgent patients admitted to a rural hospital?

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Introduction: The Canadian Triage and Acuity Scale (CTAS) was "ruralized" in 2002 to allow patients triaged as Level V: Non-Urgent to be discharged from the Emergency Department (ED) by a nurse without seeing a doctor. However, ongoing monitoring was considered essential to ensure that this was safe and effective. A recent study done in an urban ED concluding it would be measurably unsafe to triage non-urgent patients away from the ED. This was because it would lead to inappropriate refusal of care and because some non-urgent patients were admitted to the hospital. The purpose of this study was to evaluate whether any CTAS Level V: Non-Urgent patients were admitted to this small rural hospital. **Methods:** This study took place at South Huron Hospital (SHH), a typical low volume rural ED in Exeter, Ontario. A retrospective chart review was conducted to determine if any CTAS Level V: Non-Urgent patients were admitted to SHH from January 1, 2005 to December 31, 2005. The CTAS triage scores and hospital admission data were collected for analysis using a retrospective chart review. **Results:** During the one year study period, 11 546 patients were triaged in the ED and 634 (5.5%) were admitted to hospital. Of all patients triaged at the hospital, 4140 patients (35.9%) presenting to the ED were triaged CTAS Level V and of those 31 (0.75%) were admitted to hospital, totaling 4.9% of all admissions. **Conclusions:** A small percentage of CTAS Level V: Non-urgent patients were admitted to SHH during the one-year study period in this small rural hospital. **Key Words:** Rural, Triage level, Hospital admission

Table 1, Abstract 143

CTAS	# of patients	% of all ED visits	# and % of patients admitted
I	31	0.3	4 (0.6)
II	231	2.0	83 (13.1)
III	1705	14.8	193 (46.2)
IV	5439	47.1	223 (35.2)
V	4140	35.9	31 (4.9)
Total	11546	100.0	634 (5.5)

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RURAL hospital CTAS times

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Introduction: The Canadian Triage and Acuity Triage Scale (CTAS) was adopted and implemented in 1999. The main goal of

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CTAS is to more accurately define patients' needs for timely care, and provide a common standard to enable emergency departments (EDs) to compare their performance against certain operating 'objectives'. An Ontario study published in 2005 showed that these benchmarks were not being met. The purpose of this study was to compare CTAS times from a rural hospital to the provincial averages. **Methods:** All ED visits to South Huron Hospital (SHH) for 2004 were reviewed. Time to assessment by physician was quantified for each CTAS level. The average length of stay (LOS) for each CTAS level was also quantified. These were compared to the provincial average. **Results:** CTAS Guidelines SHH Ontario

Table 1, Abstract 144. Time to physician assessment

CTAS	Guidelines (min)	SHH (min)	Ontario (min)
1	3	1	36
2	15	12	120
3	30	24	174
4	60	27	156
5	120	26	126

Table 2, Abstract 144. Average length of stay in ED

CTAS	SHH (min)	Ontario (min)
1	203	522
2	189	612
3	151	504
4	78	282
5	53	192

Conclusions: Time to physician assessment at this rural hospital ED exceed CTAS guidelines at every triage level. These times are also significantly better than the provincial average. In addition, the average LOS in the ED at this rural hospital are significantly better than the provincial average. **Key Words:** Rural, Triage level, Benchmark, Time to assessment

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DEMOGRAPHICS of medical missions in western Guatemala: experiences from the University of Illinois at Chicago Department of Emergency Medicine International Program

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Introduction: Since 1999 residents and attendings from The University of Illinois at Chicago Medical Center have partnered with Pastoral de la Salud, a long-term non-governmental organization that works extensively in Guatemala. For a week each year, a group of physicians and support staff from The University of Illinois at Chicago travel to Guatemala where they disperse to remote villages and hold daily clinics for the locale in association with the village's local health promoters. **Methods:** All documented patient encounters in villages in rural Guatemala precepted by UIC resident and attending physicians for two, five day periods in February of 2002 and 2003 were reviewed for demographics, presenting condition, medications dispensed and specialty referrals. Presenting condition was categorized into abdominal pain, diarrhea, infections, malnutrition, eye complaints, gynecologic complaints, musculoskeletal complaints, respiratory complaints, skin complaints and other. Data were categorized and examined for descriptive and frequency variables. **Results:** There were 1717 patient encounters at 23 village clinic sites. The patients were 70.8% female and the mean age was 33.5 + 22.4 years. The top presenting condition was musculoskeletal complaints (30.6%) followed by other (15.6%) and abdominal pain (15.5%). The top three medications dispensed were analgesics (28.0%), vitamins (24.4%) and antibiotics (17.3%). 9.1% of patients were referred for further care. **Conclusions:** The vast majority of presentations were related to musculoskeletal complaints and this was supported by analgesics being the most commonly dispensed medication. The relative acuity in the clinics was low. This raises a concern that resources might be better directed towards local health promoter education instead of direct patient care. **Key Words:** Rural, Third world, Epidemiology

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HEALTH status of asylum-seekers in Kibondo, Tanzania

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Introduction: Along the Tanzanian Burundi border there are three way stations, which house up to 75 people each and are intended to provide shelter, food, and water while Burundian asylum-seekers wait to be granted refugee status in Tanzania. In the fall of 2006, the Burundians began to repatriate but they returned home to a devastating drought. The Burundians returned to Tanzania but were denied refugee status and could not return to the refugee camps. Instead, they continued to be housed in the way stations, which quickly became overcrowded and unsanitary. The health situation was deteriorating since appropriate health care facilities were lacking and no disease surveillance mechanisms existed. **Methods:** Four weeks were spent supervising the outpatient clinics at the three way stations in Kibondo, Tanzania. Daily duties included assessing ill patients who required transport to hospital, escorting ill patients to hospital, and epidemiologic monitoring such as crude mortality rates (CMR) and under-five mortality rates. **Results:** At the end of March, 10,200 asylum-seekers were being housed in the three way stations. The CMR was stable and below the emergency threshold, reaching 0.7 deaths / 10,000 people / day at its highest. The under-five mortality rate reached the emergency threshold of 2.5 deaths / 10,000 people / day in the last week of March. The major causes of morbidity were malaria (50%), respiratory infections (30%) and diarrhea (9%). The major causes of mortality were respiratory infections (31%), neonatal death (23%), malaria and malnutrition (15% each) and other (15%). **Conclusions:** Overcrowding was a major issue in the way stations and presented a challenge to the provision of adequate water and sanitation. The under-five mortality rate reached the emergency threshold by the end of March. Respiratory infections and neo-natal deaths were the most common causes of under-five mortality, although malnutrition was a co-morbidity in almost all childhood deaths. **Key Words:** Refugees, Third world, Epidemiology

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DIAGNOSTIC accuracy of emergency department targeted ultrasonography for intrauterine pregnancy: a meta-analysis of current evidence

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Introduction: This systematic review examined the diagnostic accuracy of Emergency Department Targeted Ultrasonography (EDTU) in symptomatic first-trimester pregnancy and generated a pooled estimate of the sensitivity and specificity of EDTU for the detection of intrauterine pregnancy (IUP). **Methods:** The literature was systematically searched. Studies were selected using predefined

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inclusion criteria based on guidelines for the critical appraisal of evaluations of diagnostic studies. The sensitivity and specificity of EDTU for IUP was abstracted from selected studies. Pooled estimates of sensitivity and specificity were calculated if the studies showed no evidence of statistical heterogeneity. Three separate analyses were planned: on all included studies, on studies using "definite IUP" (gestational sac & yolk sac or fetus with cardiac activity) as the diagnostic criterion for IUP, and on studies exclusively employing transvaginal sonography. **Results:** Seven studies met inclusion criteria. The specificity of EDTU for IUP in most studies exceeded 98%. The sensitivity in most studies exceeded 90%. There was significant statistical heterogeneity between the included studies ($p<0.01$), so a pooled analysis of all included studies was not performed. There was no evidence of statistical heterogeneity between studies using "definite IUP" as the diagnostic criterion for IUP ($p=0.0945$). The pooled specificity from these studies was 99.2% (95% CI 95.7-99.8%). The pooled sensitivity was 78.0% (95% CI 73.9 to 81.6%). Studies exclusively employing transvaginal sonography were too clinically heterogeneous to permit a pooled analysis. **Conclusions:** EDTU accurately identified patients with normal IUPs. When "definite IUP" was used as the diagnostic criterion for IUP, the specificity exceeded 99%. Patients with definite IUPs identified using EDTU may be safely discharged from the ED with outpatient follow-up. Patients with no definite IUP identified using EDTU require further evaluation to exclude ectopic pregnancy. **Key Words:** Emergency Department Targeted Ultrasonography, Intrauterine pregnancy

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DO emergency physicians overstate the severity of the patient's clinical picture when consulting other physicians?

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Introduction: Consultations in the Emergency Department (ED) are an important daily act in which all Emergency Physicians (EPs) participate. Obtaining timely and professional advice, intervention or acceptance of transfer of care from another physician is a vital, yet sometimes stressful procedure for EPs. The goal of this research was to ascertain whether EPs sometimes overstate certain aspects of their patient's clinical picture in an attempt to get quicker consultation with less conflict from other physicians. **Methods:** A web-based survey was sent to 1038 staff Emergency Physicians practicing in Canada. The survey was sent five times over a period of one year. It included 34 questions addressing different issues pertaining to the way EPs practice the consultation process. **Results:** 525 EPs responded to the survey (50.6% response rate). Of these, 126 (24.0%) stated that they never overstate the severity of their patient's clinical picture to consultants, whereas 399 (76.0%) stated that they did overstate with varying frequencies. Younger physicians were more likely to overstate than older physicians (RR 1.43, $p<0.05$). The frequency of this practice also varied between different provinces. **Conclusions:** The process of obtaining consultations in the ED can be a source of stress for EPs. Most EPs surveyed answered that they did overstate aspects of a patient's condition on occasion in order to get more timely consultation with less conflict from the consulting physicians. **Key Words:** Consultations, Survey

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FACTORS influencing knowledge translation of the Canadian C-spine Rule among ED nurses

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Introduction: The Canadian C-Spine Rule (CCR) is now being validated for use by ED triage nurses. The objective of the study was to determine the facilitators and barriers to knowledge translation of the CCR prior to its actual implementation by nurses. **Methods:** We conducted a qualitative study in the EDs of 2 teaching and 4 community hospitals, where 6 nurse research coordinators gathered feedback from ED administrators, nurses, paramedics and physicians about the application of the CCR in the current validation study. The coordinators' verbal reports were recorded and transcribed. A qualitative analysis was conducted on the aspects of the rule that providers and administrators liked or not, the problems/ challenges they encountered, and suggestions for the upcoming implementation phase of the rule. Resulting themes and categories were validated by an independent rater, the site coordinators, and research team members. **Results:** 15 facilitators and 16 barriers were identified, and were categorized into 6 themes: 1) characteristics of the rule; 2) attitudes towards change; 3) organizational characteristics; 4) physician buy-in; 5) staff training/education; and 6) leadership/project management. Ease of use was an important facilitator in non-teaching hospitals while for those in the teaching hospitals the following were most often cited: perceptions of rule validity, value for patient care, value for nursing practice and value for improving organizational efficiency. Lack of physician buy-in was cited as a barrier in both types of hospitals, as was the impact of heavy workload. **Conclusions:** This knowledge transfer study assessed multiple levels (organizational, provider) and stakeholders (administrators, staff, physicians). Configurations of facilitators and barriers are different in teaching versus non-teaching hospitals. Implementation strategies will have to be tailored based on the prominent facilitators and barriers to increase knowledge translation of the CCR amongst ED nurses. **Key Words:** Clinical decision rule, Knowledge translation, Nurses

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NON-ADHERENCE with emergency department discharge prescriptions

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Introduction: Non-adherence with medication is associated with increased morbidity and health care costs. Our objectives were to determine the incidence of non-adherence to Emergency Department (ED) discharge prescriptions, and to describe associated factors. **Methods:** This prospective study was carried out in a tertiary care center with an annual census of 65,000. We enrolled a convenience sample of patients during shifts which mirrored our ED's discharge pattern. Research assistants (RAs) recorded information on patient demographics, socioeconomic factors, illicit drug use, family physician access and herbal remedy use. Discharge prescriptions were documented and 2 weeks later a provincial prescription dispensing database was used to determine if prescriptions had been filled. RAs made up to 5 attempts to contact patients by telephone, and during the follow-up interview asked patients to perform a pill count to assess adherence. **Results:** Of 1965 patients screened, 301 were discharged with a prescription and agreed to participate. Follow-up was successful in 257 patients (85.4%). The most frequent diagnoses were skin and soft tissue infections, back pain and urinary tract infection. The most common prescriptions were for acetaminophen with codeine (27.2%), ciprofloxacin (8.2%) and cephalexin (6.2%). Ninety-one patients (35.3%, 95%CI 29.7%-41.3%) were non-adherent with 1 or more medications. Regression modeling indicated a trend towards increasing non-adherence with the prescription of 2 or more medications (1.75, 95% CI 0.98-3.11) but not with socioeconomic factors. Non-adherence to medication was associated with a trend

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towards increased ED revisits (OR 1.6, 95% CI 0.9-2.9). **Conclusions:** Non-adherence with ED discharge prescriptions is common and not independently associated with socioeconomic factors. This study was not powered to evaluate any association between non-adherence and increased health services utilization, but our results suggest a trend that merits further evaluation. **Key Words:** Prescription, Compliance, Discharge advice

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A prospective analysis of procedural sedation practices among academic emergency physicians

