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Oral Presentations
(Abstracts #1 to #58)

1

Faster ALS response intervals may improve cardiac arrest survival.

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INTRODUCTION: To date, no evidence exists to support a survival advantage of advanced life support (ALS) measures in prehospital cardiac arrest. The objective of this study was to analyze survival as a function of ALS response intervals (ALSRI). METHODS: This prospective cohort study included all adult, cardiac etiology, prehospital cardiac arrests occurring prior to EMS arrival in the 17 communities of Phase III of the Ontario Prehospital Advanced Life Support (OPALS) study. All centers provided a tiered EMS response of basic life support (BLS) with defibrillation by ambulance and firefighters and ALS by medics trained to intubate and administer cardiac drugs. All case and survival definitions followed the Utstein style. Survival to hospital discharge was plotted as a function of the ALSRI. Chi square and logistic regression analyses identified the association between incremental ALSRIs and survival. RESULTS: From 1998–2002, there were 3545 arrests managed by ALS paramedics. There were 138 (3.9%) survivors overall. Mean response intervals for ALS and BLS were 7.7 and 5.9 minutes with ALS arriving first in 32% of arrests. The survival curve began to plateau after 6 minutes. Patients responded to earlier had incrementally better survival. Univariate analysis indicated that faster ALSRIs were significantly associated with survival (%; 95% CI): 6 min (5.0%; 3.8–6.3); 5 min (6.4% 4.6–8.2); 4 min (8.1%; 5.1–11.1); 3 min (8.2%; 3.1–13.3). Controlling for known covariates, multivariate analysis provided an adjusted odds ratio of survival for an ALSRI of ≤6 min of 1.6 (95% CI 1.1–2.3). CONCLUSIONS: Faster ALS response may increase the chances of survival despite no improvement on overall cardiac arrest survival through the addition of ALS to a system of rapid defibrillation. This association is similar to that previously identified for BLS and most likely results from quicker times to basic CPR and defibrillation. However, further study is required to identify if other factors may contribute. Key words: cardiac arrest; emergency medical services; advanced life support

2

OPALS pediatrics study: What is the impact of advanced life support on out-of-hospital cardiac arrest?

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INTRODUCTION: The Ontario Prehospital Advanced Life Support (OPALS) Study is designed to evaluate EMS interventions for critically ill and injured patients. The OPALS Pediatric Study tested the impact on children with out-of-hospital cardiac arrest of adding a full ALS program to existing BLS-D EMS systems. METHODS: This multi-center before-after controlled clinical trial was conducted in 17 communities (population 20,000 to 750,000) and enrolled all children (<16 years of age) with out-of-hospital cardiac arrest 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. The primary outcome was survival to hospital discharge. Standard univariate chi-square and t-test analyses were performed. RESULTS: The 163 children enrolled during the BLS-D (N = 91) and ALS (N = 72) phases were well matched and had these characteristics: mean age 3.3 (range 0–15), male 52.87%, respiratory etiology 65.6%, unwitnessed 73.6%, bystander CPR 18.4%, initial rhythm not recorded 86.5%, defibrillator at scene <8 minutes 85.0%, defibrillated 1.8%. During the ALS phase, intubation was only attempted for 8 children with 87.5% success; intravenous access was only attempted for 14 children with 50% success. From the BLS-D to the ALS phase, there was no increase in any outcome including hospital discharge (3.3% vs. 2.8%; P = 0.85), hospital admission (11.0% vs. 12.5%; P = 0.61), or return of spontaneous circulation (11.0% vs. 13.0%; P = 0.69).

There was no survival improvement for any subgroup including cases witnessed by bystander (10.5% vs. 0%; P = 0.25) or by EMS (20.0% vs. 0%; P = 0.34); BLS vs. ALS paramedic (4.1% vs. 1.5%; P = 0.36). CONCLUSIONS: The OPALS Pediatric Study is the first controlled trial to evaluate full ALS programs for out-of-hospital cardiac arrest in children. The addition of a system-wide EMS ALS program did not improve pediatric survival although few children actually received ALS interventions. Key words: cardiac arrest; pediatric; advanced life support

3

The clinical reliability and validity of CTAS among British Columbia ambulance service paramedics.

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INTRODUCTION: The Canadian Triage Acuity Scale (CTAS) is a five-point triage ordinal scale used in Canadian EDs. The British Columbia Ambulance Service CTAS propose using CTAS as a tool to identify patients who could be left unsupervised in the ED prior to admission. We sought to evaluate the clinical inter-rater reliability and criterion validity of CTAS used by paramedics. METHODS: Driving and attending paramedics who received CTAS training and worked in the Greater Vancouver Regional District (GVRD) from March 8 to 25th, 2004, independently recorded CTAS scores for patients transported to hospital. Kappa statistics were calculated to measure agreement between the driver and attendant. A subset of these data, patients transported to St Paul's Hospital (SPH), were linked using a unique identifier to a computer derived CTAS score. Spearman's correlation coefficient measured criterion validity. Sample size was determined a priori. RESULTS: 2710 patients (69% of all transports) had paired CTAS scores. BLS paramedics evaluated 92% of the patients. Overall probability of agreement between the driver and attendant was 0.82 (0.81 – 0.84). Unweighted kappa was 0.75 (0.73 – 0.77) and quadratically weighted kappa was 0.87 (0.85 – 0.88). Agreement among the BLS paramedics was similar to the agreement within the ALS paramedics: unweighted kappa BLS = 0.74 (0.72–0.76) and ALS = 0.81 (0.74–0.88). Probability of exact agreement for the least acute category (CTAS 5) was 0.64. Agreement between driver and attendant was excellent (unweighted kappa score 0.77) for the 419 patients transported to SPH. However, correlation between paramedic and computer score was 0.44 (0.36–0.52). CONCLUSION: The clinical inter-rater reliability of CTAS is very good between paramedics, but criterion validity is only moderate suggesting that paramedic generated CTAS scores do not adequately distinguish between patients who do and do not require paramedic supervision prior to ED admission. Key words: triage; CTAS; emergency medical services

4

Is the cerebral performance category score a valid measure of functional outcome after out-of-hospital cardiac arrest?

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INTRODUCTION: The Cerebral Performance Category (CPC) score measures functional outcome following cardiac arrest but there are few data regarding its validity. We studied the accuracy of the CPC score in predicting health-related quality of life (HRQL). METHODS: This prospective substudy of the Ontario Prehospital Advanced Life Support (OPALS) Study included adult out-of-hospital cardiac arrest patients treated in 20 cities with a mixed BLS-D/ALS EMS system. Survivors were interviewed at 12 months for both CPC and the Health Utilities Index Mark 3 (HUI3), a validated measure of HRQL. CPC is a simple measure of function that ranges from 1 (best) to 5 (brain death) and can be obtained from the hospital chart. HUI3 evaluates quality of life from 0 (dead) to 1.0 (perfect health) and requires a detailed interview and calculation. Data were also collected from ambulance, dispatch, ED, and hospital records. Data analyses included descriptive statistics, 95% CIs, sensitivity, specificity, and kappa statistics. RESULTS: Of 20,867 cardiac arrest patients (1994–2002), 1056 (5.1%) survived to discharge, and 305 (1.5%) completed the HRQL interview and had CPC scored at 12 months. Of the 305 patients: mean age 63.9; male 78.0%; EMS witnessed arrest 25.6%; bystander CPR 32.1%; initial rhythm VF/VT 86.9%. Overall, the median scores were CPC 1 (IQR 1–1) and HUI3 0.84 (IQR 0.61–0.97). For each CPC score, the median HUI3s were (see Table 1, Abstract 4):

Table 1, Abstract 4

CPC	No.	%	HUI3	IQR
1	267	87.5	0.91	0.69–0.97
2	26	8.5	0.28	0.06–0.45
3	12	3.9	–0.02	0.20–0.36

Sensitivity of CPC score 1 for good HRQL (>0.80) was 61.8%, specificity 78.9%. Sensitivity of CPC score 3 for poor HRQL (<0.40) was 77.8%, specificity 100%. The weighted Kappa was 0.29. CONCLUSIONS: This is the first study to compare the CPC score with the well-validated HUI3 and demonstrates that most survivors have CPC score 1. An important problem for cardiac arrest research is the limited ability of CPC to discriminate at the high end of quality of life. Key words: cardiac arrest; outcomes; quality of life

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CAEP research grants competition: an evaluation of effect and growth over seven years.

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OBJECTIVE: Research funding for Emergency Physicians has been problematic in the past and separate research funding has been proposed by several organizations. This study examines the scholarly outcomes of the projects receiving CAEP Research Grants over its first 7 years of funding. METHODS: From 07/02–10/02, E-mail surveys were sent to 40 lead investigators funded by the national research program between 1997 and 2003. Data collection focused on grant deliverables (project completion, presentations and publications) and opinions regarding the value of the award (1–7 Likert scale). E-mail contact was made with the investigator and up to three reminders were sent. RESULTS: A total of 39 (97%) of 40 principal investigators responded to the survey; 33 projects were completed at the time of contact. Overall, 23 (70%) of completed projects were published or in press as manuscripts; 3 projects produced 2 publications. Presentations were common (n = 97); 14 (14%) local, 35 (36%) national and 48 (50%) international presentations were reported. Award winners commonly (28 {70%}) presented at CAEP meetings. The mean grant amount received from CAEP was $4,189 and 32% of respondents received additional funding; the median total award was $5,000 (IQR: 4,546–9,133). Most respondents felt CAEP funding was important in accomplishing the project (median: 6.5 or 7; IQR: 6, 7); however, not in securing additional funding (3.0 of 7; IQR: 1, 4). Most respondents felt designated grants for emergency researchers was a continuing need (median 7; IQR 7,7). CONCLUSION: Overall, the CAEP Research Grants competition has produced impressive scholarly results, despite the small sums available for funding. The funding is important in ensuring completion of

the study and results are widely disseminated in the emergency field. Funding organizations need to consider dedicated funding for EM research so that larger funds and more researchers can be supported on an annual basis. Key words: research grant; CAEP

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Communication between emergency departments and community physicians: a survey of Ontario's emergency department chiefs.

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INTRODUCTION: Continuity of patient information is required when patient care is transferred between physicians to maintain continuity of care. This survey determined how, and how well, emergency departments (EDs) communicate patient information to community physicians. METHODS: We surveyed each provincial ED chief to determine the most common media and methods of disseminating information used. We employed a modified Dillman approach to the survey, using mail, email, fax, and telephone to contact respondents. We also measured the perceived quality of their system, which was regressed against the hospital teaching status and community size using generalized logits modelling. Finally, we elicited the components of an ideal communication system for the ED. RESULTS: 143 (85.6%) of ED chiefs participated. The ED record of treatment was the most commonly used medium, being the most common medium in 95% of EDs. Regular mail was the most common method of disseminating information, being the most common in 55% of EDs. 33 (23%) chiefs perceived the quality of communicating patient information from their ED as unsatisfactory or inadequate. This perception was significantly more prevalent in larger communities (excellent vs. unsatisfactory OR 44.9 [95% CI 13.9–140] and satisfactory vs. unsatisfactory OR 2.9 [1.6–5.1]) and teaching hospitals (satisfactory vs. unsatisfactory OR 9.7 [4.7–20.3]). 78% of responding physicians felt that patient information should be disseminated using electronic means. Other issues raised were the need for confidentiality, problems with handwriting, and inadequate telephone messaging systems. CONCLUSIONS: To communicate patient information to community physicians, EDs in this province most commonly send a copy of the ED chart by regular mail. More than one fifth of ED chiefs perceived communication from their department as unsatisfactory or inadequate. Practicing physicians believe that the dissemination of patient information would be improved with new technology. Key words: emergency health services; communication

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Can emergency department utilization be predicted?

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INTRODUCTION: Crowding and diminished resources in EDs are growing concerns among the public, health care professionals and government policy makers continent-wide. Managers face difficulties in the daily management of their EDs as the number of visits continue to rise, while hospitals downsize, consolidate or close altogether. Accurate forecasting of ED visits would be beneficial for better planning for upcoming trends and required resources. The aim of this study is to examine the potential of using administrative databases and time-series models to aid in the prediction of patient ED visits. METHODS: This study used provincial ministry database of financial years 1995 to 2004 including demographic, medical and administrative data. Based on only administrative data (i.e. arrival date and time), time-series analytic approach was used to model and forecast monthly ED visits. Monthly data on patient volume for the first 8 years (April 1995–March 2003) were used for model derivation while the remaining one-year data (April 2003–March 2004) were used for model validation. The best forecasting model was automatically selected by the SAS/ETS system according to the smallest mean absolute percent error (MAPE). RESULTS: Twenty-seven EDs (out of 85) who reported complete data for 9 years were included. The MAPE between predicted vs. actual number of ED visits over the validation period is reported. For 27 EDs, the MAPE is 2.13% (Winters method–additive). The MAPEs for 8 tertiary care EDs (full range of specialized services), 14 secondary care EDs (some specialized services) and 4 primary care EDs (no specialized service) are respectively 1.35% (Linear Trend with autoregressive errors), 1.07% (Linear Trend with autoregressive errors) and 2.35% (Seasonal Exponential Smoothing). Finally for a single ED (tertiary teaching hospital), the MAPE is 1.53% (ARIMA). CONCLUSIONS: Time-series methods applied to past ED data showed that accurate forecasting of ED utilization patterns is achievable. Key words: emergency health services; utilization; crowding

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Equity of emergency care access in an inner city hospital.

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INTRODUCTION: Equity is a key quality domain. Our objective was to determine whether marginalized patients receive comparable access to emergency care. METHODS: This cohort study was performed using the ED database in an inner city hospital. Patients with no primary care provider and no fixed address were considered marginalized while patients with stable housing and a primary care provider were controls. Triage nurses trained in CTAS elicited each patient's presenting complaint and assigned a subjective triage level. Without the nurse's knowledge, the ED information system simultaneously linked the patient's presenting complaint to a CTAS-defined (complaint-linked) triage level. As a result, all patients had two triage levels recorded: a standard complaint-linked level and a subjective nurse-assigned level. Our equity marker was whether patients with similar complaint-linked triage levels fell into lower subjective triage levels. Our primary outcome was the proportion of CTAS 1–3 patients who were down-triaged (ie. subjective triage level lower than complaint-linked triage level). RESULTS: See Table 1 for Abstract 8. Over a three-year period, 133696 patients (99.3%) had both triage levels recorded, including 5116 in the marginalized group and 128580 in the control group. Marginalized patients were 81% male (mean, 32.8 years) while controls were 58.7% male (mean, 46.7 years). Overall, 20.3% of marginalized patients and 19.5% of controls were down triaged, but in CTAS levels 1–3, these rates were 42% vs. 34.8% ($p < 0.001$). Mental health complaints accounted for the largest proportion of down-triages (27% vs. 20% respectively). When MH complaints were excluded from the analysis, down-triage rates converged to 34.5% vs. 32.9% respectively ($p = 0.2$). CONCLUSIONS: Complaint-linked and subjective triage levels were substantially different. Marginalized patients with mental health

Table 1, Abstract 8

CTAS	M group (n)	% down	Control (n)	% down
1	33	97	655	87
2	478	84	15270	72
3	1319	25	43568	21
4	2301	12	47500	9.0
5	985	0	21587	0

complaints may be seen as lower priority. Key words: emergency health services; access; CTAS

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Do low-acuity emergency eepartment patients worsen ED crowding? Results from the CROWDED study.

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INTRODUCTION: It is frequently stated that reducing the number of low-acuity patients presenting to Emergency Departments (ED) would help improve crowding. We studied the impact of low-acuity ED patients on waiting times for other patients. METHODS: We obtained records on all visits to Ontario EDs from April 2002–March 2003. Variables for each ED were computed for consecutive 8hr intervals. The primary outcome was the mean ED length-of-stay (LOS) per 8hr interval for non-low acuity patients; secondary outcome was LOS for all patients. The main predictor was the number of new low acuity ED patients (defined as ambulatory arrival and CTAS 4 or 5 and discharged) in each interval. Covariates were the number of new high acuity (defined as admitted) and medium acuity (defined as neither high or low) patients, patient age, sex, hospital teaching status, time of day and day of week, and total patient-hours during the interval. Auto-regressive modeling was used given correlation in the data. RESULTS: 1095 consecutive 8hr intervals were analysed, during which 4.8 million patient visits occurred at 110 EDs. 49% of patients were male and mean age was 37.7 years. Low, medium and high acuity patients represented 54%, 35% and 11% of all patients. Mean LOS for low, medium and high acuity patients was 2.2, 2.7 and 3.3 hours in teaching EDs and 1.6, 2.1 and 2.8 hours in non-teaching EDs. In multivariable analyses, every 10 additional low acuity patients arriving per 8hrs was associated with a 5.7-minute ($p < 0.0001$) increase in mean LOS for medium and high acuity patients, and a –3.8 minute ($p < 0.0001$) reduction in mean LOS for all ED patients. Ten additional high acuity patients was associated with a 71.2-minute increase ($p < 0.0001$) in mean LOS for medium and high acuity patients, and a 65.0-minute ($p < 0.0001$) increase in mean LOS for all ED patients. CONCLUSION: Low acuity ED patients have a negligible impact on the LOS of other patients. Reducing the number presenting to EDs is unlikely to reduce waiting times or improve crowding. Key words: emergency health services; crowding; CTAS

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Access to care prior to the emergency department visit.

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OBJECTIVE: It is unclear if Emergency Department (ED) patients seek primary or alternative care before ED visits. This study attempted to understand the variety of actions that patients take before presenting to the ED. METHODS: Patients > 17 years were randomly selected from computerized ED records at 2 urban ED sites in Edmonton, AB (UAH; RAH). Following initial triage, stabilization, and informed consent, patients were asked to complete an on-line or paper survey. Survey data were cross-referenced to a minimal patient dataset. The questionnaire asked simple demographic questions, questions regarding reasons for presentation, primary care visit history and preventive health practice. RESULTS: Of the 1425 patients approached, 904 (63%) surveys were completed (UAH: n = 393, RAH: n = 514). Of these 904 patients, 32.7% of patients came to the ED for a problem for which they were already receiving medical treatment. Overall, 34.7% of patients visited a physician before the ED visit (family physician = 14.4%, specialist = 6.5%, walk-in clinic = 10.4%); 13.9% of patients visited an alternative health care professional (e.g., chiropractor, physiotherapist, nurse, etc). Telephone contact also occurred with physicians' offices (29%) or the regional health information line (8.7%) before the ED visit. Finally, 26.5% sought another source of care (e.g., pharmacist, optometrist, etc; self-treatment or researching on the internet) before the ED visit. Some patients (21%) sought no alternate sources of care before coming to the ED and this was not dependent on triage level ($p > 0.1$). The majority of patients (89.9%) perceived the ED as the best option for their problems. CONCLUSIONS: Most patients, irrespective of triage level, make an attempt to abort an ED visit prior to presenting. While a third seek traditional physician care, a wide variety of alternatives are also used. Despite this access to alternative care, patients perceive the ED as their best option for care. Key words: emergency health services; access; public health

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Assessing the quality of reports of systematic reviews in emergency medicine: Are they improving?

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INTRODUCTION: To describe the scientific quality of systematic reviews (SR) published in major emergency medicine (EM) journals from 2000 to March 2004 compared to the quality and number of SRs published during the 1988–1998 period before the launch of the QUOROM guidelines. To identify factors associated with methodological quality of systematic reviews in EM. METHODS: Retrospective study of all SRs published from January 2000 to March 2004 compared to those published from January 1988 to December 1998 in major EM journals. MEDLINE and EMBASE searches and hand searches of 7 major EM journals were conducted. Two investigators independently selected potential reviews for inclusion and assessed their methodological quality using a validated 10-point scale. RESULTS: From 190 references identified, 45 reviews published from January 2000 to March 2004 met the inclusion criteria (inter-rater kappa = 0.64) compared to 29 from 1988–1998. The scientific quality of the 2000 – 2004 cohort of SRs was low (OQAQ mean score: 2.96; 95% CI: 2.44, 3.48). When compared to the 1988–1998 group of SR (OQAQ mean score: 2.66; 95% CI: 2.09, 3.22), no statistically or clinically significant differences in the overall methodological quality were found ($F = 1.39$, $df = 69$; $p = 0.24$). No change in the methodological quality of the reviews after the introduction of the QUOROM statement was found (Δ: –0.30; 95% CI: –1.08, 0.48). Results of the multiple regression analysis demonstrated that the type of analysis was significantly associated with the quality of the reviews. The OQAQ total score increased by 2 points when the review included a meta-analysis. CONCLUSIONS: While the number of SRs published in the EM literature has increased dramatically, the quality remains relatively poor, despite the publication of QUORUM guidelines in 1999. To ensure the EM community maximizes the potential use of the scientific evidence, it is important to ensure that SRs are conducted and reported using the highest possible methodological standards. Key words: systematic reviews; research; methodology

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Reliability and validity of retrospective peer review of the quality of care in emergency medical services.

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INTRODUCTION: Peer review is common in EMS, however its reliability and validity is not well studied. We sought to determine the reliability and criterion validity of EMS appropriateness and proto-

col compliance evaluation performed by peer review. METHODS: Six peers retrospectively reviewed 168 patient care reports (PCRs) for severely injured trauma patients as defined by explicit criteria. Care was rated with a tool derived by a sequential derivation process. Emergency physicians (EPs) prospectively evaluated 118 of the patients with the same tool, blind to the PCR. Inter-rater reliability was determined between paramedics for all 168 PCRs. Criterion validity was determined between the EP (gold standard) and peer rating. Intra-rater reliability was determined from a repeated scoring of 50 PCRs after a washout period. The sample size was defined a priori. RESULTS: The criterion validity correlation coefficient was 0.29 (95% CI 0.06–0.53). The inter-rater reliability kappa score was 0.35 (95% CI: 0.17–0.53). The intra-rater reliability kappa score was 0.62 (95% CI: 0.37–0.86). Three of 14 questions had very good inter-rater reliability: was a prehospital intervention required to manage airway, cervical spine, or orthopedic injuries. Two questions had strong criterion validity: was a prehospital intervention required to manage airway or cervical spine. All questions asking if treatments provided were appropriate or compliant with written protocols had poor inter-rater reliability and criterion validity. CONCLUSION: Intra-rater reliability of retrospective peer review is good, however both inter-rater reliability and criterion validity are frequently poor. In particular, questions rating the appropriateness or compliance of treatments have poor reliability and validity. Although more research is required to fully understand this issue, our results call into question the appropriateness of retrospective peer review of the quality of care in EMS. Key words: emergency medical services; peer review; methodology

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Randomized controlled trials in emergency medicine: Where do they all go?

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INTRODUCTION: To determine the publication fate of randomized controlled clinical trials (RCTs) presented at the 1995–2003 Society of Academic Emergency Medicine (SAEM) meetings. The impact of positive outcome bias, time-lag bias, grey literature bias, and place of publication bias were also explored. METHODS: Prospective cohort study of RCT abstracts presented at 9 consecutive SAEM annual scientific meetings. MEDLINE, EMBASE and CINAHL searches (1995–April 2004) were completed to identify publications in peer-reviewed journals resulting from these abstracts. RESULTS: Of 4399 abstracts, 383 (8.7%) were identified as RCTs. The median time to publication was 32 months (95% CI: 22.97, 41.10) and 59% of the RCT abstracts were published in full within 5 years of presentation. Therefore, the fate of 41% of the RCTs that were not published afterwards is unknown. Positive outcome bias was absent: abstracts reporting positive results were not more likely to be published than those with negative/neutral results. No time-lag bias was found: abstracts reporting positive results were not published faster than those reporting negative/neutral results. A grey literature bias was present in this sample of abstracts: author's conclusions in the scientific abstract differed from those in the corresponding publications (OR: 0.26; 95% CI: 0.098, 0.69). No evidence of place of publication bias was found: studies with positive results were not more likely to be published in higher rated journals than studies with negative/neutral results. CONCLUSIONS: The proportion of emergency medicine RCT/CCT abstracts published is slightly lower than for other specialty societies; however, biases reported by others do not appear to be as common or problematic in emergency medicine RCT abstracts. Given the differences between the results reported in abstracts and manuscripts, caution is warranted with respect to employing meeting abstracts as a source of evidence for future research or systematic reviews. Key words: research; methodology; randomized controlled trials

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What do triage nurses believe to be the most important features?

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INTRODUCTION: To determine the features of emergency triage tools deemed important by triage nurses as a preliminary step toward comparing the acceptability of various triage tools. METHODS: ED triage nurses were surveyed to explore all possible influential features in the triage process. Items were generated from validated tools and triage nurse focus groups. The relative importance of each was rated using a 7-point scale and piloted on a random sample of triage nurses at four EDs. RESULTS: 25 items were generated with alpha = 0.75. The inter-rater reliability of the full sample of 30 nurses was kappa = 0.89 (95% CI: 0.86, 0.91) and the test–retest reliability after 14 days kappa = 0.67 (95% CI: 0.61, 0.72). "Very important/Essential" items included vital signs (mean score 6.8; 95% CI = 6.6, 7.0), triage time (6.5; 6.1, 6.9), allergies (6.4; 6.0, 6.8), medical directives started (6.6; 6.3, 6.9), and pediatric data (6.0; 5.6, 6.4). "Less useful" items included a full review of systems (3.3; 2.7, 3.9), and the tool's physical form (3.7; 3.2, 4.2). CONCLUSIONS: A pilot survey designed to explore the relative importance of specific items used in the ED triage process was created, with good reliability. Key words: triage; methodology

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Overview of reports on the quality of systematic reviews and meta-analysis in the biomedical literature.

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INTRODUCTION: To review the evidence for quality of systematic reviews and/or meta-analyses (SRs/MAs) available in the published biomedical literature. METHODS: Retrospective study of overviews of SRs/MAs published from 1966 to May 2004. A series of comprehensive MEDLINE searches were conducted. One investigator selected potential studies for inclusion. Data on the number of SRs/MAs included per overview, the methods of quality assessment, and the quality of SRs/MAs according to the overview conclusions are described. RESULTS: From 978 citations identified, 36 overviews analyzing the methodological quality of SRs/MAs were included. On average, 67.64 (95% CI: 40.53 to 94.7) SRs/MAs were included per report. The evidence on the methodological quality of SRs/MAs mainly arises from overviews in the areas of anesthesia/pain management (19%), and general medical journals (14%). The Overview Quality Assessment Questionnaire (OQAQ) was the most frequently used instrument to assess the quality of the SRs/MAs (47%). Overviews reporting the OQAQ median (weighted median: 3.47, n = 5) and mean total scores (weighted mean: 3.96, n = 7) found a pattern of major flaws in the methodological quality of included SRs/MAs. Overall, overview authors found methodological and reporting deficiencies in the SRs/MAs for the methods used to avoid selection bias, the reporting of criteria to assess the validity of primary studies, heterogeneity testing and publication bias. CONCLUSIONS: A large number of studies reporting the quality of SRs/MAs have been conducted to date. Although SRs/MAs are considered the "gold standard" for clinical and policy decisions in healthcare, evidence from overviews shows that the pattern of methodological quality varies across several biomedical specialties and is generally "low". The adoption of standardized guidelines for submission and appraisal for publication of higher quality SRs/MAs

must be enforced to reach an appropriate level of methodological quality across the biomedical literature. Key words: systematic reviews; research; methodology

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Medical student skills: effectiveness of core skills teaching in a procedures lab.