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Introduction: There are a wide variety of pharmacologic agents that are used for procedural sedation in the emergency department (ED). The purpose of this study was to examine current practice for procedural sedation among emergency physicians. **Methods:** This prospective, observational study was conducted in two academic EDs (80,000 annual patient visits). Eligible patients undergoing procedural sedation were identified by a nurse or physician. The primary outcome was recovery time. Other outcomes included patient, nurse, and physician satisfaction, as well as complications. Vital signs were recorded prior to sedation and every 5 minutes thereafter. Upon completion of the procedure, the Aldrete post-anaesthesia score was calculated at 5-minute intervals, with full recovery defined as a cumulative score of 10. Patient, nurse and physician satisfaction was assessed using a 7-point Likert scale. **Results:** Fifty-six patients were enrolled; two were excluded (one critically ill, one chart missing). Forty-seven patients received propofol and 7 patients received midazolam and fentanyl. Propofol was used with adjunctive agents in 29 (61.7%) patients: 23 patients received fentanyl, 3 patients received lidocaine, and 3 patients received morphine. Mean ± standard deviation recovery time for the propofol group was 17.3 ± 8.8 minutes, compared to 27.9 ± 5.7 minutes for the midazolam group (p=0.003). Complications occurred in 7 (14.9%) patients from the propofol group and in 2 (28.6%) patients from the midazolam group (p=0.44). Complete post-procedural retrograde amnesia was present in 34 (72.3%) patients who received propofol and in 2 (28.6%) patients who received midazolam (p=0.02). There were no differences in patient, nurse or physician satisfaction between the two groups. **Conclusions:** In this study, propofol was more commonly used than midazolam for procedural sedation in the ED. Propofol resulted in shorter recovery times, lower complication rates and no difference in patient, nurse and physician satisfaction when compared to midazolam. **Key Words:** Sedation, Recovery times, Propofol, Midazolam

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A prospective study of the provision and documentation of discharge instructions at a tertiary emergency department

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Introduction: The final step in emergency department (ED) care involves the provision of discharge instructions. These instructions are assumed to have a positive effect on patient outcome, but research is lacking. Our primary objective was to determine the proportion of ED patients who report receiving discharge instructions. Secondarily, we examined factors associated with the provision and documentation of discharge instructions. **Methods:** This prospective observational study was carried out in a tertiary ED with an annual census of 65,000. A convenience sample of patients from representative times of day, ED areas, and emergency physicians participated in a structured discharge interview. Charts of these patients were subsequently reviewed for documentation of instructions using explicit criteria. **Results:** 275 patients cared for by 18 emergency physicians were enrolled. The mean patient age was 48.6 years (range 19-99) and 56.2% were male. In 36.7% of cases the patient's first language was not English, and in 17.8% of cases English was not the primary language spoken at home. ED translation was required in 13 cases (4.7%). Patients reported the provision of physician discharge instructions in 234 cases (85.1%, 95%CI 80.3% to 89.1%) and nurse discharge instructions in 121 cases (44.0%, 95%CI 38.0% to 50.1%). Physician and/or nurse documentation of discharge instructions was present in 77.5% and 27.3% of cases respectively. 29 patients (10.5%) reported the absence of physician discharge instructions despite documentation to the contrary on their chart. A multivariate logistic regression model indicated physician discharge instruction provision was independent of patient age, gender, need for translation, time of day, or ED location. **Conclusions:** A significant proportion of patients at a tertiary ED report they do not receive discharge instructions, although in over half of such cases there is medical record documentation to the contrary. Further research on the cause and implications of this is warranted. **Key Words:** Documentation, Discharge advice

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PROCEDURAL sedation and analgesia facilitator" – an expanded scope role for paramedics in the emergency department

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Introduction: Procedural sedation and analgesia (PSA) are accepted as a standard of care in emergency departments (ED). PSA requires careful monitoring of a patient's cardio-respiratory status, and an ability to act immediately and appropriately in the event of any untoward event. The knowledge and skills necessary for this are a natural extension of the expertise of Advanced Care Paramedics (ACP). We report a series of PSA's conducted by ACP's over a 19 month period at a busy teaching hospital. **Methods:** This is a retrospective descriptive study presenting data from a registry recording details of all cases of ACP-facilitated PSA conducted in our ED between August 1, 2004 and February 28, 2006. baseline characteristics, reason for the procedure, medications used and adverse events are reported. **Results:** 1334 ACP-facilitated PSAs were conducted during the period. According to definitions used by this study, occurred in only 11 (0.9%) patients, and 'hypotension' in 0.6% of patients. One significant adverse event was recorded, that of pulmonary aspiration. Medications used for PSA included fentanyl (94.1%of cases), propofol (65.5%), midazolam (36.7%) and ketamine (2.3%). No long term adverse events as a result of PSA recorded. **Conclusions:** PSA conducted in the ED by specifically trained ACPs is not associated with a significant number of adverse effects. This role should be recognized and subjected to further study. **Key Words:** Sedation, Analgesia, Adverse events, Propofol, Fentanyl

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PEDIATRIC Canadian Triage and Acuity Scale as a predictor for outcome and resource utilization

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Introduction: The aim of this study was to examine hospitalization rates, diagnostic resource utilization in the emergency department (ED), and ED length of stay (LOS) with respect to the Canadian Pe-

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diatric Emergency Department Triage and Acuity Scale (Ped-CTAS) in a large tertiary academic ED. **Methods:** All Pediatric patients (0-19 years of age) who were seen in the ED during 12 randomly selected days between May 1st 2005 and April 30th 2006 were included in the study. Information was collected to investigate the relationship between Ped-CTAS levels, hospitalization rates, ED length of stay and diagnostic test utilization. **Results:** 1618 (97.4%) of the 1661 patients presenting during the study period were included in the study. Hospitalization rates were 0% in the 'non-urgent' category to 2.5% in 'semi-urgent', 15% in 'urgent' and 45% in 'resuscitation-emergent'. Blood, imaging, cultures, urinalysis, and consultation rates all increased with increasing acuity. **Conclusions:** The Ped-CTAS level correlates well with hospitalization rates and investigational resource utilization in the ED. Hence, Ped-CTAS may serve as a tool in resource planning. **Key Words:** Hospitalization rates, Diagnostics, Resource utilization, Pediatric, Triage

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IMPLEMENTATION of triage liaison physician (TLP) to alleviate ED overcrowding: evidence synthesis

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Introduction: Studies of the effectiveness of triage liaison physicians (TLP) and related interventions have been reported; however, there is a lack of consolidation of all available evidence. This report aims to identify and synthesize all evidence regarding the effectiveness of TLP implementation to alleviate Emergency Department (ED) overcrowding. **Methods:** Comprehensive searches of relevant databases such as MEDLINE, PubMed, Web of Science, and the grey literature were conducted seeking comparative clinical studies of TLP in the ED to reduce overcrowding. Search strategies were based on core keyword searches, and included searches up to year 2006. Published and unpublished studies were included and language restrictions were not applied. **Results:** Initial screening identified 10994 potentially relevant citations. Thirteen relevant citations were included; 3 were randomized controlled trials and 10 before-after studies, ranging from 2001 to 2006 and all in English language. These studies include one abstract, 5 studies published in peer-reviewed journals and 7 reports of Rapid Medical Evaluation available on a California emergency medicine website. Variation in reporting outcomes was impressive and prevented pooling of outcomes data. Overall, the evidence suggests that TLP implementation results in decreased patient length of stay, patients left without being seen, number of episodes of ambulance diversion, and waiting time for diagnostic procedures. Patient satisfaction was also reported to be significantly improved. There was no cost evaluation studies identified. **Conclusions:** Overall, the evidence regarding the role of TLPs in reducing ED overcrowding is substantial, albeit of only moderate quality and often dispersed in the grey literature. Although variations in the TLP strategies, low quality study designs and poor reporting of outcomes were identified, these results suggest hospitals should examine TLP as an option to address ED overcrowding. **Key Words:** Triage, Liaison physicians, Overcrowding

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THE impact of long-term care facility bed availability on emergency department overcrowding

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Introduction: An indicator of emergency department (ED) overcrowding is the inability for admitted patients to be transferred out of the ED to an in-patient bed. A major causal factor is the lack of in-patient beds due to non-acute medical care occupancy by patients waiting for long-term care facility (LTC) placements. **Methods:** The objective of this study was to describe the relationship between LTC bed vacancy and ED length of stay (LOS) of admitted patients. This was a retrospective panel data analysis using a generalized least squares dummy variable model. Administrative data for a single large urban Canadian city was obtained from hospital and community care access centre (CCAC) databases from May 2003 to February 2005 for an observation period of 95 weeks. The main dependent variable was the average weekly ED LOS (hours) for admitted ED patients (an indicator of ED overcrowding). The primary explanatory variable was the total weekly number of LTC bed vacancies. All explanatory variables were considered statistically significant if $p <= 0.05$. **Results:** The regression modeling showed that the number of LTC bed vacancies was a significant predictor of ED overcrowding; a weekly increase in 1 bed was associated with a weekly decrease of 1.22 minutes (95% CI: 0.61, 1.82 minutes) in ED LOS for admitted patients. Also significant were the weekly number of medical admissions; every 1 increase in total weekly number of medical admissions, there was a weekly 7.2 minutes (95% CI: 2.2, 12.0 minutes) increase in overcrowding. The presence of overcrowding in the preceding week was also a significant covariate; each hour of overcrowding from the previous week, there was a weekly increase of 30.0 minutes (95% CI: 24.1, 36.0 minutes) in overcrowding in the subsequent week. **Conclusions:** There is a statistically significant relationship between community LTC bed vacancies and ED overcrowding. However, ED overcrowding in the preceding week appears to be the most important factor affecting future overcrowding. **Key Words:** Overcrowding, Admitted patients, Long-term care

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A population-based study of the association between socioeconomic status and emergency department utilization in Ontario, Canada

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Introduction: The objective of this study was to investigate the association between emergency department (ED) utilization and socioeconomic status (SES) in Ontario, Canada. **Methods:** For Ontario respondents age 20-74 years, Canadian Community Health Survey 2000-01 responses were linked to Ontario Health Insurance Plan physician utilization data for 1999-2001 and the National Ambulatory Care Reporting System for ED utilization in 2002. SES was defined according to high school completion. The primary outcome was less-urgent ED visit, corresponding to Canadian Triage and Acuity Scale 4 and 5 and not admitted to hospital. **Results:** Overall, 31.4% of the sample used an Ontario ED in 2002. The majority of visits (59.1%) were classified as less urgent. Fair or poor self-perceived health was the largest predictor of ED use for less-urgent and more urgent visits. Respondents with low SES were more likely to have less urgent visits (OR 1.65, 95% CI 1.35-1.94) and more urgent visits (OR 1.39, 95% CI 1.09-1.68) after controlling for age, sex, income, self-perceived health, urban or rural location, regular doctor, and non-ED physician visits. SES was not associated with having less urgent versus more urgent visits (OR 0.92, 95% CI 0.68-1.14). **Conclusions:** In a setting with universal health insurance, worse health status is the largest predictor of ED utilization but low SES is independently associated with increased use of the ED, regardless of triage category. Our study lends support to findings in other health systems that those using EDs are more ill and more disadvantaged, which has implications for strategic planning to address ED overcrowding. **Key Words:** Emergency department (ED) utilization, Socio-economic status (SES), Overcrowding

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THE role of overcrowding on Alberta EDs: a survey of nursing directors

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Introduction: A recent report documented the prevalence and severity of emergency department (ED) overcrowding at large Canadian hospitals; however, no study has examined the issue at a provincial and nursing level. This study was designed to examine the perceptions of ED Nursing Directors with respect to ED overcrowding. **Methods:** A 38-item, paper-based questionnaire was distributed to ED Nursing Directors at 102 hospitals with EDs or Health Care Centre with acute care services in the province of Alberta, Canada in the Fall of 2006. ED administrative data were obtained from Alberta Health and Wellness registries. Data are compared using chi-square and T-tests, where appropriate. **Results:** Overall, 100 Directors (98%) responded; 80.4% of whom reported that their EDs were in rural areas staffed mainly by Family Physicians (54.5%) on duty. These EDs saw a median annual volume of 13701 patients (IQR: 7000, 22000), had a median of 21 (IQR: 12, 32) acute care beds and 6 (IQR: 4, 11) standard treatment spaces. Most nurses reported that their triage area was the responsibility of non-specialized RNs (77.1%); most used CTAS (90.7%), but without decision support (86%). Most reported that their EDs were without fast track areas (80%) and did not have designated observation units (61%). Some directors (21%) reported that overcrowding was a major or severe problem during the past year, which negatively affected the quality of patient care (55%), as well as nursing recruitment (56%). Some directors commented that a lack of medical and nursing staff were major contributing factor to ED overcrowding, especially in rural areas. **Conclusions:** Overcrowding is a serious nursing problem in EDs across Alberta. It affects nurse recruitment, resulting in many EDs in non-urban areas poorly staffed to deal with the overcrowding problem, and leads to poor patient care. The perspective of ED nursing directors reinforces the impression of ED medical directors that ED Overcrowding is a medical crisis. **Key Words:** Emergency department (ED) utilization, Nurses, Overcrowding

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CTAS reliability across provincial health regions

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Introduction: CTAS is increasingly being used to determine payment models and departmental efficiency based on time to physician. There have been many studies that have demonstrated the reliability of CTAS within an institution. There are very few studies that compare CTAS within and across health regions composed of different hospitals with different nursing education and administration. Our objective was to assess the inter-rater reliability of CTAS using scenarios and considering agreement on exact matching of triage level in nurses working in these different hospitals. **Methods:** Nurses enrolled in a CTAS training program were solicited to participate in this study using 50 scenarios. These scenarios were derived from a random selection of prospectively collected triage cases. These cases also reflected the anticipated ratios of CTAS 1 – 5 cases that an average emergency department would see. **Results:** 127 nurses from various sites within 3 provincial health authorities participated. There were 82 nurses from the Vancouver Coastal Health Authority. Baseline characteristics are included in the table below. Fourteen (11%) of nurses had received formal triage training. An unweighted kappa statistic was developed for each scenario. Exact match of the triage level occurred in 63.5% of cases and within one level in 92% of cases. The mean unweighted kappa value of all scenarios was 0.544 (95% CI: .0.457-0.631). **Conclusions:** The inter-rater reliability of CTAS in a broad unrelated cohort of ED triage nurses is moderate. This suggests that in order to improve triage reliability so that meaningful comparisons can occur at a regional and provincial level, training programs and/or systems that link triage to presenting complaint should be considered. **Key Words:** Triage, Inter-rater reliability

Table 1, Abstract 159

Baseline Characteristics	Mean (SD)
Age (years)	40.4 (8.9)
Years of nursing experience	17.1 (9.4)
Years of triage experience	7.2 (6.8)
Previous triage training	14 (11%)
Previous work at another hospital	55 (43%)

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OVERVIEW of triage diagnostic test properties for medical priority dispatch and the Canadian Triage Acuity Scale

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Introduction: Medical Priority Dispatch (MPD) is a measure of pre-clinical triage used in Emergency Medical Services as a diagnostic test without benefit of scientific scrutiny. In contrast to clinical triage, the Canadian Triage and Acuity Scale (CTAS) is a converging work-in-progress. **Methods:** To find and assess studies, those that evaluate the validity and or reliability of MPD and CTAS for adult patients in an urban Canadian emergency setting at the individual patient level. A search for studies was performed using the SEARCH Canada Vividex Resource Library. Studies detecting a diagnostic-related group or level of acuity as the outcome measure, either individually or in combination, were selected. One reviewer screened the title and abstract of citations. Full text articles for potentially eligible studies were obtained and cross referenced to identify additional publications. Two reviewers independently assessed the full text of the article for relevance and study rigour. Differences were resolved by discussion. **Results:** Citations for 68 articles were retrieved. The screening process culled 34 articles. Review of full text articles excluded an additional 28 articles. Six primary diagnostic studies were selected. None of the studies assessed MPD. All of the studies estimate reliability test properties for CTAS. None of the studies focus on test validity. **Conclusions:** Pre-clinical triage is a topic of research that has been ignored. Research in clinical triage is directed towards the reliability of CTAS. Reliability is an important first step in an evidence-based approach to a new triage system. **Key Words:** Emergency Medical Services, Triage, MPD, CTAS

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EVALUATION of a regional EMS acute stroke protocol in Southeastern Ontario

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Introduction: A Regional Acute Stroke Protocol (RASP) was implemented in 1999 in Southeastern Ontario to provide regional access to acute stroke care. Paramedics were trained to identify patients eligible for treatment with tPA and to bypass the closest hospital in favour of direct transport to the Southeastern Ontario Health Science Centre in Kingston. The stroke team was "activated"

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by the paramedics prior to patient arrival in the ED. This study examined whether paramedics could accurately identify patients with acute stroke and transport patients from a wide geographic area in time to receive thrombolytic therapy. **Methods:** Data from Ambulance Call Reports (ACRs) was collected prospectively and entered into a database by the Regional Base Hospital for Southeastern Ontario. Inhospital data was collected by the Ontario Stroke Registry at Kingston General Hospital. This study examined the ACRs and hospital records for all patients with stroke or TIA encountered by paramedics in SEO for 2004/2005. **Results:** In 2004/2005, paramedics encountered 1501 patients with a working diagnosis of TIA or acute stroke. 337 (22%) of these patients met RASP criteria (symptoms compatible with acute stroke, known time of onset and able to reach the stroke center within two hours) and were transported directly to the stroke center with stroke team activation. The majority of patients were excluded from the RASP because of time or symptoms resolving prior to departure from scene. 46% of RASP patients bypassed a closer hospital. Only one patient was identified as not meeting RASP criteria and being incorrectly transported to the stroke center. Four patients (0.3%) patients were determined on chart review to have met RASP criteria but were not transported as such. Twenty-two (22)% of RASP patients received tPA. **Conclusions:** Paramedics are able to accurately apply a protocol that identifies patients with acute stroke and transport patients from a wide geographic area to a regional stroke center in time to receive thrombolytic therapy. **Key Words:** Stroke, Paramedics, Protocol

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PARAMEDIC offload delays associated with prolonged response times

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Introduction: Early access is the first link in the Chain of Survival for sudden cardiac death. With CPR, defibrillation within 8 minutes increases survival rate to 20%. The success rate can be doubled if defibrillation is provided within 4 minutes and paramedic arrival within 8 minutes. With ED overcrowding, offload delays are commonplace. The Hospital Emergency Department and Ambulance Effectiveness Working Group has published it's plan to reduce the offload times for paramedic crews to a target of 30 minutes. We conducted a retrospective review of offload times in the Hamilton area, correlating the response times with offload delays seen during the same 24 hour periods. **Methods:** All consecutive ambulance dispatches with an initial priority code of 3 or 4 were retrieved from the Hamilton Health Sciences Base Hospital Program's database for 2005. The average response time for each day was compared based on the percentage of calls within the same 24-hour period with a prolonged offload delay. An offload delay was defined a priori as being greater than 60 minutes from the time of arrival to hospital until the time reported as being clear of the hospital. **Results:** During the 2005 period studied, 161199 ambulance calls recorded with dispatch priority 3 or 4 were included in the study. 6.7% of calls had offload delays greater than 60 minutes. The average response time to the scene was 8m:16s. For every 10% of calls being delayed by more than 60 minutes, there is an associated 21 second delay arriving to the scene ($p<0.01$). **Conclusions:** Paramedic crews under supervision of the Hamilton Base Hospital Program are commonly delayed more than the Working Group's 30-minute target. A small, yet statistically significant, linear relationship exists between increasing offload delays and concomitant delays in the early access to paramedic care in these highest priority calls. Further work is needed to determine if clinical outcomes are affected by offload delays beyond the 30-minute target. **Key Words:** Paramedics, Offload times, Dispatch

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QUALITATIVE analysis of a paramedic research question bank: a determinant of paramedic research priorities

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Introduction: The Emergency Health Services (EHS) Prehospital Research Initiative's Paramedic Research Question Bank (QB) houses research questions developed by paramedics, administrators and educators in standardized evidence based medicine (EBM) format. The purpose of the QB is to encourage EBM practice within the paramedic profession and can establish paramedic research priorities. **Methods:** Research questions were submitted by paramedics during facilitator guided sessions and online submission in a provincial EHS system. The QB was qualitatively analyzed by a focus group that clustered the questions within three domains (clinical, systems and education) into themes and then established the research priority within each domain. This was achieved using a Delphi approach among a group of EHS experts. **Results:** The qualitative analysis was on questions entered into the QB during the time period of September 2004 to January 2006, in which there were 79 (51%) clinical questions, 17 (11%) education questions and 58 (38%) systems questions, a total of 154 questions. Through thematic analysis the clinical research priorities were found to be: pharmacology research, patient management decisions research, airway research and expanded clinical interventions research. Paramedic education delivery is the educational research priority and human performance and systems performance, and system status planning are research priorities in the systems domain. **Conclusions:** A paramedic QB is an effective means of determining the research priorities of paramedics within a provincial prehospital system. **Key Words:** Prehospital, Qualitative, Research priorities

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INAPPROPRIATE claims of equivalence/non-inferiority in failed randomized trials in emergency medicine

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Introduction: Failed superiority-designed randomized controlled trials (SupRCTs) often make inappropriate claims of equivalence(EQ) or non-inferiority(NI). We sought to examine how often this occurs in RCTs published in Emergency Medicine(EM) journals. **Methods:** Duplicated electronic and hand-searches of 6 leading EM journals were conducted to find all published RCTs in the 2005 calendar year. Articles were included if they were considered to be failed SupRCTs. Included articles were subsequently analyzed in detail using a data extraction tool based on previously published NI/EQ design and reporting standards. Agreement analyses of search strategies, inclusion decisions and individual article analyses were conducted. **Results:** The search yielded 64 reported RCTs, of which 17 were not truly comparison RCTs. Of the 47 remaining RCTs, 24 were excluded for explicit NI/EQ design (2) or successful differences reported (23). Of the remaining 22 failed SupRCTs, 13 made an appropriate claim of failure to demonstrate superiority, whereas 9 made false claims of NI/EQ. **Conclusions:** The majority of superiority-designed RCTs published in 2005 either successfully reported differences or made appropriate claims of failure. However, a significant proportion of failed superiority-designed RCTs (9/22) made inappropriate claims of equivalence or non-inferiority. **Key Words:** Methodology, Non-inferiority, Superiority, RCT

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VALIDITY of patient-reported prescription filling as an outcome in emergency medicine research

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Introduction: Research on adherence with Emergency Department (ED) discharge prescriptions frequently utilizes unvalidated patient-reported outcome measures. In British Columbia, all prescriptions filled in community pharmacies are entered into a provincial prescription database (PharmaNet) through mandatory functions prior to dispensing. The objective of this study was to compare the validity of patient-reported prescription filling with a PharmaNet criterion standard. **Methods:** This was an a priori designed secondary analysis of a study examining adherence with ED discharge prescriptions. The study was carried out in a tertiary care center with an annual ED census of 65,000. Research assistants (RAs) collected information on consenting ED patients discharged with a prescription. Two weeks after the index visit RAs contacted patients by phone, and then used PharmaNet to determine whether patients had filled their prescription(s). Data on prescriptions for medications available over the counter was excluded. Identical a priori defined predictor variables for prescription filling were fit in two logistic regression models using each outcome measure for comparative purposes. **Results:** Data was obtained on 258 patients. During the phone interview 225 patients (87.6%) stated that they had filled their prescriptions compared with 207 patients (80.2.2%) on PharmaNet (difference 7.4%, 95% CI 1.0% to 13.6%, p=0.02). Both regression models identified the same predictor variable (illicit drug use) as statistically significant. The effect size estimates for this variable were similar and confidence intervals overlapped widely (PharmaNet outcome: OR 5.5, 95% CI 1.2-25.0; patient-reported outcome: OR 8.2, 95% CI 1.8-37.3). **Conclusions:** Despite yielding higher estimates of prescription filling using a patient-reported outcome measure, this measure yielded similar results in multivariate regression modeling compared to a criterion standard and has validity. **Key Words:** Prescription-filling, Validation, Discharge prescriptions

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AN international survey of emergency physicians knowledge, use, and attitudes towards the Canadian CT head rule

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Introduction: The derivation and validation of the Canadian CT Head Rule (CCHR) has been published in emergency medicine and general medical journals. Little, however, is known of its international diffusion and use. The purpose of this study was to determine the knowledge, attitudes and behaviour of emergency physicians (EPs) in Australasia, Canada, the UK and US regarding the CCHR. **Methods:** A prospectively conducted self-administered email and postal survey was sent to members of 4 national EP associations using a modified Dillman technique. Random samples of members from ACEM (Australasia), CAEP (Canada), BAEM (UK) and ACEP (US) were sent a prenotification letter followed by at least 4 mailouts. Awareness, use and attitudes regarding the CCHR were analyzed using descriptive and univariate statistics with 95% CIs. **Results:** Overall, 1150/2103 (54.7%) responses were received. The respondents were male (74%), mean age 42.5 years and had mean 12 years experience. **Conclusions:** Knowledge of the CCHR varied widely by country. The CCHR was viewed favourably across multiple measured dimensions. Of those aware, there is a moderately high level of use. Of those not currently using the CCHR, most would consider future use. A better understanding of the factors related to increased use of decision rules will facilitate strategies to enhance derivation, dissemination and implementation of future rules. **Key Words:** CT head, CCHR, Dissemination, Implementation

Table 1, Abstract 167

	Australia	Canada	UK	US
Response rate	54%	69%	44%	49%
Aware of CCHR	83%	87%	63%	35%
Use of CCHR	55%	83%	44%	29%
Consider future use	67%	84%	33%	77%
CCHR is useful in my practice	68%	87%	78%	74%
Patients benefit from use	69%	88%	70%	72%
Improves use of resources	66%	83%	53%	82%
Using another rule/strategy	38%	12%	60%	21%

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SYSTEMATIC qualitative review of clinical decision rules for syncope in ED for predicting adverse outcomes

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Introduction: Disposition of syncope patients is a challenging task for emergency physicians. The aim of this study was to systematically review the literature on decision rules for predicting adverse outcomes in adult syncope ED patients. **Methods:** Single reviewer systematically searched MEDLINE, EMBASE, CENTRAL, CINAHL and HTA databases until April 2006. English studies with decision rules for adverse outcomes were included. Data was extracted to calculate sensitivity, specificity and likelihood ratios (LR). **Results:** Of 8669 articles identified, 48 were reviewed fully. Only 6 met our eligibility criteria and they used 4 prediction instruments. Quinn's San Francisco Syncope Rule (SFSR) was the only prospectively derived and validated rule that included all serious adverse outcomes. Colivicchi's risk score was prospectively validated and predicts mortality only at one year. Elbesber and Crane retrospectively validated the ACEP guideline, drafted by consensus only and not derived by research. Crane's study predicted mortality at 1 year and had high loss to follow-up. Of the remainder Sarasin's was limited to arrhythmia prediction and Martin's to arrhythmia and mortality at 1 year. Both had poor Receiver Operator Characteristics curve range of 77-88 and 73-83% respectively. **Conclusions:** Studies were heterogeneous so meta analysis was not done. ACEP guideline was not rigorously derived. Only SFSR adhered to accepted guidelines for developing decision rule but was done in one site only. SFSR still needs further validation to ensure generalizability. **Key Words:** Systematic review, Syncope, Decision rule, SFSR

Table 1, Abstract 168

Study	Outcome	SENS (CI)	SPEC (CI)	+LR	-LR
Quinn04	Composite	96 (92–100)	62 (58–66)	2.53	0.06
Quinn06	Composite	98 (89–100)	56 (52–60)	2.23	0.03
Colivicchi 03	Mortality	97 (81–100)	72 (67–78)	3.55	0.04
Elbesber 05	Cardiac cause	100 (86–100)	33 (26–40)	1.49	0

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IMPAIRED driving interventions: do not forget the passengers