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INTRODUCTION: Basic procedural skills are an essential ingredient in undergraduate medical education. However, the literature suggests that contemporary education in this area is inadequate. Little has been published on effective methods of helping students acquire such skills. Emergency physicians are well-suited to assist medical students in this area. We set out to measure the effectiveness of a 1-hour mannequin-based procedure lab in improving objective and subjective performance in three skills as part of a new emergency medicine clerkship. METHODS: We gathered prospective observational data as part of a before and after program evaluation design. Participants included all members of initial cohort of medical students in a new emergency medicine clerkship. All students were given hands-on procedural skills training on IV, NG, and Foley catheter insertion. Students were observed by two expert physicians before and after the training sessions, and at the bedside by supervisors. Students were also surveyed before and after training on their self-rated competence, their number of experiences, and their satisfaction with their clerkship training. Educational impact was calculated using Cohen's d. RESULTS: The first 45 students participated. Cohen's d scores were high for objective ratings of all three skills (IV, NG, and Foley): 1.48, 2.69, and 2.14, respectively. Mean differences between pre- and post-objective skills scores (95% confidence interval) were: 21.4 (17.1–25.8) for IV, 26.6 (23.6–29.6) for NG, and 15.1 (13.0–17.2) for Foley. Cohen's d scores were also highly significant for all self-ratings of competence after training: 1.38 for IV, 1.58 for NG, and 1.38 for Foley. Overall satisfaction with the training was 4.67 on a 5-point scale, and 100% of students satisfactorily completed their clinical procedures log during the allotted time. CONCLUSIONS: This procedures lab was effective in assisting medical students in acquiring essential IV, NG, and Foley skills. Key words: medical education; procedures

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Prospective validation of a termination of resuscitation decision rule for out-of-hospital cardiac arrests managed by primary care paramedics.

Morrison LJ, Visentin LM, Verbeek PR, on behalf of the TOR investigators from 12 Land Base Hospitals and associated EMS Services; Cambridge, Cornwall, Durham, Grey Bruce, Hamilton, Peel, Peterborough, Sault Area, Simcoe/Muskoka, Timmins, Toronto, York. Division of Emergency Medicine, Department of Medicine, University of Toronto, ON

INTRODUCTION: A Primary Care Paramedic (PCP) Termination of Resuscitation (TOR) rule for out-of-hospital cardiac arrest has been retrospectively derived, but not validated. Continued PCP resuscitation is indicated when there is any one of the following: 1) return of spontaneous circulation; 2) any shock given prior to transport; 3) arrest witnessed by EMS personnel; otherwise further resuscitation is futile. The objective of this study was to prospectively validate a TOR clinical decision rule for PCPs by comparing the survival rate when the rule suggests termination to the acceptable medical futility rate of 1% for any intervention; and evaluate the diagnostic test characteristics of the rule to predict survival. METHODS: This prospective validation study was conducted in 12 rural and urban communities. Survival was measured as hospital discharge or in-hospital at 6 months. A t-test statistic compared the survival rate when the rule suggested termination to the 1% rate of survivability reflective of medical futility. Diagnostic test characteristics of the rule to predict survival were calculated. RESULTS: A total of 1241 cardiac arrest cases were enrolled over the 25 month study period, with 100% follow-up. The survival rate when the rule indicated termination was 4/776 or 0.5% (95% CI, 0.1%, 0.9%), significantly less than the medical futility rate of 1.0% ($p = 0.04$). The TOR guideline was 90% (95% CI, 88%, 92%) sensitive in predicting survival; with a specificity of 64% (95% CI, 62%, 37%), a positive predictive value of 8% (95% CI, 7%, 10%), and a negative predictive value of 99% (95% CI, 99%, 100%). CONCLUSIONS: The TOR clinical decision rule suggests termination with a survival rate below that considered to be medically futile and has a strong negative predictive value for survival. Key words: cardiac arrest; emergency medical services; resuscitation termination

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Designing an effective emergency medicine clerkship — systematic needs assessment.

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INTRODUCTION: There is renewed interest in Canada in enhancing medical student education in emergency medicine (EM). As medical schools expand in an era in which CAEP has identified a shortage of emergency physicians, a number of universities have developed emergency medicine clerkships. However, little has been written about the educational needs of medical students with respect to emergency medicine competencies. In preparation for a new clerkship at the University of Ottawa, we conducted a systematic educational needs assessment to identify the essential EM competencies of contemporary medical students. METHODS: We used a systematic educational planning model to identify four categories of EM educational needs: societal, institutional, observed by experts, and perceived by learners. We conducted a systematic literature search using the search terms medical education, emergency, emergency medicine, acute care, skills, and procedures. Medical students were surveyed about their interests with respect to EM. We used the Google search engine to find descriptions of EM student curriculum needs on the internet. We consulted Canadian medical educators and emergency medicine societies. Competency lists were integrated by iterative consensus and validated via review by EM teachers and medical students. RESULTS: We developed a competency framework for a medical student clerkship that included 20 specific competencies, 9 core procedural skills, and addressed 15 common EM presentations. CONCLUSIONS: This systematic needs assessment identified a framework of core competencies for medical students to acquire in EM. It is suitable for use in planning enhanced EM UGME education such as clerkships. Key words: medical education; emergency medicine

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A randomized clinical trial comparing efficacy and safety of etomidate versus midazolam for procedural sedation among children.

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INTRODUCTION: There are suggestions that etomidate has sedative properties superior to midazolam especially among adults. Our objective was to study the efficacy and safety of etomidate in comparison with midazolam for achieving PSA in children. METHODS: A randomized, double-blind, controlled pediatric emergency department and orthopedic clinic-based, outpatient clinical trial was carried

out among patients aged 2 to 18 years undergoing PSA for reduction of displaced limb fractures. Patients were administered 1 mcg/kg of fentanyl and either 0.2 mg/kg of etomidate or 0.1 mg/kg of midazolam. A score of 4 or 5 on the Ramsay sedation scale indicated attainment of adequate sedation. The time taken for induction and recovery was compared using non-parametric COX-proportional hazards modeling. The rates of adverse effects among the treatment arms were also evaluated. RESULTS: From April to August 2004, 100 of 128 eligible patients were enrolled (age: 8.7 ± 3.7 years and 50% male). A higher proportion of patients attained adequate sedation among those who received etomidate: 43/50 (86%) vs. 16/49 (33%) (Δ 53%, 95% CI = 33 – 86). After adjusting for potential confounding variables, time taken for induction (Hazard ratio (HR): 4.98, 95% CI 2.05–12.08), and time taken for recovery (HR: 4.95, 95% CI 2.20–11.08), were lower among those who received etomidate. Eleven (22%) patients receiving etomidate presented with myoclonus compared to none among those receiving midazolam (Δ 22%, 95% CI = 10–35). The rate of transient oxygen desaturation (<93%) was comparable between the groups (20% vs 22%); none required positive pressure ventilation. No other adverse events, including vomiting or hospitalization occurred as a result of PSA. CONCLUSION: At the dosages used for PSA among children, etomidate has higher efficacy in comparison to midazolam. Except for myclonus, the frequency of drug related adverse effects was similar between the comparison groups. Key words: etomidate; midazolam; procedural sedation

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What is the impact of testing for NT-proBNP in ED patients?

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INTRODUCTION: Serum concentrations of B-type natriuretic peptide (BNP) and more recently its precursor N-terminal proBNP (NT-proBNP) are advocated for the emergency diagnosis of congestive heart failure (CHF). We sought to estimate the impact of introducing NT-proBNP into the standard evaluation of ED patients with dyspnea. METHODS: This prospective cohort study enrolled dyspneic patients presenting to a tertiary care academic ED during research nurse hours. We excluded trauma patients or those under 30 years. Patients underwent customary evaluation, including radiography when indicated. At the moment of final ED diagnosis and blinded to the NT-proBNP result, senior ED physicians estimated the likelihood that CHF accounted for the patient's dyspnea (Yes, No or Unsure). NT-proBNP values were classified using the manufacturer-recommended, age-specific cutoff. The primary outcome was the rate of discordance between the clinical impression of CHF and the NT-proBNP assay. RESULTS: 139 visits were enrolled (129 patients, median age 76, 48% admitted). The serum NT-proBNP assay was positive in all but 20 visits (see Table 1, Abstract 20). Notably, NT-proBNP was positive in 75% (95% CI 62%–86%) of CHF No and 86% (95% CI 68%–96%) CHF Unsure visits. While average NT-proBNP concentrations were higher in patients diagnosed with CHF (median 4361 pg/mL; IQR 2386–10877) rather than pneumonia or COPD (1651 pg/mL; IQR 370–4745), these ranges overlapped extensively. CONCLUSIONS: There was high discordance between clinical judgment and NT-proBNP concentrations, particularly in patients felt not to have CHF. While the reference standard of ED diagnosis is imperfect, broad overlap in NT-proBNP concentrations suggests poor diagnostic accuracy in this target patient population. The introduction of routine ED testing for NT-proBNP using the current cutoff would be expected to result in substantial indirect costs from further diagnostic testing. Key words: BNP; congestive heart failure

Table I, Abstract 20
NT-proBNP Assay

Physician	Positive	Negative
Yes	51	2
No	43	14
Unsure	25	4

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Does practice make perfect? The volume of acute myocardial infarction patients seen in emergency departments and the risk of missed diagnoses.

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INTRODUCTION: Failure to diagnose critical conditions is a common cause of medical error in emergency departments (ED). Our prior study demonstrated wide variation in the rate of missed AMIs across EDs. Since higher volume predicts better outcomes for some medical conditions, we hypothesized that the annual volume of AMI patients seen in an ED was associated with the rate of missed diagnoses. METHODS: As in a previous study, we linked administrative health records for all acute AMI patients admitted to an Ontario hospital from April 2002–March 2003 to all ED visit records in the 7 days preceding the admission. The AMI was defined as missed if the final diagnosis on a prior ED visit matched a pre-specified list. The main predictor was annual volume of admitted AMI patients seen in the ED (grouped as 0–49; 50–99; 100–199; 200–299; 300+). Covariates were age, sex, teaching hospital, comorbidities and AMI severity index. We used GEE for logistic regression to account for clustering. RESULTS: 18,353 AMI patients were identified; 9.4% were seen in the lowest volume group EDs and 29.7% in the highest-volume group EDs. Mean age (69y), sex (63% male), and AMI severity score (mean = 0.21;SD 0.2) were similar across all AMI volume groups. Overall 410 AMIs (2.2%; 95% CI 2.0,2.5) were missed on a prior ED visit; the rate varied from 0–25% across EDs. In adjusted analyses with highest-volume group EDs as reference, the risk of missed AMI was significantly higher in EDs in the lowest (OR 1.9; 95% CI 1.4, 2.7) and second-lowest (OR 1.5; 95% CI 1.1,2.2) AMI volume groups, with similar trends in the remaining 2 volume groups. 61 fewer AMIs would be missed annually if the average rate in all AMI volume groups equaled that of the highest volume group. CONCLUSION: The risk of missed AMI is up to 2-fold higher in lower volume EDs compared with highest-volume EDs, after controlling for patient factors and AMI severity. Interventions to reduce AMI misdiagnosis should target low-volume high-risk EDs. Key words: emergency health services; myocardial infarction; diagnosis

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Sensitivity of 6 hour Troponin assays in ED patients with chest pain.

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INTRODUCTION: The measurement of cardiac troponin is the gold standard for detecting myocardial injury in acute coronary syndromes (ACS). Emergency physicians currently rely on troponin levels sampled 6 hours from chest pain onset to assess for the presence of myocardial injury. The objective of this study was to examine the sensitivity of 6 hour troponin levels in a cohort of ED patients followed for 24 hours. METHODS: This nested descriptive study stems from a cohort of ED patients with symptoms suggestive

of an ACS. Serial blood samples were taken at 1, 2, 6, and 18–24 hours from chest pain onset. Troponin I and troponin T were assessed on each sample. RESULTS: 154 patients were enrolled. Troponin I and troponin T samples were positive in 15.6% (n = 24) and 24.7% (n = 38) patients respectively. Six (16.2%) samples positive for troponin I at 18–24 hours were negative at 6 hours. The corresponding numbers for troponin T were 5, or 20.1%. One patient from each troponin assay was deemed a false positive for ACS based on subsequent clinical evaluation. CONCLUSIONS: These findings suggest that while the sensitivity of 6 hour troponin assays are high, an important proportion of patients presenting with chest pain may be discharged home with undetected coronary ischemia were discharge decisions to rely on positive troponin assays alone. Key words: troponin; chest pain; acute coronary syndrome

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From 911 to balloon: reduction of ischemic time in primary angioplasty by implementation of an expedited transfer pathway.

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INTRODUCTION: Recent publications demonstrate that transferring patients to invasive-treatment centre for primary percutaneous coronary intervention (PPCI) is safe and effective in acute ST elevation myocardial infarction (STEMI) compared to on-site fibrinolytic therapy. Yet, the process of triage, diagnosis and transportation to invasive-treatment centre may prolong time to reperfusion hence reducing its efficacy. As part of the regional cardiovascular Quality Improvement and Health Information (QIHI) initiative for the Calgary Health Region (CHR), the cardiology service, emergency medical service (EMS) and emergency department (ED) established a working group with the objective of improving outcomes in acute STEMI patients. METHODS: As phase one of QIHI, an expedited transfer pathway (ETP) was designed and implemented in Jan04 to streamline the process of care in patients who seek medical attention through 911 emergency services. These improvements include preliminary EKG diagnosis of STEMI by EMS, early communication with ED, cath lab and CCU, expedited transportation from home to invasive-treatment centre and shortening ED triage process. RESULTS: Patients (N = 17) enrolled in the ETP from Jan 04 to Mar 04 were compared to matched historical controls (n = 81). Median EMS scene arrival to balloon inflation time is reduced by 62 min (129 vs. 67; $p < 0.001$). Median door-to-balloon time is reduced by 55 min (95 vs. 40; $p < 0.001$). Majority of time saved occurred during ED triage to cath lab arrival of 43.5 min (62.5 vs. 19: $p < 0.001$). CONCLUSION: Early results from the streamlined STEMI pathway showed promising reduction of total ischemic time in patients requiring transfer to invasive-treatment centre. Key words: myocardial infarction; percutaneous coronary intervention; emergency health services

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Intramuscular versus oral corticosteroids for preventing relapse following acute exacerbations of asthma.