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Introduction: Motor vehicle crashes (MVCs) kill over 2,700 Canadians annually. Drivers with an illegal blood alcohol content (BAC) cause 34% of all crashes involving fatalities, however minimal research has been done on the future driving behavior of passengers. The primary objective of this observational study was to determine the proportion of injured passengers treated in hospital, categorized by BAC, who subsequently engage in impaired driving activity (IDA). **Methods:** We retrospectively identified all passengers injured in an MVC who were treated in our tertiary care, urban Emergency Department (1999-2003) or registered in our provincial trauma registry (1992-2005) and had a BAC measured. Injured passengers were categorized into three groups according to their BAC: Group 1: BAC=0, Group 2: 0<BAC<=17.3 mmol/L BAC 3: Group and limit), (legal>17.3 mmol/L. IDA was determined from police records (1989-2005), and defined as any of the following: a conviction for impaired driving; a 24hr or 90 day license suspension for impaired driving; involvement in a MVC where police listed alcohol as a factor; or presentation to a hospital with a BAC above the legal limit following an MVC. **Results:** 1336 passengers met inclusion criteria: 713 in Group 1; 174 in Group 2; and 449 in Group 3. IDA following the index hospital visit was identified in 78 passengers in Group 1 (10.9%, 95% CI 8.8%-13.4%); 48 passengers in Group 2 (27.6%, 95% CI 21.3%-34.6%, p<0.001 vs Group 1); and 158 passengers in Group 3 (35.2%, 95% CI 30.9%-39.7%, p<0.001 vs Group 1). Many passengers had engaged in IDA prior to their index visit: 12.8% in Group 1 (95% CI 10.5%-15.4%); 24.1% in Group 2 (95% CI 18.2%-30.9%); and 40.1% in Group 3 (95% CI 35.6%-44.7%). **Conclusions:** Passengers injured in a MVC frequently engage in subsequent impaired driving, particularly those who have a BAC above the legal limit. These findings suggest that rehabilitation programs and legal efforts targeting impaired or high risk drivers should also target high risk passengers. **Key Words:** Impaired driving, Alcohol, Motor vehicle collision

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ANTERIOR shoulder dislocation reduction: current practice

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Introduction: The management of anterior shoulder dislocations in the emergency department presents several important issues. Despite being a relatively straightforward injury to deal with, there is no gold standard approach and a simple reduction can prove costly and time consuming. The purpose of this study was to evaluate time spent in the ED, resources required, success rates and complications. **Methods:** The study included both an online survey and a medical record review. The survey was submitted to 56 ER physicians in our region. Our chart review included 38 anterior shoulder dislocations analyzed by two individual data abstractors using a computerized abstraction form. **Results:** The response rate for our survey was 66%. Overall, perceptions were that shoulder reduction has a high success rate with few complications and typically patients wait roughly 30-60 minutes for their procedure and an additional 30-60 minutes from the procedure to discharge. The Chart review demonstrates that the wait times typically are greater than 2hrs for shoulder reduction and an additional 2 hrs to be discharged. **Conclusions:** Current management of anterior shoulder dislocation reductions prove to be very time consuming and require many ER resources. Several studies have demonstrated that intraarticular lidocaine is an alternative to procedural sedation but further studies are needed. If effective, this technique may significantly reduce ER time, cost and resources. **Key Words:** Shoulder dislocation, Wait times, Shoulder reduction

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ASSOCIATION of injury mechanism with the risk of cervical spine fractures

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Introduction: A full understanding of an injury event and the mechanical forces involved should be important in predicting specific anatomic patterns of injury. Yet, information on the mechanism of injury is often overlooked as a predictor for specific anatomic injury in clinical settings. This study measures the relationship between mechanism of injury and risk for cervical spine fracture. **Methods:** This case-control study is a secondary analysis of data collected from the Canadian C-Spine Rule (CCR) Study. Data were collected from 1996 to 2002 and included patients presenting to the emergency department of nine tertiary care centres after sustaining acute blunt trauma to the head or neck. Cases are patients categorized in the CCR study as having a clinically important cervical spine fracture. Controls had no radiological evidence of cervical spine injury. Bivariate and multivariate unconditional logistic regression models were used. Results are presented as odds ratios with 95% confidence intervals. **Results:** Among the 17208 patients in the CCR study, 320 (1.9%) were diagnosed with a cervical spine fracture. Axial loads, falls, diving and non-traffic motorized vehicle collisions were injury mechanisms significantly related to an increased risk of fracture. For motor vehicle collisions, the risk of cervical spine injury increased with posted speed, being involved in a head-on collision, a rollover or not wearing a seatbelt (p<0.05). Cervical spine fracture occurrence was negligible in simple rear end collisions (1 in 3694 cases; OR=0.015, 95% CI=0.002-0.104). **Conclusions:** This study demonstrates quantitatively the relationship between specific mechanisms of injury and the risk of a cervical spine fracture. Knowledge of injury mechanism will assist emergency health providers in their care of trauma patients. **Key Words:** CCR, Mechanism, Injury, Fracture risk

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IMPACT of a difficult airway course on participants perceived ability

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Introduction: Airway management is an essential skill for both critical care and emergency physicians as well as certain allied health care providers. Despite being a life-saving skill, there can be significant morbidity and mortality associated with failure to appropriately manage a difficult airway. Recently, a group of Calgary Health Region (CHR) physicians developed a Difficult Airway Management Course targeting residents, staff and allied health care providers. We conducted a pre-post course questionnaire to assess the impact of the CHR Difficult Airway Management Course on participant's self-reported ability, knowledge, and comfort with this subject matter. **Methods:** The pre-post questionnaire assessed the participant's self-reported knowledge (general understanding of procedure), skills (ability to perform procedure), and attitudes (comfort level with procedure) using 12 questions on a 5-point scale from poor to excellent. We used a student's t-test to compare the pre- and post-course results. **Results:** The response rates for the pre-post course questionnaires

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were 96% (52 of 54) and 56% (30 of 54) respectively. Of the participants, 46% were from the division of Emergency Medicine, 27% from Respiratory Therapy, and 15% were from Critical Care. A comparison of the pre- and post-course survey results showed that participants reported improved knowledge [t (76) = 3.76, p <.001], skills [t (72) = 2.97, p < .01] and attitudes [t (71) = 3.31, p < .001] with respect to the airway topics covered during course. **Conclusions:** The CHR Difficult Airway Management course resulted in significant improvements in participants' perceived knowledge, skills and comfort with respect to difficult airway management. **Key Words:** Difficult airway, Medical education, Self-assesment

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EFFECT of simulation based training on self-assessment of comfort with management of hemodynamically unstable patients

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Introduction: Procedural skills training in emergency has traditionally been taught through a process referred to as "see one, do one, teach one". New ethical arguments support achieving competence in procedural skills prior to attempts with actual patients. We sought to assess the impact of procedural skills simulation training on the self-assessed competence of Emergency Medicine residents in performing critical resuscitation skills. **Methods:** A convenience sample of Emergency Medicine residents were surveyed for self-assessed measures of competence in the procedural skills required to manage hemodynamically unstable patients. Study participants were then exposed to an intensive 8 hour simulation based training program focusing on resuscitation procedures, in particular psychomotor skill acquisition. At the completion of the simulation course, the subjects were asked to repeat the self-assessment survey tool. Repeated measures MANOVA was used to assess interval changes in residents' self-assessments of competence. A follow-up survey 3 months after simulation training to assess confidence retention is pending. **Results:** Data analysis is ongoing. Preliminary results indicate an improvement in self-assessed competence measures following the simulation intervention ($p < 0.05$). **Conclusions:** The importance of simulation based medical education cannot be overstated. Emergency Medicine residents acquired additional confidence with resuscitation procedural skills following an intensive simulation based training program. We anticipate that this study, in concert with further studies proving knowledge transfer from the simulation environment to the clinical environment, will drastically change how procedural skills are taught. Most importantly, patient safety is the driving force behind this study. No longer is it acceptable to 'practice' on patients. Achieving procedural competence without compromising patient safety is paramount, and support for simulation based medical education is a step in that direction. **Key Words:** Simulation, Resuscitation, Procedural skills, Education

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RESIDENT code blue survey: confidence and preparedness for running cardiac-arrest resuscitations

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**please note: research is currently ongoing and expected completion date is Feb 15, 2007

Introduction: In most institutions, in-hospital cardiac-arrest resuscitations (Code Blues) outside of the emergency department are coordinated and administered by residents. The type and quality of training provided for residents to act as team leader during these cardiac-arrests is highly variable; this prior training, along with past experience, residency program and level of residency may all impact the quality of care given to patients. We will be conducting an online anonymous survey of residents who attend residency programs at one of the five Ontario medical universities regarding their preparedness to act as team leaders during cardiac arrest resuscitations. **Methods:** An anonymous voluntary on-line survey directed to persons enrolled in recognized residency programs at one of five Ontario universities. **Results:** Results will evaluate resident confidence in their ability to run cardiac-arrest resuscitations and compare this to the school they attend, their residency level, their residency program, and their prior experience and training with cardiac-arrest resuscitations. **Conclusions:** It is hoped that conclusions established from this survey may contribute to the development or improvement of training programs in cardiac-arrest management. **Key Words:** Education, Cardiac arrest, Resuscitation, Preparedness, Residents

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A lesson in history - clinical history predicts acetaminophen toxicity in children

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Introduction: Acetaminophen is frequently reported as an agent of toxic ingestions, both accidental and non- accidental. We aimed to determine the diagnostic test properties of history in the diagnosis of acetaminophen toxicity in children. **Methods:** This is a retrospective chart review in a tertiary pediatric emergency department (ED) in Canada. We included all children that had acetaminophen levels drawn in the ED. The main outcome measures were sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV). **Results:** We included 1989 acetaminophen levels drawn during 1905 unique patient visits. Of 1886 analyzed tests, 13 children were considered "toxic" and 55 children were considered "possibly toxic". All but 2 had a clear history of ingestion on arrival to the Emergency Department. There was a statistically significant association between a positive history of ingestion and toxicity ($p<.0001$). This association did not change with re-classification of the "possible-toxicity" group. The overall odds ratio for toxicity when a history of overdose was given was 71.9 (95% CI 17.5 – 294.5). If all children with a "possibly toxic" acetaminophen levels were considered "toxic" the Sensitivity, Specificity, PPV and NPV (95% CI) for history was 0.97 (0.90 – 1.0), 0.69 (0.66-0.71), 0.10 (0.08-0.13), 0.998 (0.994 - 1.0) respectively. **Conclusions:** Unlike in adults, in children a history of ingestion is an excellent predictor for possibly toxic acetaminophen plasma levels. This may result in a significant reduction of number of acetaminophen levels drawn in the ED. **Key Words:** Acetaminophen, Toxicity, Toxicology, Predictors

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PARENTERAL base therapy in pediatric critical illness: systematic review

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Introduction: Current practice guidelines do not provide clear indications for the use of base therapy in acute severe illness. In clinical practice base therapy is prescribed frequently by physicians caring for critically ill children. **Methods:** We conducted a systematic review of published literature from 1966 to August, 2006. With an academic librarian we developed a broad search strategy for 7 elec-

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tronic databases (Medline, EMBASE, CINAHL, Cochrane DSR, ACP Journal Club, DARE, CCTR). We included a variety of subject headings relating to base therapy and critical illness. Eligible studies included parenteral administration of base to children 1 month-18 years who had acute severe illness. We excluded case reports with <4 patients, outpatient studies, and non-English language publications. Articles identified in the primary search were reviewed for exclusion criteria based on title and abstract. The remaining articles were reviewed in full. We abstracted the population, intervention and study design. **Results:** 1183 articles were identified in the primary search. 125 articles were assessed in full. 11 met inclusion criteria. One randomized controlled trial of 60 adults and children with acute organophosphate poisoning found high dose sodium bicarbonate reduced hospital stay. 10 pediatric observational trials were found. All were retrospective. The location of patients was ICU(5), ER(1), and other in-patient(4). Sodium bicarbonate was the intervention of interest in all studies. Diseases included diabetic ketoacidosis (4), severe asthma(2), need for continuous renal replacement therapy(2), gastroenteritis-induced metabolic acidosis(1), and ethylene glycol intoxication(1). **Conclusions:** In contrast to the frequent use of sodium bicarbonate in acutely ill children, we found few pediatric studies of this or any base therapy. Further high-quality research including randomized trials is needed to facilitate the development of evidence-based guidelines and inform clinical practice. **Key Words:** Base therapy, Sodium bicarbonate, Critical care, Pediatrics

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THE effect of concentrating periods of physical activity on the risk of injury in organized sports in a pediatric population

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Introduction: Biopsychological markers suggest that overtraining syndrome arises from a continuum and is perpetuated by an imbalance between rest and effort. The current trend in pediatric sport organizations is to regroup activities into weekend tournaments. This practice could theoretically increase the risk of sports injuries given that there is a lack of rest periods. Objectives : To evaluate the association between the risk of sport injury and the effect of consolidation of physical activity for periods of 48 hours and 7 days in children. **Methods:** A case-crossover study was conducted in an emergency department of a tertiary care hospital. To be included, participants had to be aged between 8 to 16 years old and acutely injured in an organized sport-related event. A standardized questionnaire was used to evaluate the amount of physical activity performed during 28 days prior to the injury. The case periods were the 48 hours and 7 days prior to the injury and were compared to control periods of similar length. The primary analysis was the comparison of the number of hours of activity between the case and control periods. It was prospectively determined that a clinically significant difference is 1 hour for the 48 hours study and of 2 hours for the 7 days study. **Results:** The mean age of the 48 recruited patients was 13.25 years. The injuries occurred mainly during soccer, basketball, football and hockey. On average, participants performed 356 minutes of organized sports per week and 136 minutes in the 48 hours preceding the injury. Participants reported an increase of 13±24 minutes for the case period in the tournament effect study and of 40±47 minutes for the 7 days prior the injury. **Conclusions:** The present study failed to disclose any association between the consolidation of organized sport activity and the risk of injury in children. A limitation of the study relies in its retrospective aspect and conducting a prospective study of a large number of athletes would allow a more complete collection of data. **Key Words:** Organized sports, Injury, Physical activity, Pediatrics

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A needs assessment for obesity-related anticipatory guidance in the pediatric emergency department

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Introduction: Paediatric obesity is a major concern in industrialized nations and is recognized by the Canadian Paediatric Society as an important anticipatory guidance (AG) topic. Our objective is to determine the proportion of non-urgent patient-families interested in obesity-related anticipatory guidance while they wait in the Paediatric Emergency Department (PED). **Methods:** A survey was distributed to patients and families in the waiting area of the PED of the Children's Hospital of Western Ontario (CHWO). **Results:** 200 people were surveyed; 92% were parents and 4% were patients. 51% of families had someone in the family dieting, exercising or both for weight loss and 17% of respondents believed at least one child in their family considered themselves overweight or obese. Respondents that considered themselves overweight or obese were significantly more likely to state their children also consider themselves overweight or obese (22.8% vs. 11.1%, p=0.03). This group was also significantly less interested in AG (66.7% vs. 90.1%, p=0.009). Conversely, the unemployed were significantly more interested in information about nutrition or exercise compared to those that were employed (49.0% vs. 31.2%, p=0.023). 41% of all respondents were interested in further information on obesity in the PED, 91% of whom were interested in information on both nutrition and exercise. Of the 22.4% of patients that felt their physician was not meeting their needs for nutrition or exercise-related AG, 76.3% were interested in further information (p<0.001). The preferred method of knowledge dissemination was via brochure (31.5%) followed by an internet-based resource (12%). **Conclusions:** Obesity is a major AG topic for physicians of all specialties. It is important to address this issue at every opportunity and convey our message with the highest impact possible. Our study demonstrates that a segment of the PED population would be receptive to AG in the PED and suggests different health care environments require diverse AG approaches. **Key Words:** Obesity, Pediatrics, Prevention, Anticipatory guidance