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OBJECTIVE: To determine the benefit of intramuscular (IM) and/or oral corticosteroids (CCS) for patients with asthma discharged from the Emergency Department (ED) after an asthmatic exacerbation. METHODS: A comprehensive search was conducted using the "Asthma and Wheez* RCT" register maintained by the Cochrane Airways Group (which includes searches on EMBASE, MEDLINE, CINAHL, and hand searches of the top 20 respiratory care journals). Trials were included if patients with acute asthma were randomized to receive oral or IM CCS versus placebo after discharged from the ED. Two reviewers performed selection, methodological quality, and data extraction independently. The main outcome of the study was relapse to additional care. Results were analyzed using relative risk (RR) with 95% confidence intervals (CI). RESULTS: A search that yielded 821 references identified 68 potentially relevant articles for inclusion. A total of 15 trials produced in the past 15 years were included (Kappa: 0.81). Overall, no significant difference in the relapse rate to additional care between IM and oral CCS (RR (fixed effects) = 0.88; 95% CI: 0.68, 1.14; six studies) was found. This result was consistent both at 7–10 days (RR = 0.73; 95% CI: 0.49, 1.09) and at 11–21 days of follow up (RR = 1.03; 95% CI: 0.73, 1.44). IM CCS did not significantly differ from placebo in the relapse rate (RR = 0.29; 95% CI: 0.09, 1.01; two studies). Oral CCS were more effective than placebo at reducing the relapse rate (RR = 0.50; 95% CI: 0.37, 0.67; eight studies). This effect was consistent both at 7–10 days (RR = 0.65; 95% CI: 0.43, 0.97) and at 11–21 days of follow up (RR = 0.36; 95% CI: 0.20, 0.66); however, seems to be deleterious at 22 days and over (RR = 0.63; 95% CI: 0.32, 1.23). CONCLUSIONS: Oral CCS appear to effective in preventing relapse after ED discharge; IM CCS, while effective, do not appear to be more effective than oral agents at preventing relapse. IM agents are a valuable alternative in selected patients. Key words: asthma; steroids

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Predicting relapse in acute asthma following discharge from the emergency department: the importance of adhering to oral corticosteroids.

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OBJECTIVE: Despite prescription of standard treatment, many asthma patients relapse (defined as need for "additional care" based on worsening of symptoms) following Emergency Department (ED) discharge. Oral and inhaled corticosteroids (OCS and ICS) reduce rates of relapse; however, little is known about other factors associated with relapse. Predictors of relapse were investigated using individual patient data (IPD) from randomized trials conducted for the treatment of acute asthma. METHODS: IPD (N = 456) from 4 comparable trials conducted at Canadian EDs were combined. In all studies, patients received OCS (prednisone 50 mg) for 7 days and short acting beta-agonists. Additional inhaled treatments included placebo (n = 71), low-dose fluticasone (n = 28), high-dose budesonide (n = 82), high-dose fluticasone (n = 107), or high-dose fluticasone/salmeterol (n = 93). All patients were followed until relapse or for 1 month after discharge. Proportional hazards models were used to determine predictors of relapse, presented as adjusted relative risks (RR) with 95% confidence intervals (CI). RESULTS: Overall, relapse occurred in 16% (75/456) of patients. Univariate analyses demonstrated that relapse was associated ($p<0.05$) with older age (34 vs. 29 yrs), female gender (17 vs. 11%), smoke exposure at home (12 vs. 20%), smaller changes in PEFR during ED stay (94 vs. 134 L/min) and missed prednisone doses (7 vs. 29%). No evidence supported a difference based on the dose or type of inhaled treatments. In the multivariate model, missing prednisone doses (RR = 4.29; 2.49–7.40), smaller changes in PEFR (RR = 0.94; 0.91–0.97) and older age (RR = 1.14; 1.02–1.27) were independently associated with relapse. CONCLUSIONS: Our results indicate that non-adherence with OCS is one of the major determinants of acute asthma relapse following ED discharge. Additional research to improve adherence with OCS and explore other modifiable factors associated with relapse following discharge are warranted. Key words: asthma; steroids

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Mechanisms of injury associated with brain injury in mild head injury patients.

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INTRODUCTION: To identify high-risk mechanisms of injury that are associated with clinically important brain injury in mild head injury patients. METHODS: This secondary data analysis was conducted on patients from the Canadian CT Head rule study, a prospective cohort involving adults with loss of consciousness, amnesia, or confusion and a GCS score of 13–15. The outcome criterion was clinically important brain injury on CT. Study nurses reviewed ambulance, ED, and in-hospital records to classify each case according to 21 mechanisms of injury. A logistic regression model was built by manual stepwise addition of pre-injury characteristics, adding interactions and adjusting for clustering by hospital. RESULTS: Characteristics of the 5,858 patients were: important brain injury 8.4%, urgent neurological intervention 1.5%, male 69%, intoxicated 13.3%, median age 34 years. Odds ratios with 95% CIs for brain injury for each mechanism with MVC as the comparison group were: Motorcycle with speed >100 km/hr 5.8 (1.2, 26.9), Motorcycle 0.9 (0.3, 2.4), and Other motorized vehicle 1.8 (0.8, 4.0), pedestrian struck 3.8 (2.4, 6.2), pedestrian stuck & thrown 4.0 (2.6, 6.3), Bicycle struck un-helmeted 3.0 (1.3, 7.3), Bicycle struck 1.6 (0.6, 4.4), Bicycle collision un-helmeted 6.6 (2.4, 17.7), Bicycle collision 1.2 (0.4, 4.1), Other bicycle 0.4 (0.2, 1.1), Fall onto Head 6.9 (2.6, 18.5), Heavy object on the head 4.1 (1.9, 9.1), Fall <3 feet 1.6 (1.1, 2.3), Fall >3 and <10 feet 4.4 (2.7, 7.3), Fall >10 feet 3.2 (2.1, 4.9), Contact sports 1.5 (0.6, 3.7), Other sports 0.6 (0.3, 1.3), Assault feet or fist 1.3 (0.8, 2.2), Assault blunt object 3.8 (2.4, 5.9), and Hit head on an object 1.3 (0.5, 2.9). Other important pre-injury variables were: age (10-year increments) 1.3 (1.3, 1.4), female 0.7 (0.5, 0.8), and suspected intoxication 1.3 (1.0, 1.6). CONCLUSIONS: Certain injury mechanisms place patients at increased risk of brain injury, and health care providers should carefully ascertain details of the injury when managing mild head injury patients. Key words: head injury; traumatic brain injury; trauma

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Utility of silver sulfadiaizine in burn management: a systematic review.

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INTRODUCTION: This systematic review was undertaken to determine the superiority of silver sulfadiazine (SSD) compared to other topical ointments in the management of superficial partial-thickness second degree burns, for the outcomes of wound healing and wound infection rates. METHODS: Independent search strategies included electronic databases (Medline, EMBASE, CINAHL, Cochrane Collaboration), manual searches of reference lists and core textbooks in emergency and burn medicine. Of the 122 randomized controlled trials identified, 20 met predefined inclusion criteria. Methodological quality was measured independently by the Jadad criteria, and only those with a score of 3+/5 points were included in the analysis. Independent data extraction was performed using standardized forms. Data analysis was performed using the Cochrane Revman 4.0 software. RESULTS: Only 3 of 12 available articles met the required Jadad threshold of 3+/5 for the wound-healing outcome. For wound healing at 10–14 days, the OR (random) was 0.45 (95% CI 0.20–0.99) in favour of SSD. For the wound infection outcome, only 2 studies met the Jadad threshold. For wound infection at 7 days, the OR (random) was 2.98 (95% CI 1.03–8.65) in favour of controls. There was no appreciable difference in effect measures using a random vs. fixed effects model. For either outcome, no study involving outpatient management met the Jadad threshold for inclusion in the analysis. CONCLUSION: This study demonstrates that SSD is not clinically superior to other ointments in outcomes involving wound healing or wound infection rates. The methodologic quality of studies that are published in the burn literature is uniformly poor, as determined by Jadad criteria. There is need for a well-designed randomized controlled trial to establish the utility of SSD in outpatient burn management. Key words: burns; silver sulfadiazine

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Simple educational intervention for the prevention of chronic whiplash: results of a randomised, controlled trial.

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OBJECTIVE: To examine the effectiveness of an educational pamphlet given to emergency department (ED) patients experiencing a grade 1 or 2 whiplash injury. METHODS: Patients aged greater than 17 involved in a motor vehicle collision (MVC) as a passenger or driver who presented to one Alberta ED were approached for participation. Consecutive subjects were randomly allocated to either an educational intervention or usual care. The intervention group received an educational pamphlet based on the current best evidence, while the control group received a standard discharge information sheet. Follow-up interviews were performed at 2 weeks and 3 months. The primary outcome was self-assessed complete recovery from injuries. Additional outcomes concerned severity of symptoms, resource use, litigation, and employment status. RESULTS: Between 12/2002 and 01/2004, 112 subjects were randomised. Demographics, collision parameters and ED treatments were similar between the groups. At 2 weeks post-collision, 7.3% of the intervention group reported recovery compared to 8.8% in the control group (absolute risk difference [ARR]: –1.5%; 95% CI: –12.6% to 9.7%). At 3 months post-collision, 21.8% of the intervention group reported complete recovery compared to 21.0% in the control group (ARR: 0.8%; 95% CI: –14.4% to 16.0%). At 3 months there were no significant differences between groups in severity of symptoms, limitations in daily activities, health resource use, medications used, employment status and lost time from work, or litigation status. CONCLUSIONS: An evidence-based educational pamphlet provided to patients at discharge from the ED is no more effective in relieving pain, reducing time lost from work or reducing litigation than usual care for patients suffering grade 1 or 2 whiplash-associated disorder. More research is required to determine what, if any, interventions may effectively reduce the symptoms associated with chronic pain following MVC. Key words: whiplash; patient education

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Changes in cyclist helmet wearing following the introduction of helmet legislation in Alberta for those under age 18.

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INTRODUCTION: Helmet use is known to protect against head and face injuries in cyclists; however, voluntary use is low, especially in children. The purpose of this study was to determine the changes in helmet wearing in Edmonton, AB cyclists following the introduction of a bicycle helmet law in 2002. METHODS: This study was conducted from June–August 2004 (post-legislation) and data were compared to a similar survey completed at the same locations and

days in June–August 2000 (pre-legislation). The assessment of cyclists was made at randomly selected locations in the city by two independent observers. Univariate and bivariate analyses consisted of examining changes in the prevalence of helmet use between observation periods. Logisitc regression analysis with adjustment for clustering was used to relate helmet use to cyclist characteristics, location, average annual income level, and date (2004 vs. 2000). RESULTS: Results: Data were collected for over 270 cyclists in 2004 compared with 699 cyclists in 2000. The overall prevalence of helmet use increased from 43% (95% CI: 39–47) in 2000 to 54% (95% CI: 48–59) in 2004. Helmet use increased in those under 18 (28%, 95% CI: 22%–35% in 2000; 83%, 95% CI: 22%–35% in 2004), but did not change in those 18 and older (49%, 95% CI: 45%–54% in 2000; 48%, 95% CI: 42%–55% in 2004). In the cluster adjusted multivariate logistic regression model, the odds of helmet use increased for those under age 18 (Adjusted Odds Ratio (AOR): 13.73, 95% CI: 6.44–29.29), but did not change for those 18 and older (AOR: 0.95, 95% CI: 0.61–1.48). CONCLUSIONS: Our results clearly show a substantial post-legislation increase in helmet use, but only for those affected by the Alberta helmet law (i.e., those under age 18). These results identify persistent variation in the use of cycling helmets in Edmonton and the extension of the legislation to all age groups should be considered. Future research should focus on cycling rates and cycling injuries. Key words: helmets; head injury; legislation

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Trends in the incidence of spinal cord injury in Alberta.

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INTRODUCTION: The impact of traumatic spinal cord injury (SCI) can be devastating, especially when accompanied by permanent loss of sensory or motor function. The annual incidence rate of SCI in Alberta is estimated at 44.3 per million population (95% CI: 39.8, 48.7). The highest incidence occurs among males, adolescents and young adults. The leading causes of SCI are motor vehicle collisions and falls. The objective of this study was to examine the trends in incidence of SCI in Alberta over eight years. METHODS: This population-based study used administrative data from centralized health care databases. Inclusion criteria were persons with SCI (ICD-9-CM diagnostic codes 806.x or 952.x) who were admitted to a trauma centre in Alberta between April 1992/93 and March 1999/00. Measures of incidence included the number of SCI cases and age–sex standardized incidence rates. The 2001 population of Alberta was used as the standard. RESULTS: Over the 8-year study period, 917 individuals sustained a SCI. The mean number of cases per year was 115 and ranged from 104 injuries in 1999/00 to 122 in 1997/98 and 1998/99. The annual age-standardized rates ranged from 35.2 injuries (95% CI: 28.5, 41.9) per million population in 1999/00 to 45.6 (95% CI: 37.3, 53.9) in 1992/93. The annual rates varied over the study period; however, there was no significant linear trend ($p = 0.15$). For all years, the incidence rate for males was higher than for females. CONCLUSIONS: SCI incidence trends in Alberta suggest that SCI is not decreasing. Since there is currently no cure for SCI, primary prevention efforts are critical. Targeted injury control initiatives must be implemented if the injury statistics are to improve. Key words: spinal cord injury; trauma; injury surveillance

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Clinical predictors for pelvic fracture following severe trauma.