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COMPARISON of four pain scales in children with acute abdominal pain in a pediatric emergency department

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Introduction: Pain documentation is becoming more and more frequent in the emergency department. In children, many pain scales may be used. However, their interchangeability, especially in the evaluation of acute pain, is not well known. The objective of our study was to evaluate the agreements between the visual analog scale (VAS), the standardized color analog scale (CAS), the Wong-Baker Faces Pain Rating Scale (WBFPS), and a verbal numeric scale (VNS) in children with acute abdominal pain suggestive of appendicitis in a paediatric emergency department (PED). **Methods:** Participants were children aged 8 to 18 years old presenting to a PED with abdominal pain suggestive of appendicitis recruited to participate in a randomized controlled trial evaluating the efficacy of morphine. Patients were initially asked to grade their pain on a plasticized CAS, a paper VAS, a paper WBFPS, and then with a VNS. Thirty minutes after morphine or placebo administration, the same assessment was repeated. All scales were then converted to a 0 to 100 mm; agreements between scores were evaluated using the intraclass correlation (Ric) and the Bland-Altman method. **Results:** A total of 87 children were included in the study, 58 of them with confirmed appendicitis. All pain scales were correlated between each others (Ric between 0.88

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and 0.97, p<0.001). However, except for the VAS/CAS comparison, the limits of agreement between each other were all more than our a priori limit of acceptability of ± 20 mm: VAS/CAS -18.6, 14.4; VAS/WBFPS -20.1, 33.7; VAS/VNS -30.2, 20.8; CAS/WBFPS -18.5, 36.3; CAS/VNS -26.9, 22.1; WBFPS/VNS -38.7, 15.7. Also, the measurements differed by more than 20 mm in more than 10% of the patients for all the scales comparison except for VAS/CAS. **Conclusions:** Our study suggests that only the results from the VAS and the CAS are interchangeable in children with acute abdominal pain suggestive of appendicitis. In particular, the VNS is not interchangeable with the other evaluated scales. **Key Words:** Pain Scales, Interchangability, Appendicitis, Pediatrics

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SAFETY of the modification of the triage level for children 6 to 36 months old with fever

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Introduction: The Paediatric Canadian Triage and Acuity Scale (PaedCTAS) was implemented in Canadian paediatric emergency department (ED) in 2001. An item of the PaedCTAS stipulates that patients aged between 3 and 36 months with fever must be triaged as urgent. To maximize resources use, a modification has been applied in our institution since 2001. The protocol stipulates that children 6 to 36 months old with fever and no sign of toxicity could be triaged as semi-urgent. **Objective:** Evaluate whether children 6 to 36 months old with fever but no sign of toxicity and triaged as semi-urgent behave as all the other patients triaged semi-urgent. **Methods:** A retrospective cohort study evaluating all patients triaged in an urban tertiary paediatric hospital during a 6 month period was performed. Data were retrieved from the ED database (Staturg® from Statdev®). Hospitalisation rate was compared for 4 groups: 1. children aged 3 to 36 months with fever triaged urgent, 2. children aged 3 to 36 months with fever triaged non-urgent (following the protocol), 3. all the patients triaged urgent, and 4. all the patients triaged semi-urgent. **Results:** During the study period, there were 36,285 visits at the ED and 3,477 visits for children aged 3 to 36 months with fever. Of these, the nurses triaged 1322 (38%) patients as urgent and 1869 (54%) patients as semi-urgent. The proportion of hospitalisation for children aged 3 to 36 months with fever triaged urgent was similar to the proportion of all the patients triaged urgent (13.1% vs.13.4%) while the proportion of hospitalisation for children aged 3 to 36 months with fever triaged semi-urgent was similar to the one of all the patients triaged semi-urgent (2.3% vs. 2.0%). No patient downgraded as semi-urgent were admitted to the intensive care unit. **Conclusions:** Patients aged 6 to 36 months with fever and no sign of toxicity can be triaged as semi-urgent safely. This would modify the triage level of approximately 5% of the population visiting a paediatric ED. **Key Words:** CTAS, Triage level, Fever, Infants

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CANADIAN best practice recommendations for stroke cCare (2006) - stroke prevention in the emergency department

Harris DR, Lindsay MP, Witt J, McDonald AM, Phillips SJ, on behalf of the Canadian Stroke Strategy (a joint initiative of the Canadian Stroke Network and the Heart and Stroke Foundation of Canada). Department of Emergency Medicine, St. Paul's Hospital, Vancouver, BC

Introduction: The Canadian Stroke Strategy Best Practices and Standards Working Group (BPS-WG) was developed to aid in the translation of research into practice for stroke care. The goal of the BPS-WG was to recommend best practices in stroke care appropriate to the Canadian context and based on the highest levels of evidence available. This abstract focuses on the recommendations for secondary stroke prevention that are relevant to emergency physicians. **Methods:** The recommendations were developed by systematically searching for existing practice guidelines, appraising their quality using a validated tool, selecting recommendations for inclusion in the final document, and obtaining expert feedback on the proposed recommendations. Core performance measures were identified for each recommendation. Emergency physicians played an active role on the working group through all stages of development and review. **Results:** Of a total of 24 recommendations, seven relate to primary and secondary prevention of stroke, and are relevant to emergency physicians: 1. Life style management (exercise, smoking, diet, weight, alcohol and stress); 2. Blood pressure management; 3. Lipid management; 4. Diabetes management; 5. Antiplatelet therapy; 6. Antithrombotic therapy for atrial fibrillation, and; 7. Carotid intervention. In addition, recommendations also stressed the necessity of public awareness, and patient and caregiver education across the continuum of care. **Conclusions:** The Canadian Best Practice Recommendations for Stroke Care: 2006, provide guidance to physicians who are responsible for initiating or modifying secondary stroke prevention therapy for patients who present with TIA or minor stroke. **Key Words:** Stroke, Prevention, Best practice, Secondary prevention

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CANADIAN best practice recommendations for stroke care (2006) - acute stroke management

Harris DR, Lindsay MP, Witt J, McDonald AM, Phillips SJ, on behalf of the Canadian Stroke Strategy (a joint initiative of the Canadian Stroke Network and the Heart and Stroke Foundation of Canada). Department of Emergency Medicine, St. Paul's Hospital, Vancouver, BC

Introduction: The Canadian Stroke Strategy Best Practices and Standards Working Group (BPS-WG) was developed to aid in the translation of research into practice for stroke care. The goal of the BPS-WG was to recommend best practices in stroke care appropriate to the Canadian context and based on the highest levels of evidence available. This abstract focuses on the recommendations for acute stroke management that are relevant to emergency physicians. **Methods:** The recommendations were developed by systematically searching for existing practice guidelines, appraising their quality using a validated tool, selecting recommendations for inclusion in the final document, and obtaining expert feedback on the proposed recommendations. Core performance measures were identified for each recommendation. Emergency physicians played an active role on the working group through all stages of development and review. **Results:** Of a total of 24 recommendations, eight relate to primary and secondary prevention of stroke, and are relevant to emergency physicians: 1. Acute stroke unit care; 2. Brain imaging; 3. Blood glucose; 4. Acute thrombolytic treatment; 5. Carotid artery imaging; 6. Dysphagia assessment; 7. Acute aspirin therapy, and; 8. Management of subarachnoid and intracerebral hemorrhage. In addition, recommendations also stressed the necessity of public awareness of the signs and symptoms of stroke, and patient and caregiver education across the continuum of care. **Conclusions:** The Canadian Best Practice Recommendations for Stroke Care: 2006, provide guidance to physicians who are responsible for acute stroke management. **Key Words:** Acute stroke, Management, Best practice

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OUTCOME of patients with an emergency department discharge diagnosis of transient ischemic attack

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Introduction: Patients who experience a transient ischemic attack (TIA) are at high short-term risk of stroke. The purpose of this study was to determine the outcome of patients with an emergency department (ED) discharge diagnosis of TIA (ICD-9CM 435.9) as coded by the emergency physician within one year after the event. **Mehtods:** We undertook a retrospective study in a tertiary care, urban academic hospital in Vancouver, British Columbia utilizing the emergency department administrative database linked with provincial vital statistics data and the regional database of emergency encounters. Only patients with the primary diagnosis of TIA were analyzed, from January 2001 to August 2005. We were interested in the incidence of stroke, recurrent TIA, cardiovascular event (angina, myocardial infarction) or death within 90 days and 1 year after the index event. **Results:** Over the 55 month period, 329 patients had a discharge diagnosis of TIA from the ED. 184 were men and the average age was 67 years. 72 patients (22%) were referred to neurology in the ED and 42 (12.8%) were admitted to hospital on the index event. Of those admitted, median length of stay was 3.25 days (IQR = 1.8, 5.6). Of those patients discharged, 8 (2.4%) were readmitted to an acute care hospital within 90 days with a diagnosis of stroke. Outcomes are outlined further in the Table. **Conclusions:** In this study, the risk of stroke, recurrent TIA, cardiovascular event or death is high after a TIA, yet lower than other published estimates. Interventions must be directed at patients presenting with TIA to the ED to prevent further cardiovascular events. **Key Words:** TIA, Stroke, Short-term risk, Prevention

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Event	Number (percent)
TIA < 90 days	13 (4.0)
TIA > 90 days & < 1 year	2 (0.6)
CVA < 90 days	8 (2.4)
CVA > 90 days & < 1 year	2 (0.6)
ACS < 1 year	1 (0.3)
Death < 90 days due to TIA/CVA	1 (0.3)
Composite for 90 days	22 (6.7)
Composite for 1 year	27 (8.2)

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RURAL emergency department use by CTAS IV and V patients

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Introduction: It is well known that many Emergency Department (ED) visits are non-urgent as classified by the Canadian Triage and Acuity Scale (CTAS). Many reasons have been suggested for such ED use including a lack of family physicians. A survey done by Field and Lantz (2006) quantified some reasons patients with non-urgent problems use a tertiary care ED. The purpose of our study was to determine if these same reasons applied to patients presenting with non-urgent problems to a low volume rural ED. **Methods:** The same patient survey used in the aforementioned urban study was administered to CTAS Level IV and V patients, who attended the South Huron Hospital ED in Exeter, Ontario for two weeks in December, 2006. **Results:** The survey completion rate was 97% (137/141) of non-urgent patients presenting to the ED. Eighty-nine percent (122/137) of patients reported having a family physician. More than half (70/136) had their problem for more than 48 hours while only 24% (33/137) had an acute medical problem of less than 48 hours. However, 39% (53/136) felt they had a problem which needed treatment as soon as possible. Forty-three percent (53/122) reported using the ED because of limited access to their family physician. One third (45/137) presented to the ED because of special services that they thought they would require (xray, sutures, casting and IV medication). Only 4% (6/137) used the ED because they did not have a family physician. **Conclusions:** In this low volume rural setting, most non-urgent ED visits were for medical problems of more than 48 hours. Many patients used the ED for specialized services; most of which are available at the walk-in clinic. The lack of a family physician was not associated with non-urgent ED use. In fact, many patients had already seen a doctor about their problem. The most common reason cited for coming to the ED was inability to obtain timely access to their family physician. **Key Words:** Non-urgent, Low acuity, CTAS, Rural ED

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WHAT strategies are the most efficient for the identification of medical errors in the emergency department?

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Introduction: Medical errors [MEs] and patient safety have become important topics on the national health care agenda. Emergency departments [EDs] are recognized as an environment at high risk for MEs due to their clientele and the nature of the work. However, little is known concerning the various methods for detecting and investigating of MEs in the ED. This project aims to provide a comprehensive method of detecting and investigating MEs in the ED. **Methods:** A seven month prospective comparative study of methods for detecting MEs was conducted in a tertiary care hospital ED with an annual census of 70 000 visits. Four identification processes were implemented to flag potential MEs in the ED: Doctor's (MD) incident reports; nursing incident reports; database queries 3 consultations, length of stay ≥ (death in ED, > 48 hrs, ICU/CCU admission); and pharmacy reports on specific medications. For each potential ME identified through electronic database queries, an email was sent to the MD taking care of the admitted patient asking them to assess "patient care" within the ED. Potential MEs were classified as case (ME with moderate to severe adverse event [AE]), control (ME without or with minor AE) or normal (No ME). **Results:** The sample size consisted of 1117 flagged potential MEs: male = 54%; mean age = 65.8; triage code I = 1%; II = 33%; III = 49%; IV = 16%; V = 1%. Six percent of potential MEs were reported by MDs, 11% by nurses, 67% through database queries and 16% through pharmacy reports. Among the 1117 potentials MEs, 14% were identified as MEs. From these 14%, 18% resulted in moderate to severe AEs and 82% in minor or no AEs. Moreover, sensitivity of the various methods to detect MEs is as follows: MD reports = 34%, nursing reports = 56%, database queries = 9% and pharmacy reports = <1%. **Conclusions:** Although database queries and pharmacy reports flagged 83% of the potential MEs, the MD and nursing incident reports were the more sensitive in identifying the presence of ME (90%). **Key Words:** Medical error, Patient safety, Incident reports

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AN analysis of emergency department patient safety culture

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Introduction: Safety is an emergent phenomenon of sociotechnical system interactions. Therefore, we sought to explore how healthcare providers create patient safety within the culture of an emergency

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department. **Methods:** In-depth, semi-structured interviews were conducted with eighteen front-line emergency department (ED) healthcare professionals from two urban Canadian tertiary care EDs (six physicians, nine registered nurses, one resident physician, one ED technician, and one social worker). Statements from the Hospital Survey on Patient Safety Culture were used to prompt detailed narrative exploration of the factors that contribute to patient safety culture. Interviews were recorded and transcribed, and data were analyzed iteratively for patterns and themes. **Results:** Interviews averaged ninety minutes in length. Six broad areas were identified as issues to address in order to better foster a culture of safety in the ED: 1) Flexibility and resilience with respect to flow, capacity, resources, and recovery when errors occur; 2) Transparency and voice; blame or shame was felt by some, and speaking up was rarely rewarded; 3) Safety and security of person and department, including physical and psychological safety; 4) Reporting of patient safety events was often perceived as ineffectual, with a sense of "no harm, no foul" when a near miss occurs; 5) Feedback and learning, if present, were experienced as ad hoc and local rather than systematic and organizational; 6) Teamwork, communication and responsibility themes endorse the risks associated with transitions in patient care. **Conclusions:** These findings highlight organizational features that influence the ability of healthcare providers to create safety for patients in busy, urban EDs. Further research and evaluation of interventions to promote patient safety culture in the ED are warranted. Funding: Canadian Medical Protective Association **Key Words:** Patient safety, Qualitative, Safety culture

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CLINICAL utility of emergency department targeted ultrasonography in symptomatic first-trimester pregnancy: a systematic review of current evidence

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Introduction: This systematic review examined the effect of Emergency Department Targeted Ultrasonography (EDTU) on time-to-diagnosis and time-to-surgery for ectopic pregnancy, emergency department length-of-stay, and costs in the evaluation of emergency patients with symptoms of pain or bleeding in the first trimester of pregnancy. **Methods:** The literature was systematically searched. We included articles that examined the outcomes listed above, and that compared EDTU to formal ultrasonography performed by diagnostic imaging departments or consultant gynaecologists. No constraints on methodological quality were used. Rather, the quality of each study was critically appraised and described in detail in the review. **Results:** Nine studies were included in this systematic review. Three retrospective studies examined time-to-diagnosis and time-to-surgery in patients evaluated using EDTU compared to historical controls evaluated with formal ultrasonography. Mean time-to-diagnosis was reduced by over 2 hours in one study, while time-to-surgery was reduced by 2.5-3.5 hours. EDTU reduced the proportion of patients with ectopic pregnancy who were discharged from the ED. One randomized, controlled trial and one prospective cohort study demonstrated that EDTU reduced length of stay by approximately two hours for patients with live intrauterine pregnancies. Three retrospective studies had similar findings. One randomized, controlled trial and one retrospective study demonstrated lower health-care costs associated with EDTU compared to formal ultrasonography. No pooled analyses were performed because of heterogeneity of the methods of the included studies. **Conclusions:** The use of EDTU in symptomatic first-trimester pregnancy reduced ED length of stay for patients with viable pregnancies, and reduced health care costs. There is also evidence that EDTU use reduces time-to-diagnosis and time-to-treatment of ectopic pregnancies. **Key Words:** Ultrasonography, EDTU, Pregnancy, Ectopic

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WHAT is the impact of sexual assault nurse examiners on emergency department care?

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Introduction: Examination and management of the sexually assaulted patient is a complex task. On-call nurses with advanced training are used in some hospitals but their impact on patient care and appropriate forensic examination is largely unknown. We evaluated the impact of the introduction of a Sexual Assault/Domestic Violence Program (SADVP) on emergency department (ED) flow, comprehensive patient care and collection of forensic evidence. **Methods:** Patients presenting to the Kingston area (pop 185000) EDs following sexual assault were compared for two time periods: 1) pre-SADVP (2001 through August 2004) 2) post-SADVP (September 2004 to August 2006). ED, hospital discharge, SADVP and police records were reviewed. Data abstraction included patient demographics, assault characteristics, forensic examination results and treatment protocols. **Results:** More patients were seen by the SADVP in a shorter time frame (n=61 pre-SADVP; n=92 post-SADVP). SADVP numbers approximate number of police reports. Median times to initial clinical evaluation were lower in the SADVP group (20 vs. 33 minutes; P=.04). Patients in the post-SADVP group reported less vaginal/anal penetration (77% vs. 98%; P<.001) and experienced fewer genital injuries (13% vs. 39%; P=.007); other sexual assault characteristics were similar between the two study periods. Forensic kits were completed more often in the post-SADVP group (77% vs. 66%; P=.18). Pregnancy and STD prophylaxis was provided more consistently post-SADVP (98% vs. 85%; P=.007) as was counseling (100% vs. 95%; P=.06). **Conclusions:** The profile of patients observed post-SADVP changed to include less stereotypical sexual assaults with less discrepancy seen between police and hospital estimates of sexual assault. Introduction of the SADVP decreased wait times for sexually assaulted patients, despite the need for the on-call nurses to attend the ED. This program also showed higher completion on a number of important indicators of quality of care: forensic kits, counseling and pregnancy and STD prophylaxis. **Key Words:** Sexual assault, Specialized nurses, Program impact, Wait times

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DIAGNOSTIC imaging for renal colic in Ontario emergency departments

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Introduction: Over the past decade, computed tomography (CT) has become a common imaging modality for patients with suspected renal colic. However, there is ongoing debate as to the most appropriate initial investigation for these patients, and in particular, concern about the amount of radiation exposure from CT for younger women and children. This study examined the inter-hospital variation in investigations performed in patients diagnosed with renal colic, and variation with age and gender. **Methods:** Ten hospital-based emergency departments (EDs) comprised of a mix of paediatric, teaching, small and large volume community hospitals from across Ontario agreed to participate in this study. Data for all ED visits was collected by each hospital, and submitted to the Canadian Institute for Health Information (CIHI). This data set, for the period from September 1, 2005 to August 31, 2006 was reviewed by the investigators. An analysis was conducted of all patients discharged with a confirmed diagnosis of urolithiasis or renal colic (ICD-10 codes N20-N23). **Results:** Of 518,488 ED patients treated during the study period, 3,264 (0.6%) had a discharge diagnosis of renal colic.

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There was marked variation between hospitals in diagnostic modality chosen. 61.8% underwent imaging. Of these patients that had investigations, 16.1% (range 1.8-71.4%) underwent ultrasound (US), 20.9% (range 6.3-64.0%) had only plain x-ray, 61.6% (range 0.0-89.9%) underwent CT and 1.5% (range 0.0-6.3%) had both US and CT. Women <45 and children were less likely to receive a CT scan than adult males and females > 45 years (p=0.02). **Conclusions:** CT scan appears to be the imaging modality of choice at most centres in patients with a final diagnosis of renal colic, although there was marked variation in use of ultrasound and plain radiographs between hospital sites. In this study there was less use of CT scan in children and young women. Further research is needed to clarify the most appropriate use of CT in the diagnosis of renal colic. **Key Words:** Renal colic, CT, Imaging, Urolithiasis

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IMMEDIATE complications of central venous catheterization

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Introduction: Central venous catheterization (CVC) is associated with serious patient morbidity and mortality. The objective of this study was to determine the prevalence of CVC mechanical complications. **Methods:** A formal health records review was performed for the period August 2005 to December 2005 in a university tertiary referral centre. Research ethics approval was obtained. Inclusion criteria included any patients who received a percutaneously inserted CVC, anywhere in the hospital. Patients with peripherally inserted central catheters were excluded. A single reviewer identified cases using procedure codes for CVC and abstracted data into a standardized electronic database. Descriptive statistics were used on the collected data which included operator, training, procedural approach, and complications. **Results:** 412 medical charts were identified and reviewed. 242 charts were excluded because of lack of documentation and unavailability of records. 170 charts were analyzed and the mean patient age was 51.0. 60.2% were male. Main indications for CVC were IV access (53.5%), dialysis (25.3%) and OR procedure (7.1%). Most procedures were done in the ICU (48.8%) followed by diagnostic imaging (19.4%), the ward (15.9%), and the emergency department (9.4%). 64.9% of CVC were performed by residents. Most residents were in postgraduate year two (19.4%) and three (9.4%), although 22.9% did not document their level of training in the medical record. There was an overall complication rate of 9.9%. Arterial puncture was the most common complication (4.7%), followed by hematoma (4.1%) and pneumothorax (1.2%). Veins most commonly used were internal jugular (51.8%), subclavian (26.5%) and femoral (21.8%) and each were associated with a complication rate of 7.9%, 9.4%, and 16.1%, respectively. **Conclusions:** Accurate documentation regarding CVC is quite limited. Strategies to improve documentation are needed to accurately monitor educational interventions to decrease complications associated with CVC. **Key Words:** Complications, Documentation, Central line, Central venous catheterization

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A comparison of the care profile of physicians and nurse practitioners in a community hospital emergency department

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Introduction: Physician shortages in Ontario have lead to the introduction of alternate care providers to care for lower acuity patients in Emergency Departments (EDs). Nurse practitioners (NPs) are independent primary healthcare providers with a defined scope of practice who work in cooperation with physicians in this setting. We examined the activities of emergency physicians (EPs) and NPs as well as the profile of patients seen by both provider groups in a community hospital ED. **Methods:** Data was collected at a single community hospital ED by research assistants who directly observed EPs and NPs for entire shifts and recorded their activities on a moment-by-moment basis for two separate one-week periods in 2006. Patients were categorized according to the five-point Canadian Triage and Acuity Scale (CTAS). The individual times of all activities associated with a given patient were summed to derive a directly observed estimate of the amount of provider time required to treat a patient. **Results:** 1,539 patients were observed. NPs only treated patients in the three lowest acuity categories. Data analysis was therefore confined to CTAS 3, 4 and 5 patients so that a direct comparison of EPs and NPs could be performed. Median (interquartile range) treatment time for CTAS 3, 4 and 5 patients cared-for by EPs was 18.5 min (12.4-28.9), 9.3 min (5.9-14.0) and 8.1 min (5.5-12.5), respectively. Treatment time for CTAS 3, 4 and 5 patients cared for by NPs was 25.1 min (19.5-40.2), 20.4 min (15.2-27.4) and 11.7 min (9.8-27.2), respectively. EPs treated an average of 3.2 patients/hour while the NPs treated 1.9 patients/hour. Total time spent in activities unrelated to patient care was not different between EPs (13.2%) and NPs (14.8%). **Conclusions:** NPs were able to successfully assess and treat lower acuity patients in a community ED. Treatment times for patients cared for by NPs were longer (p<0.05) in all CTAS categories, resulting in lower patient throughput than EPs. Patient outcomes and satisfaction were not assessed. **Key Words:** Nurse practitioners, Throughput, Treatment times

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CRITICAL care in Canadian emergency departments: a survey of CAEP members

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Introduction: Early and aggressive management has been demonstrated to improve outcomes in critically ill patients. However, little data is available on the management of critically ill patients in the ED. The goal of this survey is to characterize the provision of critical care in Canadian ED's. **Methods:** An internet-based survey was distributed to members of CAEP. Participants were asked to provide data on the management of critically ill patients in their ED including demographic data, and comfort level in the performance of various invasive procedures and vasopressor medications. In addition, barriers to the provision of critical care in the ED were explored. Pairwise and multivariate Wilcoxon rank-sum tests were used to compare categorical variables. **Results:** Of the 360 respondents (response rate 44.9%), 79.6% indicated that they managed >6 critically ill patients per month. Critical care consultants and respiratory therapists were commonly available (78.4%; 77.2% respectively). Emergency physicians were responsible for the management of critically ill patients awaiting transfer to an ICU either alone (21.9%) or jointly with the ICU service (50.0%). The majority of invasive procedures performed on critically ill patients were by emergency physicians. Physician comfort with invasive procedures and choice of vasopressor were closely related to their frequency of use in the previous year (p<0.05). Laryngoscopy and lumbar punctures were associated with the highest comfort levels; trans-tracheal jet ventilation and brachial arterial catheters the lowest. 93.2% of respondents indicated that EM physicians should provide critical care. However, barriers were common (77.6%), with the most frequent being "balancing ED flow" and "nursing skill at critical care procedures". **Conclusions:** Canadian EM physicians provide substantial critical care for patients in the ED. Barriers to the provision of critical care in the ED may influence management, and require further delineation to optimize patient outcomes. **Key Words:** Critical care, Resuscitation, Physician practice

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A consensus-established set of important indicators of pediatric emergency department performance

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Introduction: Quality assurance (QA) is a new and important area of research in pediatric emergency medicine (PEM). There are few studies that describe which performance indicators best represent PEM practice. This primary study objective is to construct a set performance indicators that have been selected by current and former pediatric emergency department (PED) medical directors as most useful in assessing PED performance. The secondary objective is to assess which indicators are measured to assess performance in PEDs. **Methods:** Current and former directors of accredited Canadian PEM programs were considered eligible participants. A list of indicators was generated by survey (item pool generation); this list was refined by clarifying unclear terms or eliminating redundant and unquantifiable performance indicators (item scaling); PED directors were asked to rate each item of this refined list to indicate which indicators were more useful in assessing PED performance (item prioritization). A ranking formula was used to prioritize those items considered most useful by a larger proportion of respondents. **Results:** 14 current and former medical directors were considered eligible participants. Indicators related to patient morbidity and mortality, adverse outcomes, return visits, patient length of stay (LOS), and waiting times were considered to be more useful. Less useful indicators included the number of deaths, daily census, number of incident reports, and individual physicians' admission rates. The most commonly measured PED performance indicators included the left without being seen rate, patient LOS, and the waiting time until being seen by a physician by triage category. **Conclusions:** The top quartile of performance indicators considered most useful by participants included indicators that reflected clinical outcomes, LOS, and waiting times. A dichotomy may exist between those performance indicators that PED directors are considered more useful, and those indicators that are currently measured. **Key Words:** Quality assurance, Performance indicators, Pediatric

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CHILDREN admitted to the hospital after returning to the emergency department within 72 hours