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INTRODUCTION: Pelvic x-ray is recommended by the Advanced Trauma Life Support course for blunt trauma. This study determined the correlation of clinical findings to pelvic fracture and the feasibility of developing a clinical decision rule. METHODS: This historical cohort study was conducted at a university level 1 trauma center. We enrolled all adult blunt trauma patients with an injury severity score of >12 for one year. Patients transfers with confirmed pelvic fracture or >48 hrs from injury were excluded. Data was extracted from patient's trauma record and electronic diagnostic imaging (DI) record. Patients without pelvic DI had discharge summary and subsequent DI checked for missed fractures. We defined pelvic fracture as any fracture or displacement to the pelvic ring. Descriptive, univariate and logistic regression analysis were performed. RESULTS: Of 342 patients identified, 254 were eligible. Injury mechanism included: fall 38.8%, motor vehicle accident 39.2%, pedestrian 4.7%, recreational vehicle 5.1%, and other 12.2%. Enrolled patients had the following characteristics: pelvic fracture 6.3%; mean age 47.3 yrs; median GCS 15 (IQR 11, 15); tender with palpation of pelvis 20.5%; bruise at pelvis 6.7%; pelvic instability 2.4%; decreased rectal tone 3.6%; gross blood in urine 23.4%; pelvic x-ray 30.2%; pelvic CT 31.9%; CT and/or x-ray 42.9%. Table 1 (of Abstract 31) shows % injury and non-injury with findings, p-value, adjusted odds ratio:

Table 1, Abstract 31

ASSESSMENT	INJURY	NON-INJURY	P VALUE	O.R.
Tender to Pelvis	50.0%	18.5%	0.007	8.2
Bruise at Pelvis	26.7%	5.5%	0.006	1.2
Pelvic unstable	33.3%	0.4%	<0.001	243
Dec. Rectal Tone	13.3%	3.0%	0.012	2.2
Blood in Urine	50.0%	21.6%	0.018	1.7

CONCLUSION: Pelvic fracture is relatively rare. Tenderness on palpation of the pelvis, pelvic instability and decreased rectal tone correlate highly with pelvic fracture. Deriving a clinical decision rule is likely feasible and future research should address this issue. Key words: ATLS; pelvic fracture

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Survey of domestic violence screening protocols in Canadian emergency departments.

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INTRODUCTION: At least 6% of the adult female population are victims of domestic violence. Approximately 30% of Canadian emergency departments (EDs) routinely screen for these women. In 2003, the Canadian Task Force on Preventive Health Care (CTFPHC) reported no evidence in favour for or against this practice. The objectives of this study were to determine: the proportion of Canadian EDs with a universal screening program for victims of domestic violence; the proportion with domestic violence intervention policies and procedures; changes in practices in the past ten years and; changes in ED domestic violence policies and procedures since the CTFPHC Recommendations. METHODS: A cross-sectional survey of a stratified random sample of all 638 full-service, Canadian EDs was conducted between September and December 2004 using the Dillman method. Participants were asked about their ED policies and procedures for the identification and management of victims of domestic violence. Validation of responses was via receipt and review of the institution's written policies and procedures. RESULTS: The

response rate for the 114 participating sites was 78.9% (95% CI: 70.6, 85.4) with 12.3% (95% CI: 7.5, 20.0) reporting a universal screening program and 27.2% (95% CI: 19.9, 36.0) reporting intervention policies and procedures. Ten years ago, 13% (95% CI: 9.1, 18.6) of Canadian EDs reported use of a universal screening program and 39.4% (95% CI: 32.8, 46.3) reported having policies and procedures for victims of domestic violence. All 7.0% (95% CI: 3.6, 13.2) of respondents that made changes to their policies and procedures since the CTFPHC 2003 Recommendations were contrary to the recommendations. CONCLUSIONS: Despite a CTFPHC recommendation concluding insufficient evidence to recommend for or against screening for violence against women, there has been no significant change in how EDs screen for victims of domestic violence in the past ten years. Future work needs to focus on knowledge dissemination of this evidence-based information. Key words: domestic violence

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Emergency department triage: evaluating a computerized triage tool and its implementation strategies.

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INTRODUCTION: Emergency Department (ED) triage prioritizes patients based on urgency of care. The Canadian Triage and Acuity Scale (CTAS) is the nationally recognized standard. A web-based triage tool (eTRIAGE) based on CTAS has been developed. We describe its implementation into a busy ED and compare it triage without electronic decision support. METHODS: This prospective study took place in a tertiary care ED in a large urban centre. In Phase 1, duty triage nurses did not use any electronic decision support. In Phase 2, the ED deployed eTRIAGE after providing a three hour training course to a small cohort of triage nurses who were to share this knowledge with their untrained colleagues during regular triage shifts. In Phase 3, a group of eight triage nurses, selected for their triage experience and interest, underwent further training with eTRIAGE. In each phase, patients were assessed first by the triage nurse, using memory in Phase 1 and eTRIAGE in Phases 2 and 3. A blinded study nurse then independently used eTRIAGE to triage each patient. Inter-rater agreement is reported using kappa (weighted κ) statistics. RESULTS: Phase 1 enrolled 722 patients with 693 (96.0%) complete records, Phase 2 enrolled 570 patients with 541 (94.9%) complete records, and Phase 3 enrolled 577 patients with 569 (98.6%) complete records; phases ranged from 5–9 weeks to complete. At least 37 different triage nurses made the initial triage assessments in Phases 1 and 2. Inter-rater agreement during Phase 1 was fair (weighted κ = 0.36, 95% CI 0.31, 0.42) but improved to moderate in Phase 2 (weighted κ = 0.41, 95% CI 0.35, 0.47) and Phase 3 (weighted κ = 0.52, 95% CI 0.46, 0.57). CONCLUSIONS: Agreement between study nurses using eTRIAGE and duty triage nurses improved when duty nurses were provided eTRIAGE over memory. Further improvement was observed employing nurses selected for triage interest and provided with further eTRIAGE training. Continued attempts to improve the triage process, the triage environment, and training appear warranted. Key words: CTAS; triage

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Should spectrophotometry be used to diagnose xanthochromia in the cerebrospinal fluid of alert patients suspected of having subarachnoid hemorrhage?

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INTRODUCTION: Clinicians rely on the absence of xanthochromia in the cerebrospinal fluid (CSF) obtained by lumbar puncture (LP) several hours after headache to exclude subarachnoid hemorrhage (SAH). Several authorities and guidelines from the United Kingdom (UKNEQAS) advocate spectrophotometry to measure xanthochromia, but most hospitals in North America rely on visual inspection. This study examines the accuracy and impact of spectrophotometry for SAH. METHODS: This prospective cohort study was conducted at three university tertiary care EDs. We enrolled neurologically intact patients >15 yrs with non-traumatic acute (<1 hour from onset to peak) headache who had a LP to rule out SAH. CSF was centrifuged immediately, then frozen and analyzed later in batch (Milton Roy Spectronic). Four definitions of spectrophotmetric xanthochromia were compared to visual inspection. 6-month telephone follow-up was conducted. RESULTS: We enrolled 220 patients (mean age 42 ± 16 yrs; CT rate 87.7%; angiography rate 5.9%). Two SAH were identified with current practice: 1 with aneurysm on CT and 1 with blood in CSF with positive angiography. No additional SAH were identified on follow-up. Table 1 (of Abstract 34) reports sensitivity, specificity and percentage requiring an angiogram (change from current practice) for each definition:

Table 1, Abstract 34

TEST	% SENS (95% CI)	% SPEC (95% CI)	% ANGIO (% change)
Visual inspection	50 (3.0–81)	97 (92–99)	0.9 (–84.6%)
Traditional (425nm)	100 (16–100)	29 (23–35)	71.4 (+1208%)
Chalmers and Kiley	0.0 (0.0–16)	89 (84–92)	10.9 (+185%)
Chalmer rev (476nm)	100 (3.0–100)	29 (23–35)	67.7 (+1146%)
UKNEQAS	100 (3.0–100)	83 (76–87)	15.0 (+254%)

CONCLUSION: Spectrophotometric xanthochromia has a low specificity for SAH. Each spectophotometric definition would result in a substantial increase in angiography, and would therefore be expected to identify more incidental aneurysms, increase patient anxiety and expose patients to unnecessary surgical or investigational complications without benefit. Key words: subarachnoid hemorrhage; lumbar puncture

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Why do some use the emergency department more than others?

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INTRODUCTION: The objective of this study was to describe high users of emergency departments (ED) in terms of their patient characteristics, comorbidities and health care use, through comparison to low users. METHODS: Based on visit counts over one year, a cohort of Winnipeg ED users were classified as high (four or more visits a year) or low users. Anonymized linkage to population-based health care databases in Manitoba allowed for a more comprehensive description of the cohort. Study variables included gender, age, income, use of health care services, and multiple morbidity (using an established case-mix classification system). RESULTS: In 2001, 120456 users made 197707 visits to the six adult emergency depart-

ments in Winnipeg. Of these, 8007 (6.63%) were classified as high users, contributing to 24.3% of the total visits. High users, on average, were older (51.3 vs. 42.7 years), more often female (52.5% vs. 50.7%), had more physician visits (18.9 vs. 9.7) and hospitalizations (2.24 vs. 1.45) during the study year, when compared to low users. 48.7% of the high users had at least seven different morbidities; in the low user group, this percentage dropped to 18.9%. Further refinement of ED user morbidity was carried out using an extended diagnosis clustering (EDC) methodology. The most prevalent EDC among high users was depression, anxiety and neurosis (33.05%). Substance use and congestive heart failure were also more prevalent in high users (4.52 and 3.17 times more often, respectively). High users identified as having depression, anxiety and neurosis were less likely to have other major morbidities (14.9%), while those high users with congestive heart failure showed a higher prevalence of other major morbidities (37.6%). CONCLUSIONS: High users of emergency departments in Winnipeg use a disproportionate amount of emergency department services and are a complex group of patients with multiple morbidities and variable health care needs. Key words: emergency health services; utilization

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Predictive validity of the triage risk screening tool in a Canadian emergency department.

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INTRODUCTION: The Triage Risk Screening Tool (TRST) developed in Ohio has never been validated externally. This study's purpose was to evaluate the predictive validity of TRST for emergency department (ED) re-visits, hospital admissions, and long-term care (LTC) facility placement in a Canadian setting. Methods: From March 1 to 24, 2004, a prospective observational cohort study of a convenience sample of patients ≥65 years old discharged from a tertiary care academic ED were given a TRST score without physician knowledge. Patients were excluded if they were LTC facility residents, previously enrolled, or had no proxy if cognitively impaired. The primary outcome was any ED re-visit, hospital admission, or LTC facility placement event at one, four, and six-months. Binary logistic regression was used to model the primary outcome odds using the TRST score as an indicator variable. Demographic variables with significant univariate analyses were added to the model. Odds ratios with confidence intervals for each variable were calculated. Somers' D rank correlation test measured the association between observed responses and predicted odds. RESULTS: 218 patients were screened, 193 patients consented to follow-up, 73 met exclusion criteria. 120 patients were enrolled, with one patient lost to follow-up. Age was associated with the primary outcome in univariate analyses ($p = 0.001$). Logistic regression showed that with each TRST score increase by one, the primary outcome odds increased by 1.60 (95% CI: 1.02, 2.50), 1.39 (95% CI: 0.97, 2.00), and 1.44 (95% CI: 1.00, 2.06) times at one, four, and six-months. Despite a good-fit ($p = 0.274$), this model correctly predicted only 61.0% to 62.9% of observed primary outcomes (Somers' D value: 0.27 to 0.29). CONCLUSIONS: Although the TRST works reasonably well to risk stratify Canadian elders for the occurrence of any ED re-visit, hospital admission, or LTC placement over six-months, it does not allow good patient-level predictions for these outcomes. Key words: emergency health services; utilization

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Reporting of notifiable diseases in the ED: a survey of emergency physician knowledge, practices, and perceived barriers.

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INTRODUCTION: To assess EP knowledge, compliance with, and perceptions regarding provincial and national notifiable disease reporting requirements. METHODS: Web-based survey of CAEP membership using modified Dillman technique. EP knowledge, perceptions, and practice regarding notifiable diseases were assessed. Chi square and ancova were performed using Excel and SPSS. RESULTS: 384 (33.7%) of 1141 EPs responded, representing all Canadian provinces and a broad range of age, gender, certification, and practice setting. A test of EP knowledge of notifiable diseases resulted in mean and median scores of 70.9% and 69.2%, with significant difference in scores across provinces. 80.5% of EPs rated their knowledge of notifiable diseases as fair or poor. Only 12.9 % of EPs recognized the requirement to report suspected notifiable diseases before lab confirmation. 48.3% reported never consulting a list of notifiable diseases. Only 30.5% knew the location of a notifiable disease list in their ED. 45.9% of EPs indicated reporting ≤40% notifiable diseases. EPs identified lack of knowledge (53.1%) and time (56.8%) as major barriers to reporting. 3.2% of EPs reported that ethical concerns frequently impacted on compliance and 32.7 % reported occasional impact. Knowledge of notifiable diseases was correlated with personal estimate of knowledge ($p < .001$) and knowledge of location of notifiable disease list in ED ($p = .007$) but not with personal estimate of compliance. Knowledge was not correlated with years in practice, gender, certification, practice setting, teaching affiliation, or workload. CONCLUSIONS: EP compliance with notifiable disease reporting requirements is suboptimal. Lack of knowledge and time are identified as constraints. Key words: communicable diseases; public health

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In search of the best therapy for alcohol withdrawal in the emergency department.

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INTRODUCTION: Multiple studies demonstrate that symptom-triggered therapy for alcohol withdrawal treats patients more quickly and with a lower total benzodiazepine dose than scheduled treatment. However, this therapy lacks widespread adoption across North America. Indeed, a chart audit of 200 patients from two urban Canadian emergency departments (EDs) revealed that no patient received symptom-triggered treatment. The most commonly accepted and validated scale for measuring alcohol withdrawal is the Clinical Institute Withdrawal Assessment of Alcohol, Revised (CIWA-Ar). Our study uses the CIWA-Ar to direct symptom-triggered therapy in the ED, and examines whether lorazepam or diazepam is more efficacious in the efficient discharge of acute alcohol withdrawal patients. METHODS: In this randomised double-blind trial, 97 patients were randomly assigned to treatment with lorazepam or diazepam. The CIWA-Ar was used hourly to quantify the extent of withdrawal and to guide therapy. Physicians were blinded to the study drug, but chose the route (IV or oral) and the dose (high or low dose). Discharge was based on both CIWA-Ar score and clinical judgment. The primary end points were time to ED discharge and time to CIWA-Ar score less than 10. RESULTS: There was no difference between the groups in either their time to discharge from the ED ($p = 0.99$, relative hazard 1.00, CI 0.62–1.61), or their time to CIWA-Ar less than ten ($p = 0.33$, relative hazard 1.26, CI 0.79–1.99). The study was underpowered; physicians became unwilling to enroll patients as they found the CIWA-Ar too time-consuming for use in a busy ED. CONCLUSIONS: Current adoption of symptom-triggered therapy may be limited by the fact that the CIWA-Ar is lengthy and perceived as cumbersome. Further research is required to develop shorter and

more efficient tools for measuring alcohol withdrawal. With better tools, the goal of widespread symptom-triggered therapy becomes achievable. Current investigations in our city are developing this concept. Key words: diazepam, lorazepam

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Incidence and risk factors for methicillin-resistant Staphylococcus Aureus cellulitis in the emergency department.

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INTRODUCITON: Cellulitis is a common diagnosis in any emergency department (ED). At St Paul's Hospital, an inner ED with 60,000 patients visits/year, 7% of visits are for cellulitis. Since september 2003, there has been a marked increase in methicillin resistant staphylococcus aureus (MRSA) cellulitis incidence, and subsequent treatment with intravenous Vancomycin in our emergency department. This has important public health ramifications since Vancomycin is one of the only antibiotics to which MRSA is sensitive, and its increasing use poses a theoretical risk for the development of resistance. Also, its use in the ED is resource-intensive since it is provided every 12 hours, for many days, and requires monitoring of renal function. METHODS: Using the New Emergency Resource Database (NERD) we identified all cases of cellulitis and MRSA cellulitis between January 2003 and September 2004. Using a nested (within a cohort) case–control design, we compared risk factors between 50 incident cases MRSA cellulitis and 100 randomly selected controls, matched ± 1 month on calendar date of diagnosis, with cellulitis that was not due to MRSA. Risk factors were assessed using multivariable conditional logistic regression. RESULTS: Incidence of MRSA cellulitis increased steadily between January 2003 to September 2004 from 0.6% of cellulitis cases to 4.8% of cases. Risk factors for MRSA cellulitis include injection drug use, previously documented MRSA cellulitis, number of episodes of non-MRSA cellulitis, number of prescriptions for oral antibiotics, and previous admission to hospital ($p < 0.05$). CONCLUSION: Over a 20 month period, the incidence of MRSA positive cellulitis has increased eight-fold at our institution. Risk factors are injection drug use, previous episodes of MRSA cellulitis, episodes of non-MRSA cellulitis, number of prescriptions for oral antibiotics prescriptions, and previous admission to hospital. These findings have important ED and public health ramifications. Key words: injection drug use; methicillin resistance; vancomycin; cellulites

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Adult epiglottitis: a five-year retrospective chart review of all cases in Hamilton.

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INTRODUCTION: Introduction of Haemophilus influenzae type B (HIB) vaccine to the immunization schedule has led to an increasing awareness of unvaccinated adults presenting with epiglottitis to the emergency department. This study examines the clinical presentations and outcomes of all adult epiglottitis cases presenting to all emergency departments in Hamilton, Ontario between 1999 and 2004. METHODS: We employed explicit protocols with defined variables, trained abstractors, standardized abstraction forms, and reviewed all adult cases of epiglottitis during a five-year period. Inter-rater agreement was measured using a kappa statistic. Summary measures are presented with 95% confidence intervals as calculated by the modified Wald method. RESULTS: Inter-rater reliability for data abstraction was $\kappa = 1$. 54 cases of epiglottitis were identified from a total of 1 million ED admissions. The mean age was 49 years (CI: 4.8–53.2) and 69% of patients were male. The three most frequently documented symptoms were sore throat (100%) (CI: 92.5–100), odynophagia (94.4%) (CI: 84.4–98.7), and inability to swallow secretions (63%) (CI: 49.7–74.7). The two most frequently documented signs were swelling of the epiglottis and/or supraglottis 98.1% (CI: 89.4–100), and tachycardia 53.7% (CI: 40.7–66.4). Organisms were isolated from blood in 11.1% of the cases. There was a white blood cell count >20,000 X 10^9/L in only 4 of the cases (9.6%). From the 54 cases only 9 of the patients were intubated and all were safely discharged from hospital. CONCLUSIONS: Adults presenting with epiglottitis to the Emergency Department in Hamilton have good outcomes. Conservative airway management is safe in the treatment of adult epiglottitis. Key words: epiglottitis

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Teaching ED teachers how to teach: a directed faculty development program.

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INTRODUCTION: There has been little research to inform faculty development around effective Emergency Medicine (EM) teaching. We sought to develop, implement, and evaluate a new EM teaching faculty development initiative. METHODS: An interactive small group half-day workshop was designed based on recent qualitative research into practical EM teaching techniques. Small group discussion topics were based on a pre-workshop needs analysis. Evaluation included a post-workshop questionnaire and a three-month follow-up survey for practice implications. RESULTS: Fifteen faculty participated. Learner-derived small group topics were: "Teaching mistakes", "Interactive teaching", and "Problem learners." Workshop component evaluations averaged 4.2/5. All 15 participants would recommend the workshop to colleagues and said they themselves would attend another similar workshop. Follow-up questionnaires were returned by 11 participants. All had successfully incorporated new strategies into their teaching, the most common being: 'Focusing on teaching points' (50%), 'Soliciting learning objectives' (60%), 'Actively seek out learners' (50%), and 'Providing focused feedback' (40%). Comfort levels for teaching were increased in 82% of respondents. CONCLUSIONS: Participants in a faculty development workshop can identify specific learning goals. Tailoring the workshop to these objectives can assure participant satisfaction, increase confidence in teaching, and lead to incorporation of new teaching strategies. Key words: medical education

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Medical student skills: effectiveness of a procedures lab in teaching suturing.

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INTRODUCTION: Suturing is an essential skill to be acquired via undergraduate medical education. However, little has been published on effective methods of helping students acquire such skills. We set out to measure the effectiveness of a 1 hour mannequin-based procedure lab in improving objective and subjective performance in suturing as part of a new emergency medicine clerkship. METHODS: We gathered prospective observational data as part of a before and after program evaluation design. Participants included all members of initial cohort of medical students in a new emergency medicine clerkship. All students were given hands-on suturing skills training by expert instructors, which included discussions, demonstrations, online video, and practice. Using a previously validated checklist, students

were rated by two expert physicians before and after the training sessions, and at the bedside by supervisors. Students were also surveyed before and after training on their self-rated competence, their number of experiences, and their satisfaction with their clerkship training. Educational impact was calculated using Cohen's d. RESULTS: 58 students participated. Cohen's d score was high for objective ratings of change in competence at 3.17. Mean difference between pre- and post-objective skills scores (95% confidence interval) was 7.37 (6.60–8.12) out of a score of 13. Cohen's d scores were also highly significant for all self-ratings of competence after training at 1.65. Overall satisfaction with the training was 4.65 on a 5-point scale. CONCLUSIONS: This procedures lab was effective in assisting medical students in acquiring essential suturing skills. Key words: medical education

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Is a negative CT scan of the head and a negative lumbar puncture sufficient to rule out a subarachnoid hemorrhage?

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INTRODUCTION: Current clinical practice assumes a negative CT head and a negative lumbar puncture (LP) together are adequate to rule out subarachnoid hemorrhage (SAH) in patients with acute headache. Only 2 small studies support the safety of this practice. Our objective was to determine the accuracy of a strategy of negative CT combined with a negative LP to exclude SAH. METHODS: This prospective cohort study was conducted at two academic tertiary care EDs over three years. We enrolled all patients >15 years with a complaint of non-traumatic acute (<1 hour from onset to peak) headache, normal neurological exam, and who had a CT head and an LP if the CT was negative. A negative CT was defined as no blood in the subarachnoid space. A negative LP was defined as the final tube of cerebrospinal fluid having no xanthochromia or red blood cells <5 x 106/ high-powered field. Patients were followed with a structured telephone questionnaire 6–36 months after their ED visit. Hospital records were reviewed to ensure no missed SAH. We calculated sensitivity, specificity, negative predictive value (NPV) and likelihood ratios (LR) of the strategy of CT then LP for SAH. RESULTS: There were 601 patients enrolled with 64 positive SAH. The mean patient age was 43.6 years (SD: 15.4) with 59.6% female. The following (see Table 1, Abstract 43) is the 2x2 for the strategy of CT then LP for SAH:

Table 1, Abstract 43

	SAH	NO-SAH
STRATEGY +	64	186
STRATEGY –	0	360

This CT/LP Strategy classified patients with sensitivity 100% (95% CI: 94–100), specificity 66% (95% CI: 6 2–70), NPV 100% (95% CI: 98–100), LR+ 2.936, LR– 0.0015. Hence, in an ED headache population with a 1% SAH prevalence, a patient with CT/LP strategy– has a post-test probability of SAH of only 0.002%. CONCLUSION: This is the largest prospective study evaluating the accuracy of a strategy of CT and LP to rule out SAH in alert patients presenting to the ED with an acute headache. This study validates clinical practice that a negative CT with a negative LP is sufficient to rule out SAH. Key words: diagnosis; computed tomography, lumbar puncture, subarachnoid hemorrhage

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Comparison of termination-of-resuscitation guidelines for basic life support-defibrillator providers in out-of-hospital cardiac arrest.

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INTRODUCTION: Termination of Resuscitation (TOR) in the field for Out-of-Hospital Cardiac Arrest (OHCA) can reduce unnecessary transport to hospital and increase availability of EMS and ED resources for other patients. However such guidelines should be highly reliable and accurate. We sought to compare the performance of three TOR guidelines for Basic Life Support-Defibrillator (BLS-D) providers when applied to cardiac arrest patients in the Ontario Prehospital Advanced Life Support (OPALS) study. METHODS: This prospective cohort study involved all OHCA patients attended by BLS-D providers in 21 Ontario urban or suburban communities. The data analyses were conducted secondarily on these prospectively collected data. Three TOR guidelines proposed by Marsden (1995), Petrie (2001) and Verbeek (2002) were applied and contingency tables calculated to show the relationship between the rule and actual survival, area under the Receiver Operator Characteristic (ROC) Curve, and an evaluation of the sensitivity and specificity in each rule. RESULTS: From 1988 to 2003, BLS providers attended 13,684 cardiac arrest patients and 636 (4.7%) survived to hospital discharge. For the 3 TOR rules, sensitivity was: Petrie 99.8% (95% CI 99.5–100.0), Verbeek 99.5% (99.0–100.0) and Marsden 99.8% (99.5–100.0). Specificity was Petrie 9.9% (95% CI 9.4–10.4), Verbeek 52.9% (52.1–53.8), and Marsden 19.4% (18.8–20.1). Negative Predictive Value was 99.9% (95% CI = 99.8–100.0), 100.0% (95% CI = 99.9–100.0) and 100.0% (95% CI = 99.9–100.0) respectively. These rules would have resulted in field TOR in Petrie 9.4%, Verbeek 50.5% and Marsden 18.5% of cases. TOR was recommended for 1 patient (Petrie), 3 patients (Verbeek) and 1 patient (Marsden) who eventually survived. CONCLUSION: We found all three TOR rules to have high sensitivity and negative predictive value. However specificity and transport rates varied greatly. These results will be useful for EMS providers considering adoption of TOR in BLS-D systems for OHCA. Key words: cardiac arrest; resuscitation

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The effect of triage-applied Ottawa Ankle Rules on length of stay in a Canadian urgent care department: a randomized control trial.

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INTRODUCTION: Do triage nurses ordering X-rays according to the Ottawa Ankle Rules (OAR) before physician evaluation will decrease the length of stay for patients visiting an urgent care department? METHODS: From July to September 2004, a randomized control trial of consecutive patients with ankle/foot twisting injuries arriving at an urgent care department took place. Patients aged ≥18 years with a ≤7 day old injury were included. They were excluded if there were neurovascular deficits, limb deformities, open fractures, or non-isolated ankle/foot injuries. Patients were randomly allocated to an X-ray-ordering clinical pathway (intervention) or standard departmental care (control). Those assigned to the intervention group had triage nurses apply the OAR and send those with positive OAR for X-rays before physician evaluation. Physicians were blinded to negative OAR nurse assessments. Investigators were blinded to group allocation. The primary outcome was the total median length of stay (TLOS). The secondary outcomes were patient satisfaction (5-point ordinal scale) and the proportion willing to return (WOR)

for future care. Mann–Whitney Test was used to analyze the TLOS and satisfaction rating differences between groups. Two-proportion t-test was used to analyze the WOR outcome. This study had 80% power to detect an effect size of 25 minutes. RESULTS: 167 patients were eligible, 130 patients consented and were enrolled. 3 patients were then excluded, 3 were lost to follow-up, and 1 left without being seen. The intervention and control groups had median TLOS of 73.0 mins and 79.7 mins respectively. There was a non-significant time difference of –6.7 mins (95% CI: –20.9, 7.4 mins) between groups. There were no differences in patient satisfaction ratings (0; 95% CI: –1,0) or WOR (3.8%; 95% CI: –3.3%, 11.0%). CONCLUSION: Triage nurses using OAR and ordering X-rays before physician evaluation for twisting ankle/foot injuries does not decrease the length of stay in an urgent care department. Key words: clinical prediction rule; Ottawa Ankle Rules

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The use of Hounsfield units on initial CT-scan of the head to rule out a subarachnoid hemorrhage.