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Introduction: Children returning to the Emergency Department (ED) within 72 hours after their visit may increase overcrowding and healthcare costs. Some of the returning children need admission. Identifying characteristics of these children may help distinguish who might need admission on their first visit. The objective of this study was to comparing characteristics of children who returned to the ED and needed admission to those discharged. **Methods:** A retrospective chart review of children under age 19 years visiting our tertiary pediatric ED over a one year period. We excluded patients who left without being seen and against medical advice. We determined the rate of return visits, and then performed Chi square and Student's t-test analyses. The main outcome measures were returning to an emergency department and needing admission to the hospital. **Results:** Of 47,655 eligible children, 2115 (4.4%) had return visits to the ED within 72 hours. The admission rate for the second visit was 353 (16.7%). There was no significant difference in age, gender, language spoken at home or time elapsing from the first visit to the presentation again in the ED between children admitted on the first versus second visit. The acuity was significantly lower among children discharged after returning ($p<0.001$), but not among those admitted ($p<0.220$). **Conclusions:** Four percent of our pediatric ED visits are for children returning within 72 hours. Progression of illness resulting in higher acuity, not age, gender, time from previous visit or change in chief complaint category, was directly associated with admission on the second visit. **Key Words:** Return visit, Pediatric

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AGREEMENT of a computerized triage tool using written case scenarios

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Introduction: Emergency department (ED) triage prioritizes patients based on urgency of care. A web-based triage tool (eTRIAGE©) has been developed with Canadian Triage and Acuity Scale templates and studied in an active clinical setting. Some authors also advocate the use of written case scenarios to evaluate triage. This study examined the agreement between nurses using eTRIAGE© with written patient case scenarios, and agreement between these nurses and a consensus standard triage score. **Methods:** Volunteer experienced triage nurses were recruited for this study. Each nurse was provided 50 written case scenarios and used eTRIAGE© to arrive at a triage score. The cases were representatively balanced between CTAS 1 through 5, and the nurses evaluated triage notes and vital signs but were blinded to identifying characteristics or the other nurses' triage. These scores were compared to each other and to a consensus score using the weighted and unweighted kappa (κ) statistics. **Results:** Eight triage nurses volunteered for this project; all completed the 50 cases. An experienced emergency nurse and two emergency physicians generated the consensus scores. Agreement was very good among the eight nurses (overall $\kappa = 0.73$; 95%CI: 0.69, 0.77). When compared to each other, the agreement was excellent (mean quadratic weighted $\kappa = 0.88$; 95%CI: 0.61-1.00). When compared to the consensus scores agreement was excellent (mean quadratic weighted $\kappa = 0.91$; 95%CI: 0.77, 1.00). **Conclusions:** Nurses using eTRIAGE© to evaluate written patient scenarios had good to excellent inter-rate agreement and excellent agreement when compared to a triage score generated by consensus. Further research to create this degree of agreement in the live setting is needed. It is also unclear what amount of training and experience with eTRIAGE© is required to become competent or to maintain competence. **Key Words:** Triage, Reliability, Computerized

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DEVELOPMENT of a standardized diagnosis list for use in Canadian emergency departments

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Introduction: Monitoring and managing Emergency Departments (EDs) would benefit from reliable data using a standardized ED specific diagnosis classification list (DCL). EDs across the country use a variety of heterogeneous lists. This study's objective was to use a national consensus process to develop a standardized DCL that could be used by ED personnel to prospectively code patient diagnoses (Dx) in Canadian EDs. **Methods:** A modified Delphi method was employed to develop the DCL from the ICD10-CA, including over 17,000 Dx. Emergency physicians from across Canada were provided with a randomly selected chapters and were asked to rate the importance of including each Dx using a Likert scale. All Dx with a reviewer consensus

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of importance of 70% or more were retained in round 1. In round 2 of the Delphi, reviewers assessed only the Dx which did not achieve a strong general consensus (50% to 70%) and those that had achieved a consensus only among paediatric emergency based reviewers. The research team reviewed the results for inconsistencies. **Results:** The Delphi Round 1 was completed by 83 participating MDs. The reviewers averaged 12 years of experience in emergency medicine, with 63% working in a tertiary care hospital and 26% serving as chiefs of departments. Delphi Round 2 was completed by 69% of the reviewers and resulted in the addition of 26 items for a total of 1416 Dx for the detailed DCL. The chapter with the largest number of retained items was injury and poisoning. This was followed by the gastrointestinal, musculoskeletal and infectious disease chapters. **Conclusions:** We report the creation of a DCL tailored for EDs developed through a consensus mechanism involving 83 ED physicians from across Canada. This should allow tertiary and academic hospitals to prospectively code ED visits without the need for retrospective coding by nosologists. A shorter and less detailed list applicable to most EDs is being finalized. **Key Words:** Discharge diagnosis, ICD-10

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ED overcrowding: a comparison of urban vs rural EDs

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Introduction: The prevalence and severity of emergency department (ED) overcrowding in larger urban centers in Canada has recently been reported. Its role in smaller and rural EDs is less clear. The objective of this study was to explore the degree of severe or major overcrowding in rural EDs. **Methods:** ED Medical Directors at 102 Alberta sites, located in rural or urban communities were surveyed with a 29-item paper-based questionnaire in the fall of 2006. Data relevant to ED administration were obtained from Alberta Health and Wellness registries. Data are compared using chi-square and T-tests, where appropriate. **Results:** Overall, 83.3% directors from 17 urban and 85 rural sites responded. The median number of patient visits to urban/teaching hospitals was 17,500 (IQR: 13,000, 30,186), significantly ($p = <0.00001$) higher than 11,488 (IQR: 5756, 21,974) of rural/non-academic hospitals. Factors such as community size (rural/non-academic: <50,000 vs. urban/teaching: >50,000) and access block to admitted beds (26% vs. 65%; $p = <0.00001$) were similarly different. Among them, 67% from urban and 19% from rural hospitals ($p = <0.00001$) reported overcrowding as a major or severe problem during the past year. A similar difference was reported by 57% and 19% directors from teaching and non-academic hospitals ($p = 0.00255$), respectively. While directors from rural areas commented a lack of alternatives to the ED (after-hours clinics, office availability) to be a significant contributing factor to ED overcrowding, urban ED directors attributed the ED overcrowding problem to a lack of admitting beds. **Conclusions:** In urban and teaching EDs in Alberta, overcrowding is a serious problem; however, it is much less of an issue for EDs in rural areas. Moreover, the perceived contributing factors to the problem were differed between rural and urban sites. Hence, solutions for resolving ED overcrowding in rural and urban areas may require different policies and interventions. **Key Words:** Overcrowding, Rural

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BILLING comparisons between fee-for-service and alternative-funding-arrangement emergency physicians in Ontario

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Introduction: This study compared the billing patterns of Emergency Department (ED) physicians working in both fee-for-service (FFS) and alternative-funding-arrangement (AFA) practices. The study hypothesis was that AFA physicians bill less efficiently than do their FFS counterparts. **Methods:** A series of hypothetical paper case sets were generated with variations in chief complaints, acuity, time of day, management plans and disposition. Case sets were given to two groups (one FFS, one AFA) of EM physicians in an academic teaching center. Participants in each group billed the cases based on the information documented, using the current Ontario Schedule of Benefits codes. Demographic variables for correlation testing included total years in practice, and years elapsed since last working in an FFS environment. Analyses included descriptive statistics of case billings between groups, and frequency of billing errors. **Results:** A total of 27 cases were completed by 17 FFS physicians, and 37 cases by 27 AFA physicians. In both groups, there was considerable variation in use of billing codes and mean billings per case. AFA physicians were considerably lower in average billings per case compared to FFS physicians, especially in the use of resuscitation vs. standard assessment codes. AFA physicians were also less likely to utilize appropriate specialized procedure codes, and made more mistakes using inappropriate billing codes and premiums. There was a correlation of optimal use of billing codes and time elapsed from practice in an FFS environment. **Conclusions:** AFA EM physicians are less efficient than their FFS counterparts in optimal use of OHIP billing codes in this paper case exercise. AFA physicians are less likely to bill appropriate codes in resuscitative/procedural situations, and use of premiums. Since the majority of Ontario ED's are under AFA remuneration, these results illustrate potentially serious problems in billing practices and shadow-billing revenues generated. **Key Words:** Billing, Fee-for-service, Alternate payment

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PATIENT flow and bed capacity as causative factors in ED overcrowding

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Introduction: ED crowding, better termed access block, occurs when there are more patients requiring care than available ED stretchers. Access block is usually attributed to inadequate hospital capacity (lack of beds), but patient flow may be equally important. The difference between patient demand (number of patients needing care) and available ED stretcher capacity can be described as capacity deficit. Our objective was to quantify ED capacity deficits as a proxy for hospital bed shortfalls, and to determine the potential importance of flow dynamics vs. bed capacity in 3 urban hospitals. **Methods:** For a one year period, our regional data support group used arrival and discharge times for 166,000 ED patients to determine the number of patients present in each ED every hour of every day. Hourly ED census was then compared to ED stretcher capacity to determine ED capacity deficit. **Results:** Hourly ED census patterns and capacity deficits were highly predictable and consistent across all sites. At all sites, by mid morning, patient inflow exceeded outflow, causing ED census and capacity deficit to rise. Capacity deficits peaked in early evening, after which outflow began to exceed inflow, allowing census and capacity deficits to fall. Average capacity deficit, the difference between ED census and available care spaces, ranged from –1 (one extra stretcher) to +15, depending on time of day (table). On average, hospitals had small capacity deficits at night and large deficits during the day. **Conclusions:** Patient census and capacity deficits are highly predictable across diverse sites and differ by time of day, showing that imbalance between inflow and outflow is an important cause of ED crowding. Small capacity deficits at night suggest that ED crowding may be

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more related to poor flow than to hospital bed shortages. Strategies aimed at enhancing flow will profoundly mitigate ED overcrowding. **Key Words:** Access block, Capacity deficit, Overcrowding

Table 1, Abstract 206. Average deficit by hour of day

Site	0600	1200	1800	0000	Best	Worst
LGH	0	12	13	5	0	15
VGH	0	11	14	10	0	15
SPH	-1	10	11	4	-1	12

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UTILIZATION of computed tomography angiography in the diagnosis of acute pulmonary embolus

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Introduction: The purpose of this study was to assess appropriate use of Computed Tomography Angiography (CTA) in the diagnosis of acute pulmonary embolism (PE). **Methods:** Review of 580 inpatient (45%), ED (41%) and outpatient (14%) CTAs evaluating for PE at a large US teaching hospital from Jan 04 through Mar 05. Based on chart review blinded to final diagnoses, PE pretest probability using Wells criteria was retrospectively assigned. D-dimer values (if obtained) were also reviewed. **Results:** The overall PE rate was 10%; rates by location were 12% inpatient, 8% ED and 1% outpatient. Only 3 patients (<1%) were high probability; 2 of these had PE (67%). Of the remaining 577, 48% were intermediate and 51% were low probability. In these two groups, the PE rate was 14% and 5%, respectively. D-dimer was only ordered on 39% of patients; 17% were negative (<0.5), 47% intermediate (0.6-2.0) and 36% positive (>2.0). Only 1 patient with a negative D-dimer and 3 patients with intermediate D-dimers had PE but 146 CTAs (25% of the total) were obtained in these two groups. Of the ED patients, 21 had PE (9%). Rates by probability group were 50% high, 15% intermediate and 2% low. D-dimer was drawn on 59% of ED cases; 21% were negative, 54% intermediate and 25% positive. The PE rate was 50% in the positive group and 3% in both the negative and intermediate groups. **Conclusions:** CTA is fast, diagnostic and widely available for evaluation of acute PE. Wells criteria stratify patients and guide the PE workup. Our data show suboptimal use of Wells criteria and subjective overestimation of PE probability prior to CTA. Negative D-dimer also does not deter unnecessary CTA. This represents a paradigm shift in which clinical tools are supplanted by imaging that, while noninvasive, is not without cost or risk. While no definitive acceptable positivity rate for CTA has been established, we feel 10% represents inappropriate use of CTA as a screening rather than diagnostic test, equating to ineffective resource utilization and unnecessary radiation exposure. **Key Words:** Computed tomography angiography, Pulmonary embolism, D-dimer

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PERCEIVED barriers and facilitators to the implementation of the Canadian C-spine rule by emergency department nurses

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Introduction: Currently, ED nurses are validating use of Canadian C-Spine Rule (CCR) in 6 Ontario hospitals. We sought to determine the potential barriers and facilitators to actual implementation of the CCR by ED nurses to clinically clear the c-spine of minor trauma patients. **Methods:** As part of a prospective validation study, we conducted a mail survey using a modified Dillman technique. Included were all ED nurses who had been trained to evaluate the CCR at 4 community and 2 teaching hospital EDs. These nurses had evaluated the CCR on alert and stable trauma patients for 18 months prior to the survey. Questions included practice patterns, application of the CCR, aids to applying the CCR, and the opportunity to list additional barriers and facilitators. We calculated descriptive and univariate analyses as appropriate for the data. **Results:** The 86 respondents, representing a 46.9% response rate, had these characteristics: female 77.9%, mean years in nursing 20.0, mean years in ED 10.8, community hospital nurses 37.2%, and full time 62.8%. Among the nurses, 90.7% (95% CI 82-95%) responded that they were comfortable applying the CCR and 88.4% (95% CI 79-93%) indicated that the CCR was easy to use. Other responses included:

1. Useful to my practice 94.2%
2. Easy to remember 87.2%
3. Efficient use of my time 95.4%
4. Not safe for patients 14.0%
5. Not nurses role to apply CCR 19.8%

Examples of potential facilitators included: "improved overall triaging", "good MD support", "speeds patient removal from boards and discharge", and "good peer support". Barriers included "fear of making a mistake", "perceived lack of time", and "lawsuits". **Conclusions:** The majority of ED nurses are comfortable applying the rule and feel it is useful to their practice suggesting great potential for nurses to clinically clear the C-spine. Prior to successful widespread implementation, potential barriers will need to be addressed. **Key Words:** Decision rules, C-Spine, Implementation

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CLINICAL predictors of high risk transient ischemic attack