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INTRODUCTION: We conducted this study to assess the diagnostic value of obtaining Hounsfield units (HU) of the cerebrospinal fluid (CSF), on the initial computed tomography (CT) scan of the head, in ruling out subarachnoid hemorrhage (SAH) in patients presenting with acute headache. METHODS: Data was collected prospectively and consecutively on all alert, neurologically intact patients presenting to two tertiary care EDs with a sudden (<1hour to peak), severe headache suggestive of a SAH. A research assistant, blinded to the outcome, retrieved CT scans from the Picture Archiving & Communication System (PACS). The average HU was obtained from the CSF spaces by taking an elliptical sample of 12–25 pixels while avoiding the vessels inside the cisterns. SAH was diagnosed by visible blood on CT scan or confirmed by angiogram following a positive lumbar puncture. The average HU of each cistern was compared using the student's t test and cutoffs of 100% sensitivity were selected. RESULTS: The sample size was 569, with 31 cases of SAH; seven had a negative CT scan. The mean age was 44 ± 17 years and 63% were female. The Supracellar cistern, Sylvian fissure and Basal cistern predicted SAH ($p < 0.001$). We found the optimal combination to be an average HU <6 in the right or left Sylvian fissure or <3 in the right or left anterior horns of the Supracellar cistern. This cutoff displayed 100% (95% CI 86%–100%) sensitivity, 26% (23%–30%) specificity, 7% (5%–10%) positive predictive value and 100% (99%–100%) negative predictive value for SAH. Compared to current practice, it could reduce the need for lumbar punctures from 95% to 70% of all patients without missing any cases of SAH. Other more complex combinations could reduce the need for lumbar puncture to 46%. CONCLUSION: Measuring HU provides significant potential for reducing the need for confirmatory lumbar punctures to rule out SAH after a CT scan. Key words: computed tomography; lumbar puncture; subarachnoid hemorrhage

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Implementation of a prehospital advance directive protocol in southeastern Ontario.

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INTRODUCTION: Do not resuscitate (DNR) orders are universally accepted in the health care setting, but are less widely recognized in the prehospital setting. This study documents the satisfaction of paramedics and surviving family members with a prehospital DNR protocol that allows paramedics to honour verbal and non-standard written DNR requests for patients encountered in cardiac arrest. METHODS: This ongoing prospective observational study reviewed all cardiac arrests in Southeastern Ontario between March 1, 2003 and December 1, 2004. Following a DNR request, paramedics were required to complete a survey, and a follow-up structured telephone interview was conducted with surviving family members. RESULTS: There were 841 cardiac arrests during the study period, of which 73 met inclusion criteria. Paramedic surveys were available for 66 (90%) of these, and surviving family members were successfully contacted in 44 (60%) cases. Two families declined follow-up interview. The mean patient age was 73, of which 61% were male. Forty-nine (67%) of the DNR requests were verbal, 21 (29%) written, and three not specified. Paramedic comfort was rated as 4.92 on a five-point Likert scale (95% confidence interval 4.86–4.98). Survivor comfort was rated by paramedics as 4.84 (95% C.I. 4.75–4.95). Survivors reported comfort with the decision to withhold CPR in 41 of 42 cases (98%) and with paramedic care in all cases. One survivor reported discomfort, stating the DNR request was consistent with the patient's wishes, but she was uncomfortable having to make the request. CONCLUSIONS: This novel prehospital DNR protocol allows paramedics to honour verbal and non-standard written DNR requests made by substitute decision-makers. Interim findings demonstrate that satisfaction with the protocol among paramedics and surviving family members is uniformly high. Conclusions are limited by a small sample size, lack of comparison group, and limited follow-up, however it appears that such a protocol is appropriate for the prehospital setting. Key words: advance directive; cardiac arrest; emergency health services; resuscitation

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Assessment of the performance of medical priority dispatch system with respect to prehospital Canadian triage and acuity scale.

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INTRODUCTION: The Medical Priority Dispatch System (MPDS) consists of 33 protocols used by emergency medical services (EMS) dispatchers to interrogate callers and determine dispatch priority. Although use of MPDS is common, there is little evidence that dispatch priority correlates with patient acuity. The Canadian Triage and Acuity Scale (CTAS) is a validated tool used to prioritize patient care requirements, and correlates with both admission rates and need for investigations. OBJECTIVE: To determine the performance of MPDS with respect to prehospital CTAS. METHODS: The Toronto EMS communications database was queried to obtain all calls from March 1, 2003 until February 29, 2004. All duplicate calls, non-emergency transfers, and cancelled calls were excluded. Only protocols accounting for > 1% of calls were analyzed. A focus group consisting of paramedics, dispatchers, EMS physicians, and EMS managers assigned a range of MPDS dispatch priorities considered appropriate to each CTAS level. Sensitivity, specificity, overtriage, and undertriage rate was calculated for all protocols collectively and individually. RESULTS: Of 197,882 calls, 54,598 were excluded due to cancellations by caller or patient, and 26,879 were excluded due to missing data fields. Nineteen protocols accounted for 96.2% of calls. The focus group defined 5% undertriage as an appropriate target for dispatch protocols. The overall sensitivity and specificity of MPDS was 56.8% and 56.8%, respectively. Overall overtriage and undertriage rates were 65.7% and 23.2%, respectively. Only protocols for patients with diabetic problems or shortness of breath undertriaged less than 5% of calls. CONCLUSIONS: Comparison of MPDS to CTAS represents a novel method of evaluating dispatch

protocols. MPDS exhibits low sensitivity and specificity for detecting high patient acuity, and seventeen of nineteen protocols undertriaged high acuity cases in >5% of calls. These protocols may represent targets for revisions of the MPDS. Key words: CTAS; emergency health services; triage

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OPALS major trauma study: Does the addition of ALS to a multicentre BLS system affect traumatic brain injury outcomes?

Stiell IG, Nesbitt LP, Pickett W, Brisson D, Banek J, Field B, Spaite D, Munkley D, Luinstra-Toohey L, Lyver M, Campeau T, Wells GA, for the OPALS Study Group. Department of Emergency Medicine, University of Ottawa, Ottawa, ON

INTRODUCTION: The Ontario Prehospital Advanced Life Support (OPALS) Study is a multicenter before–after controlled clinical trial. Within this, we sought to determine whether the addition of a full ALS program to an optimized BLS EMS program improved outcomes for patients with acute traumatic brain injuries (TBI). METHODS: Adult major trauma (ISS >12) patients were enrolled in 17 communities. During the before phase, care was provided at the BLS level. During the after phase, ALS providers performed endotracheal intubation and provided IV fluid therapy, as required. Patient data were abstracted from the Ontario Trauma Registry and prehospital records. TBI patients were defined as those with a total GCS < 8 on arrival to the lead trauma hospital. Study outcomes were survival to hospital discharge and functional independence measure (FIM). Results were evaluated using descriptive, contingency table and logistic regression analyses. RESULTS: 401 patients (216 BLS, 185 ALS) were enrolled: mean age 44.5 (range 16–97), male 75.3%, injury type (blunt 93.3%, penetrating 6.5%); median ISS 26 (IQR: 25–38); survival to discharge 54.9%. Patients in the ALS phase received these interventions: oral intubation 17.5%, nasal intubation 9.7%; IV fluid bolus 8.4%. TBI patients in the two study phases had similar rates of survival, both overall (54.8% ALS vs. 54.4% BLS; P = 0.93), and within a priori subgroups: e.g. motor vehicle collision (60.6% vs. 54.8%; P = 0.53), falls (45.7% vs. 43.1%; P = 0.86), age > 60 years (28.6% vs. 27.5%; P = 1.00). The adjusted odds of mortality for ALS vs. BLS TBI patients were non-significant (1.31; 95% CI: 0.83–2.07). There were no differences in FIM among TBI patients at discharge (76.4 ALS vs. 84.6 BLS; P = 0.13) or 6 months post-discharge (108.3 vs. 107.7; P = 0.94). CONCLUSIONS: The OPALS Study is the largest controlled trial of prehospital care for critically injured patients. The addition of a full ALS EMS program did not improve patient outcomes for traumatic brain injuries. Key words: emergency health services; emergency medical services; trauma; traumatic brain injury

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Inter-rater reliability and comfort of application of a termination of resuscitation decision rule for primary care paramedics.

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INTRODUCTION: This study aims to evaluate the reliability of Primary Care Paramedics (PCPs) in the application of a Termination of Resuscitation (TOR) clinical decision rule and to measure their comfort level using this rule to terminate resuscitation. METHODS: This survey was completed during the prospective validation study of the TOR rule in out-of-hospital cardiac arrest with PCP care only, conducted in 12 rural and urban communities. PCPs were asked to theoretically apply the TOR rule and rate their comfort level using the rule, on a 5 point Likert-type scale, where 1 = Very comfortable and 5 = Very uncomfortable. A Kappa score for agreement with truth was calculated for each TOR event as interpreted by the PCP crewmembers responsible for delivering patient care. A t-test statistic comparing mean comfort level between PCPs interpreting the rule correctly versus incorrectly was computed. RESULTS: A total of 1184 attendant PCPs and 1211 driver PCPs completed the rule portion of the data collection form, with 1160 cases with both driver and attendant data available. Kappa for agreement of interpretation of the rule between driver and attendant PCP was 0.89 (95% CI, 0.87, 0.92); between attendant and truth, Kappa = 0.88 (95% CI, 0.85, 0.91); between driver and truth, Kappa = 0.88 (95% CI, 0.85, 0.91). PCPs who applied the rule correctly were significantly more comfortable (N = 2253, mean comfort score = 2.0 or comfortable, 95% CI, 2.0, 2.1) than those who did not (N = 134, mean comfort score = 3.0 or neutral, 95% CI, 2.8, 3.3), p < 0.0001. CONCLUSIONS: PCPs were able to correctly apply the TOR clinical decision rule and were comfortable doing so. Comfort was associated with correct interpretation of the rule. Applying the rule correctly and comfort with the rule are important considerations in prospectively implementing a TOR rule for PCPs. Key words: cardiac arrest; clinical prediction rule; emergency health services; resuscitation

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Evaluation of a training program in endotracheal intubation for rural primary care paramedics.

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INTRODUCTION: Endotracheal intubation (ETI) is considered the gold standard for airway management in cardiac arrest and is part of the skill set for Advanced Care Paramedics (ACP) but not for Primary Care Paramedics (PCP). Delivery and retention of advanced skills such as ETI can be problematic in the rural setting. We designed and evaluated a novel focused ETI training program for PCPs in rural and small town ambulance services. METHODS: A two week training program included didactic teaching, mannequin practice and intubation on live patients in the operating room followed by a defined schedule of continuing education and yearly recertification by the EMS Medical Director. Paramedics were allowed to intubate patients in cardiac arrest according to a protocol which was integrated with automatic defibrillation and the administration of endotracheal epinephrine. All patients were transported to hospital where tube placement and complications were recorded by an emergency physician. RESULTS: Between April 2000 and December 2003, 41 PCPs attended 240 patients in cardiac arrest and attempted ETI on 237. ETI was successful in 207/237 patients (87%), with 173/207 (84%) intubated on the first attempt and additional 34/207 (16%) on a subsequent attempt. Complications were recorded for 6 patients and included one unrecognized esophageal intubation. Six of 240 (2.5%) patients survived to hospital discharge, 3 of whom regained a pulse with defibrillation alone. CONCLUSION: PCP's in rural and small communities can successfully intubate cardiac arrest patients following a training program that includes didactic teaching, mannequin practice, operating room experience and a schedule of continuing education. This study has implications for the management of cardiac arrest and the development of cease resuscitation protocols in the rural setting. Key words: airway management; emergency health services; resuscitation

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OPALS major trauma study: impact of advanced life support on survival and morbidity.

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INTRODUCTION: The Major Trauma component of the Ontario Prehospital Advanced Life Support (OPALS) Study tested the incremental impact on survival of adding ALS to a multicenter BLS system. METHODS: This before–after controlled clinical trial was conducted in 17 communities (population 20,000 to 750,000) and enrolled adult major trauma (ISS >12) patients during BLS and a subsequent ALS phases. ALS providers performed endotracheal intubation and administered IV fluids and drugs, as required. Patient data were abstracted from the Ontario Trauma Registry, then ambulance, centralized dispatch and ED records. Trauma cases were compared with norms from the Major Trauma Outcome Study (MTOS). The primary outcome was survival to hospital discharge. Secondary outcomes were prehospital times and functional independence (FIM). Study phases were compared via chi-square, Students' t, and Mann–Whitney U tests, and multiple logistic regression. RESULTS: On average, OPALS trauma cases were more severe than MTOS norms (M = 0.691). The 2,750 patients enrolled during BLS (N = 1,276) and ALS (N = 1,474) phases were characterized: mean age 46.1 (range 16–98), male 71.8%, injury type (blunt 91.4%, penetrating 5.9%, burn 2.6%); median ISS 22 (IQR: 17–29); GCS < 8: 25.1%. Intubation and IV fluids were administered in 13.3% and 14.2% of ALS patients, respectively. Time on scene increased with ALS: median 17 vs. 15 minutes, P < 0.001). Patient survival did not change overall (81.1% ALS vs. 82.1% BLS; P = 0.52), nor among patient subgroups defined by injury mechanism (P = 0.32 to 0.59), ISS (P = 0.22 to 0.29) and GCS (P = 0.42 to 0.50). The adjusted odds of mortality for ALS vs. BLS patients were non-significant (1.08; 95% CI: 0.76–1.54). There were no differences in FIM among discharged patients (94.3 ALS vs. 94.7 BLS; P = 0.82). CONCLUSIONS: The OPALS Major Trauma Study is the largest controlled trial to examine potential benefits of ALS programs. The addition of prehospital ALS interventions did not improve trauma patient outcomes. Key words: emergency health services; trauma

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Prospective evaluation of the management of moderate to severe cellulitis with parenteral antibiotics at a pediatric day treatment centre.

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INTRODUCTION: The objective is to assess the clinical outcome of pediatric patients with moderate to severe cellulitis managed at a Day Treatment Centre (DTC). METHODS: Prospective cohort of all patients (3 months–18 years) with a presumed diagnosis of moderate to severe cellulitis made in a pediatric Emergency Department (ED) from Sept. 2003 to Nov. 2004. Patients were treated in the DTC, except in the presence of orbital or peri-orbital cellulitis, septic arthritis, osteomyelitis, chondritis, immunosuppression or surgical intervention required, in which cases they were hospitalized. Patients treated in the DTC were given ceftriaxone (IV or IM) (50 mg/kg) daily or clindamycine (IV and PO) if allergic. RESULTS: During the study period, a presumed diagnosis of moderate to severe cellulitis was made in 124 patients in the ED. Fifty-two patients were treated at the DTC (42%) and 88% received ceftriaxone. Their mean age was 7.6 (range: 1–16) years and 65% were male. The sites of infection were: lower limbs (54%), upper limbs (33%) and face (13%). The cellulitis had a median width of 7 (range: 1–38) cm and median length of 6 (range: 1–26) cm. Blood cultures were performed in 98%; one was positive for S. aureus. After 3 days of therapy, 39 patients (75.0%) were successfully discharged and switched to an oral agent. For these patients no relapse occurred. Thirteen patients required inpatient admission for further therapy for a mean additional duration of 3.9 (SD 2.5) days. Reasons for admission included osteomyelitis (2), abscess requiring drainage (2), underlying skin condition complicating therapy (1) and evolution of cellulitis deemed unsatisfactory by the treating physician (8). No patient was diagnosed with necrotizing fasciitis in the course of therapy. Forty-two anonymous satisfaction questionnaires were handed in and revealed very good to excellent parental satisfaction with treatment at the DTC in 95%. CONCLUSIONS: The DTC is a safe alternative to hospitalization for pediatric patients with moderate to severe cellulitis. Key words: cellulitis; pediatric

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Prospective validation of a pediatric appendicitis score.

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INTRODUCTION: Several clinical scores have been developed for appendicitis in adults. Samuel's pediatric appendicitis score (PAS) was developed on a cohort of patients in the UK. The aim of our study was to prospectively validate this score. METHODS: We prospectively recruited children 1–17 years old that came to our tertiary pediatric Emergency Department (PED), with a chief complaint of abdominal pain less than 7 days over a 12-month period. PAS components included fever > 38oC, anorexia, nausea/vomiting, cough/percussion/hopping tenderness (2-points), right-lower-quadrant tenderness (2-points), migration of pain, leukocytosis >10,000 (10^9/L) and polymorphonuclear-neutrophilia > 7,500 (10^9/L). A follow-up call was made to verify final outcome. Sensitivity, specificity and the receiver operating characteristic (ROC) curve of the PAS with respect to diagnosis of appendicitis was calculated. RESULTS: We collected data on 533 children. 97 (18%) had pathology proven appendicitis. Mean (median, range) score for children with appendicitis and without appendicitis was 6.7 (7, 2–10) and 1.8 (1, 0–9) respectively. If a PAS of 2 were used to discharge patients without further investigation, only 4 (4%) of children with appendicitis would have been sent home. The sensitivity at this level was 96% and specificity 74% . If a PAS of 6 or over were used to take children to the operating room without further investigation, only 14 (3%) would have undergone a negative appendectomy. The sensitivity at this level was 57% and specificity 97%. For the Samuel PAS the area under the ROC curve was 0.94. CONCLUSIONS: The Samuel PAS is useful, as a value of 2 is valid for ruling out appendicitis, and a score of 6 is valid for predicting the presence of appendicitis. Children with PAS of 3–5 should undergo further investigation such as ultrasound or computerized tomography. Key words: appendicitis; clinical prediction rule; pediatric

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Epidemiology of pediatric cardiac and respiratory arrest in the cities of the CanAm Pediatric Study Group.

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INTRODUCTION: The CanAm Pediatric Study Group is a consortium of U.S. and Canadian cities and was created to conduct clinical trials for out-of-hospital pediatric cardiac (CA) and respiratory arrest (RA). In order to properly plan these trials, the group sought to determine the current incidence, etiology, and outcomes of children

who suffer either cardiac or respiratory arrest. METHODS: The CanAm Pediatric Study Group communities represent 7 discrete geographic regions with a combined population of 27 million and are served by 30 different EMS ALS services. We conducted a cohort study that included all children <19 years with out-of-hospital CA or RA in a 12-month period. Data were collected from ambulance reports, dispatch data, and hospital records. Obtaining IRB and HIPAA approvals proved to be time consuming. We performed descriptive statistics with 95% CIs. RESULTS: Among the 525 children, we compared the 447 who suffered cardiac arrest to the 78 who suffered respiratory arrest for these characteristics: median age 2 (IQR 0–12) vs 6 (IQR 1–11); male 60.7% vs 62.3%; bystander witnessed 36.9% vs 56.4%; trauma related 25.1 vs 28.2%; SIDS 7.2% vs 0%; bystander CPR 18.6% vs 21.8%; asystole 69.3% vs 0%; PEA 25.2% vs 0%; VF/VT 5.5% vs 0%. Table 1 (of Abstract 55) compares interventions and outcomes for the two groups:

Table 1, Abstract 55

	CA	RA
TREATMENT		
Ventilated BVM	94.8%	75.0%
Intubated	58.6%	11.5%
Success/attempts	73.4%	22.0%
IV started	32.4%	34.6%
Success/attempts	63.6%	79.4%
Intraosseus line	18.6%	0.0%
Defibrillated	7.4%	0.0%
OUTCOMES		
Admitted	23.4%	92.3%
Discharged alive	13.2%	83.3%

The annual incidences per 100,000 pediatric population were CA 8.3 and RA 1.4. CONCLUSIONS: This is the largest multicenter population-based cohort of pediatric CA and RA reported to date and reveals large differences from the adult arrest population. Future research and EMS management strategies need to prioritize the unique features of these lethal pediatric conditions. Key words: cardiac arrest; emergency health services; pediatric; resuscitation

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Administration of analgesic medication by parents to children suffering from limb or clavicle area injury.

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INTRODUCTION: Our objectives were to document if parents administer analgesia to their children after suffering trauma to a limb or clavicle, and if they do so, what pharmacologic regimens are used. METHODS: We interviewed parents of children (0–18 years old) presenting to a large urban pediatric Emergency Department with an acute limb or clavicle injury. Demographic information, injury related circumstances and outcome were recorded. Student t-test and Chi-squared test were used to compare between parents who administered analgesic medications and those that did not. Statistical analysis was done using SPSS. RESULTS: A total of 214 families completed the interviews in the emergency department. 146 (68%) were found to have fractures, 59 (28%) discharged with a diagnosis of soft tissue injury and 9 (4%) had dislocation. 72% (153/214) of injuries were in the upper limb and 27% (58/214) in the lower limb. 3 (1%) patients had an injury that involved the shoulder. Most parents (44%, 94/214) chose to use non-pharmacological measures to treat their child's pain. 27% (59/214) used pharmacologic analgesia. 29% (61/214) of parents administered no analgesia before coming to the ED. The 3 most common reasons for not treating the child's pain were "Did not want to mask my child signs and symptoms" (37/181, 20%), "My child's pain was not bad enough" (33/181, 18%) and "Did not want to delay treatment by a doctor" (27/181, 15%). Of the 59 children that were treated for pain, 43/56 (77%) got the appropriate dose. When asked regarding treating the pain with anti-pain medication in the future in a similar scenario, 53% (112/212) reported they will treat their child for pain. 27% (58/212) of the families were still concerned that treating their child for pain will "interfere with the child assessment and treatment". CONCLUSION: Most children did not receive pharmacologic analgesia after an acute painful injury, before arriving to the ED. An educational endeavor is needed to improve parents' awareness of pain management in acute injury conditions. Key words: pain management; pediatric

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What factors influence a parent's decision to enrol their child in a pediatric emergency research study?

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INTRODUCTION: This study aimed to determine the most significant factors that deter or encourage parents to enroll their children in pediatric emergency dept (PED) research studies. METHODS: We conducted a prospective survey of parents visiting the PED of the Alberta Children's Hospital from July to August, 2004. All parents presenting with children <17 years who were CTAS 3, 4, or 5 were eligible. The survey explored the importance of various factors in either positively or negatively influencing a parent to enroll their child into a research study. Parents were asked to rate their degree of agreement with how each factor might influence their decision to provide consent. RESULTS: Of 131 eligible respondents, 117 completed the survey, 11 declined, and 3 surveys were not returned. 94% of respondents agreed that more research was needed for childhood medical conditions. Parents would be positively influenced to enroll their child in a study if they perceived that: a) the study results would directly benefit their child [91% agree (A) or strongly agree (SA)], b) the treatment for their child's condition was unknown [85% A/SA], c) they could get a medication for their child which they otherwise could not afford [79% A/SA], d) the study was easy to understand [78% A/SA], e) their child would have access to otherwise unavailable medications (66% A/SA). Factors identified as being deterrents to enrolling their children in studies included: a) if the study involved "experimental therapy" [54% A/SA], b) if they were unable to consult with their spouse prior to providing consent [43% A/SA], c) if they were approached in the middle of the night [38% A/SA], and d) if the study required them to bring their child back for follow-up [37% A/SA]. The child's age, illness severity and wait time were not significant deterrents. CONCLUSIONS: This study may assist PED researchers to better address parents' concerns relating to enrolling children in research studies. Understanding parental perceptions may assist in improving recruitment for PED studies. Key words: pediatric; research

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Culture results via the internet — A novel way for communication after an emergency department visit.

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INTRODUCTION: The Internet is a health-information source for

parents, children and pediatricians. Follow-up after patient discharge from the Pediatric Emergency Department (PED) is difficult although necessary to report tests received after discharge. The aim of this study was to determine whether the Internet could be used to facilitate the delivery of culture results to care-givers. METHODS: During a 10-month period, we approached parents of children that had cultures taken and were discharged from our tertiary PED. Internet access, e-mail use and demographic information were collected. Parents were given a unique ID and password to retrieve information on culture results from the study web-site. Results were posted on the web-site soon after they were received from the Hospital laboratory and an e-mail was sent to the family. Access pattern to the web-site was recorded, and a follow-up call with the family (after 5 or 10 days) was made. RESULTS: A total of 527 families were approached, 224 were excluded. Of 303 cultures available, 24 (8%) were positive and 5 (2%) were positive with contamination. 186 (61%) parents accessed the Internet-system after a mean of 94 hours (range 1m–611hr) after the e-mail was sent. Of the 243 (80%) families reached for follow-up, 66 (27%) "had no time" to enter the web-site. Almost 95% wanted future cultures and other tests to be posted in a similar way. CONCLUSIONS: The majority of recruited families used the new web-based follow-up system and were extremely satisfied. Future efforts should be made to increase awareness of parents and patients about the importance of obtaining culture results which would help implement a web-system such as ours. Key words: emergency health services, quality

Poster Presentations
(Abstracts #59 to #115)

Administration

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Development of an objective emergency physician practice profile.

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INTRODUCTION: Emergency physicians find it difficult to obtain objective feedback on personal practice patterns. An iterative process is being undertaken to develop an objective profile by which emergency physicians can compare their own practice to that of peers in the same environment. METHODS: A profile was developed by combining a regional EDIS database, a regional diagnostic imaging database, a regional Health-Information database, and billing service databases tracking hours worked. Profiles are provided to individual physicians revealing personal data on each parameter, along with normative data of the entire group of 85 physicians, with personal and normative data being provided for practice at each of the four Calgary emergency departments. Profiles are provided in a non-threatening manner for personal information, but if individual physicians are outliers, results are discussed in biannual performance reviews. RESULTS: The third iteration of the profile included the following parameters: total number of patients seen, new patients seen per hour, CTAS breakdown of patients seen, admission rate for each CTAS level and overall admission rate, median length of time from physician sign-up for CTAS 3 patients until the patients leave the emergency department, percentage of patients seen with residents or clinical clerks, percentage of patients receiving Ultrasound, CT, VQ scan or IVP, and percentage of patients returning within 72 hours of discharge and requiring admission, with a list of these patients and diagnosis on both visits. Physicians receive information for each site worked, and normative data is separated by site. Physicians working on several sites demonstrate significant variability on different sites. The fourth iteration will include rates of consultation of various services on each site, and complaints received per 1000 patient care encounters. CONCLUSIONS: After initial apprehension prior to the first iteration release, the process has been very well accepted and requested by emergency physicians. Key words: medical administration; physician evaluation; CQI

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Physician determinants of emergency care quality.

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INTRODUCTION: High quality care is safe, timely, patient focused, effective and efficient. Care quality may be related to physician characteristics like age, training path and experience. Our objective was to determine whether shorter (CCFP-EM) residency training is associated with differences in emergency care quality. METHODS: We assessed safety by tracking bounce-back rate (% of patients hospitalized within 72 hrs of ED discharge) and we measured timeliness by waiting time to physician exam. We used random exit surveys to evaluate patient perception of MD communication and concern (patient focus) and to assess physician skill and care quality (effectiveness). Efficiency was based on admission rates for triage level 2–3 patients and on imaging rates (number of studies per 100 patients) in two cohorts: abdominal pain and extremity injury. For each outcome, physicians were stratified by quartile and the sum of their quartile ranks in 7 domains comprised an overall Q-score where low score = high quality. RESULTS: See Table 1, Abstract 60. 23 physicians were evaluated, including 12 CCFP-EM, 6 FRCP and 5 ABEM. Median Q scores (IQR) were 19 (17.8–20.2), 15.0 (14–16) and 15.5 (14.3–17.5) for CCFP-EM, ABEM and FRCP physicians, respectively ($p = 0.16$). Median Q scores (IQR) were 19 (17.8–20.2) for CCFP-EM vs. 15 (14–17) for other physicians ($p = 0.06$). This apparent difference was not apparent ($p > .10$) when ANCOVA was used to adjust for years in practice. CONCLUSION: Quality measures did not differ significantly based on training path. Key words: medical administration; CQI; emergency medicine, residency training

Table 1, Abstract 60

Median	(IQR)	CCFP–EM	(12)	Other (11)
Practice years	10	(8–19)	20	(13–22)
Bounce-back rate	0.75%	(.62–.89)	0.67%	(.58–.78)
Wait time to MD (min)	30	(26–31.8)	28	(25–31)
Effectiveness (0–100)	85	(80.3–87.3)	87	(84.8–92)
Patient focus (0–100)	74.5	(70–78.9)	78	(72.2–85.3)
Admit rate	25.8%	(24.3–27)	25.9	(25–26.7)
AP Imaging (n/100)	52	(44–55)	44	(39–50)
Extremity imaging	92	(82–100)	93	(86–96)