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Introduction: Patients with transient ischemic attack (TIA) are at increased risk for a stroke. It is not clear which ED patients with TIA require expedited investigations and management. This study assessed the incidence of patients returning to the ED with a TIA/stroke within 6 months of index visit. **Methods:** We conducted a one-year historical cohort study at a university-affiliated tertiary care ED (census 60,000 visits/year). All patients with weakness, TIA or stroke were screened. We enrolled all patients with an ED diagnosis of TIA. Data was extracted from paper/electronic records to data extraction forms. Clinical findings, medications and tests were recorded. Data was inputted into a database using Statistical Analysis System (SAS) software. Descriptive analyses were conducted for the primary outcome of recurrent TIA/stroke within 6 months of the index ED visit. **Results:** 211 patients were enrolled in the study. The patients had the following characteristics: mean age 71.2 years (SD 13.8), 56.9% female, 53.1% hypertension, 26.5% ischemic heart disease, 17.1% stroke, 16.6% previous TIA, 15.2% diabetes mellitus, and 6.2% smokers. 41.2% of patients had unilateral arm weakness. 94.3% of patients underwent CT head, of which 16.1% demonstrated an acute/previous infarct. 32.7% of patients were treated with ASA, 23.7% with dipyridamole/ASA, 8.1% with clopidogrel and 6.6 % with warfarin. 34.1% were on a statin lipid-lowering agent and 59.2% were on antihypertensives. TIA was confirmed by neurology in 76.9% of referred patients. Subsequent TIA/stroke within 6 months occurred in 16.1% of patients, of which 47.1% were completed strokes. **Conclusions:** This study established that a relatively large number of TIA patients have subsequent TIA/stroke within 6 months of initial diagnosis. A clinical decision rule is needed for ED patients with TIA to identify patients at high risk of an impending subsequent event to ensure prompt testing and optimal risk reduction. **Key Words:** Transient ischemic attack, Stroke, Outcomes

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OPTIMAL use of diagnostic imaging for ED patients with cough

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Introduction: There are no reliable criteria to determine which ED patients with cough require diagnostic imaging. We sought to identify criteria that would allow ED patients with cough to be exempt from diagnostic imaging. **Methods:** We conducted a health records review of adult patients presenting with cough to a tertiary care hospital ED during a 12-month period. We abstracted data from the history and physical examination findings and compared to chest x-ray results as determined by both the ED physicians and by staff radiologists. Data analyses included chi-square, Student's t-test, and kappa statistic. **Results:** Of 528 patients with cough, we enrolled 354 who had a chest x-ray: mean age 52.9 years, male 48.3%, abnormal chest x-ray 45.8%, admission 15.5%, return to ED within 14 days 4.2%. Variables significantly associated (P<0.05) with abnormal x-rays included history of fever, abnormal chest exam, age >= 65, male gender, oxygen saturation <= 90%, and temperature >=38. Variables not associated with abnormal x-ray were green sputum, bloody sputum, shortness of breath, heart rate. A combination rule of age < 65, temp < 38, oxygen saturation > 90%, and normal chest exam identified abnormal chest x-ray with 86.4% sensitivity and 44.3% specificity and would have decreased the need for imaging in 30.2% of cases. We found an excellent agreement between ED physicians and radiologists (kappa = 0.86) in their interpretation of chest x-rays. **Conclusions:** We identified predictive factors for an abnormal chest x-ray among patients with acute cough and could limit the use of imaging to patients with age > 65, temperature > 38, oxygen saturation < 90%, and abnormal chest exam. We also found excellent agreement between ED physicians and radiologists in chest x-ray interpretation. This acute cough rule must be supported by a prospective validation study prior to clinical use. **Key Words:** Decision rule, Cough, Chest x-ray

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DOES a clinical decision rule guide physician decision-making? a vignette-based study

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Introduction: To examine if ankle injury radiography decisions are governed by the Ottawa Ankle Rules (OAR). Some rules are reportedly widely used, yet physician self-report on issues like this can be unreliable. Our vignette-based study examined whether radiography decisions for realistic ankle injury scenarios are based on clinical findings that are part of the OAR (Rule-based findings) or others (Non-Rule-based findings). We tested two hypotheses: 1) Physicians should put greater weight on Rule-based findings than Non-Rule findings; 2) Findings used in decision making will differ between older and younger subgroups of physicians. **Methods:** Our postal survey to 240 Canadian emergency physicians included 20 case vignettes of patients with ankle pain. Each vignette described 8 clinical findings known to affect ankle radiography ordering. Respondents estimated the likelihood they would order an ankle x-ray for each case. Using these data, we inferred – for each physician – the weight they placed on each of the 8 findings in making their decision. Two findings were part of the OAR, 3 were predictive of fracture but not in the rule, and 3 were non-predictive. **Results:** There were 116 responses (48% response rate). 1) Weights for Rule-based findings differed from 0 for 91.6% of respondents; for Non-Rule predictive findings, 12.7%, and for Non-Rule, Non-Predictive findings, 5% (Rule vs. others: p < .001). 2) Younger physicians (<7 years post-graduation) differed from the oldest physicians (19+ years) in that they placed less emphasis on one Rule indicator (p=.013), and greater emphasis on one Non-rule predictive indicator (p=.015). **Conclusions:** Physicians placed greatest emphasis on the two clinical findings that are part of the OAR. Younger physicians differed from more experienced physicians in their use of specific clinical findings, suggesting areas for targeted training. This methodology is useful for understanding how CDRs fit into the decision making processes of individual physicians. **Key Words:** Decision rule, Ankle x-ray

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DELAYED transfer times of injured patients within a trauma system

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Introduction: Regionalization of trauma services is based on the idea that injured persons at non-tertiary facilities will be stabilized and rapidly transported to a more definitive center. Trauma systems seem to improve outcomes for urban patients, but this same benefit has not been shown for rural patients. There are many factors associated with the decision to transfer injured patients including referral hospital and patient age for example. The purpose of this study is to examine factors that influence the timing of transfer of trauma patients and specifically to determine if establishing specific trauma systems has led to any changes over time. **Methods:** All trauma patients at the University of Wisconsin between 7/1/99 and 6/30/05 with an ISS>9 who had been transferred to UW after evaluation at an outside hospital were included. The variables considered were age, referring hospital, emergency department time at referring hospital, ISS, the presence of a head injury, performance of a head CT, mode of transport, and the date of ED evaluation. **Results:** There were 1,656 patients. The average ED time was 153±82 minutes. ED time was significantly shorter for those with ISS scores >25 and for those transported by helicopter. 30% of patients had a head CT performed before transfer, of which 44% were repeated at the trauma center. The average ED time for those in whom a CT was performed was longer than those without (179±81 minutes vs. 142±84). The ED times were slightly longer for level 3 hospitals (158±82 minutes) than for level 4 hospitals (137±74 minutes). ED times were longer for older patients. The times in the ED showed an upward trend. After controlling for all other variables, ED times were not significantly different over the time period studied. **Conclusions:** Development of a statewide trauma system and outreach education has not affected transfer times from nontrauma centers in our system. Outreach education should focus on systematic trauma evaluation, prompt transfer and limitation of nontherapeutic testing. **Key Words:** Trauma services, Transfer times

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CHILDREN are not crash dummies – a surveillance of road traffic injuries in children in Singapore

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Introduction: To study the patterns of injuries sustained in children involved in road traffic accidents in Singapore. **Methods:** 522 children aged 0-16 years, who attended the Emergency Departments in the Singapore Health Services network for injuries caused by road traffic accidents from Feb 2002 to Jan 2004 were surveyed as part of the Childhood Injury Surveillance Project. Data on type of road user, mechanism of injury, injuries sustained and injury severity were collected via the use of questionnaire forms, review of in-patient records and coroner's reports. Data was recorded using the International Classification of External Causes of Injury Codes. **Results:** There were 522 children who sustained injuries from road traffic accidents in Singapore during the study period. Most of the children were

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pedestrians (46.6%), car passengers (25.2%) and on bicycles (13%). The commonest serious injuries sustained were limb fractures (10.1%), skull fractures (3%) and intracranial haemorrhage (2.9%). There were 13 deaths (2.5%) and 6.1% of the children required admission to the High Dependency or Intensive Care Unit. 61.5% of the deaths were among pedestrians. Pedestrians sustained the most severe injuries with the highest mean Injury Severity Score (ISS) of 7.55 followed by cyclists with a mean ISS of 6.59. In children with an ISS greater than 20, 44.4% had skull fractures and 18.5% had intracranial hemorrhage. At least 36.6% of car passengers did not have any form of safety restraint. **Conclusions:** Road traffic injuries involving children can be severe and life threatening. The cost of healthy lives lost is immeasurable and it is important to implement injury prevention strategies focusing on road and bicycle safety to reduce unnecessary mortality and morbidity caused by injuries on the roads. **Key Words:** Trauma, Traffic accidents, Pediatric

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PREGNANCY testing in female trauma patients: a retrospective chart review

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Introduction: In female trauma patients of child bearing age, it is imperative to quickly determine pregnancy status. Trauma is the leading cause of non-obstetrical morbidity and mortality in pregnant females. Identifying a patient as pregnant may have implications for interpretation of vital signs, resuscitative maneuvers, investigation and management of conditions unique to the pregnant female such as placental abruption. The Hamilton Health Sciences (HHS) Trauma program is referred patients from 25 hospitals and keeps a database on patients with an Injury Severity Score greater than 12. This study will determine the number of female trauma patients being tested for pregnancy. **Methods:** A retrospective chart review of all female trauma patients 16 to 50 years old in the HHS Trauma database for January 1, 2004 to December 31, 2005 was completed. These patients were manually cross referenced with MediTech, the hospital lab system, for urine and serum BHCG tests within 24 hours of triage and during admission. Charts with no BHCG test were examined by 1 reviewer for a BHCG done elsewhere or documented inability to be pregnant. The results were also compared to a similar analysis at the same centre performed in 2004 for January 1, 2002 to December 31, 2003 using a Chi-square test of independence. This study was approved by the HHS Research Ethics Board. **Results:** In 2004 and 2005, 118 patients met the inclusion criteria. Sixty-eight (58%) were found to have BHCG tests or documented inability to be pregnant within 24 hours of triage. The proportion of patients being tested for pregnancy did not improve from the 2002 to 2003 period compared to the 2004 to 2005 period (49% versus 54%, p = .14). Three (4%) of the 73 patients with BHCG tests during their admission were pregnant. Based on this 4% incidence of pregnancy, 2 to 3 pregnancies may have been missed during this 2 year period. **Conclusions:** Further efforts are required to improve the detection of pregnant trauma patients to optimize their care. **Key Words:** Trauma, Pregnancy, bHCG

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INJURIES sustained in a MVC do not prevent subsequent impaired driving

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Introduction: Motor vehicle crashes (MVCs) kill over 2,700 Canadians annually. Drivers with an illegal blood alcohol content (BAC) cause 34% of all crashes involving fatalities. The objective of this observational study was to determine the proportion of injured drivers treated in hospital, categorized by BAC, who subsequently engage in impaired driving activity (IDA). **Methods:** We retrospectively identified all drivers injured in a MVC who presented to our tertiary care, urban Emergency Department (1999-2003) or were registered in our provincial trauma registry (1992-2005) and had a BAC measured. Injured drivers were categorized into three groups (Gp) according to their BAC: Gp 1: BAC=0, Gp 2: 0<BAC<=17.3 Gp 3: BAC > 17.3 (BC legal limit >17.3 mmol/L (80 mg/dl)). IDA was determined from police records (1989-2005), and defined as any of the following: a conviction for impaired driving; a 24 hour or 90 day license suspension for impaired driving; involvement in a MVC where police listed alcohol as a factor; or presentation to a hospital following an MVC with a BAC above the legal limit. **Results:** 3366 drivers met inclusion criteria: 189 in Gp 1; 310 in Gp 2; and 1074 in Gp 3. IDA following the index hospital visit was identified in 189 drivers in Gp 1 (9.5%, 95%CI 8.3%-10.9%); 70 drivers in Gp 2 (22.6%, 95%CI 18.2%-27.5%, p<0.001 vs group 1); and 344 drivers in Gp 3 (32.0%, 95%CI 29.3%-34.9%, p=0.001 vs Gp 2). Only 8.7% of the drivers in Gp 3 were convicted of impaired driving as a result of their index crash. Many drivers had engaged in IDA prior to their index crash: 15.2% in Gp 1 (95%CI 13.7%-16.9%), 32.9% in Gp 2 (95%CI 27.8%-38.3%); and 54.2% in Gp 3 (95%CI 51.2%-57.2%). **Conclusions:** A significant proportion of injured drivers treated in hospital following an MVC engage in subsequent IDA. This is particularly true for those with a BAC above the legal limit. These findings support the need for rehabilitation programs and increased legal efforts to target high risk drivers treated in hospital after a MVC. **Key Words:** Blood alcohol levels, Motor vehicle collisions

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DO non-helmeted cyclists use more emergency department and hospital resources?

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Introduction: This study of injured cyclists presenting to the emergency department (ED) assessed whether ED and in-hospital resource utilization varied by helmet use. **Methods:** A retrospective case series of all patients presenting to the ED of Kingston General and Hotel Dieu Hospitals in Kingston, Ontario with bicycle related trauma in the 2002 and 2003 fiscal years. Cases were identified using the Canadian Hospitals Injury Research and Prevention Program (CHIRPP) database. Information on each patient's management within the ED was obtained by linking the CHIRPP data with the National Ambulatory Care Reporting System database. Inpatient data for all inpatient days, critical care/ICU days, ventilation and discharge disposition were obtained from the hospitals' inpatient databases. **Results:** 885 cycling injury events were treated during the study period. 36.8% reported wearing helmets at the time of injury. Non-helmeted cyclists were more likely to arrive via ambulance than helmeted cyclists (16.1% vs. 9.8%; p=0.005). Non-use of helmets was associated with more severe head injuries (37.0% vs. 19.8%; p=0.014). There was also greater use of ED-based procedures (p<0.001), and specialty consultation (p=0.014) in patients not wearing a helmet. There were no deaths in this sample. 35 persons required hospital admission and this varied little by helmet use. Yet important differences were apparent for in-hospital resource utilization. Length of stay was longer for non-helmeted cyclists (4.0 days vs. 2.5 days; p=0.002). All seven cyclists requiring ICU care received mechanical ventilation, and were non-helmeted. **Conclusions:** Utilization of ED-based and hospital resources is greater in cyclists who were not wearing helmets at the time of injury. This study suggests that successful injury prevention strategies targeted at increased helmet use would reduce overall costs of medical care for injured cyclists. **Key Words:** Bicycle injuries, Helmets, ICU

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