ICEM 2006
Scientific Abstracts
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INTRODUCTION

The ICEM 2006 Research Abstract Process: Trials and Tribulations

Andrew Travers, MD; Andrew Affleck, MD; Doug Sinclair, MD.
Canadian Association of Emergency Physicians

Introduction: The specialty of Emergency Medicine (EM) is in a state of continued evolution throughout the world. The International Federation of Emergency Medicine (IFEM) is tasked with aiding this evolution by enabling collaboration across geographic and academic boundaries. The International Conference on Emergency Medicine (ICEM) is the premiere international EM education and research event, with participation from the IFEM and its members in various stages of academic and clinical EM development. ICEM is a key forum for the presentation of original research from every corner of the globe. **Hypothesis:** The purpose of the IFEM Research Track is to highlight the heterogeneity of emergency research across the globe. **Methods:** The ICEM 2006 Steering Committee established 5 research subgroups from the following IFEM members: [1] Australian College of Emergency Medicine (ACEM), [2] American College of Emergency Physicians (ACEP), [3] British Association of Emergency Medicine (BAEM: responsible for all abstracts submitted from the United Kingdom), [4] Canadian Association of Emergency Physicians (CAEP), and the [5] Society for Emergency Medicine in Singapore (SEMS: responsible for all abstracts submitted from Africa, Asia, South America, and Europe). Each organization was responsible for populating abstracts from their respective organization. As per IFEM requirements, 20% of the available 'oral slots' were allocated to each of the 5 IFEM subgroups. The ICEM 2006 Conference utilized an online abstract process for the recruitment, submission, review, and collation of research abstracts. This system has been in use for the CAEP annual scientific assembly for the past 5 years (www.vscommunications.com /vsreview/Login.jsp?c=caep001). The ICEM 2006 Research Track opened the submission process on Nov. 1, 2005, and closed on Jan. 4, 2006. The authors were prompted to submit their abstracts in a standardized format. Using this online review system, the individual IFEM research subgroups used methodology specific criteria to score each individual abstract. Based on these scores each IFEM subgroup ranked both their top orals and selected posters to the ICEM 2006 Research Committee. **Results:** In total 404 abstracts were submitted for review. These included 33, 30, 64, 164, and 113 for ACEM, ACEP, BAEM, CAEP, and SEMS respectively. The ICEM 2006 Planning Committee allocated 105 available oral slots with an unlimited number of poster slots. Consequently 21 orals were allocated to each IFEM subgroup. All IFEM subgroups employed the online abstract submission and review process with the exception of BAEM. There was variation in the review process between organizations where some IFEM groups allocated three reviewers per abstract to an IFEM group that allocated one reviewer per abstract. Despite the online submission system there was obvious heterogeneity in the format, content, and quality of abstracts submitted for both oral and poster presentations (103 orals, 291 posters, 10 abstracts withdrawn or declined). **Conclusions:** Although the ICEM 2006 Research Track has abstracts that vary significantly in format and content, it does illustrate the diversity and robustness of emergency-based research across the globe. The opportunity to share and showcase this research will advance Emergency Medicine as a whole and provide a network for communication, collaboration and education amongst research stakeholders.

The abstracts and allocated schedule presented in this Supplement were based on the individual IFEM research subgroup selections as of Mar. 1, 2006, and do not account any cancellations or withdrawals of abstracts since that date. / Les résumés et le calendrier de répartition que présente ce Supplément correspondent à la sélection effectuée par le sous-groupe de recherche de la FIMU au 1er mars 2006 et ne tiennent pas compte des annulations ou retraits de résumés reçus depuis.

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ICEM 2006
Oral Abstract Presentation Schedule

Sunday, June 4th: Oral Abstract Presentations

INJURY TRACK

1330: Abs. 1 Evaluation of new needle catching instrument for suturing simple wounds (Breslin TM et al)
1345: Abs. 2 Why do UK emergency physicians ignore the Canadian CT head rule? (Townend WJ et al)
1400: Abs. 3 Is the Harborview Assessment for Risk of Mortality Score (HARM) an improved measure of patient mortality in Scottish trauma patients compared to TRISS? (James E et al)
1415: Abs. 4 Spinal injury in the adult trauma population: patterns of injury and associated risk factors (Amin O et al)
1430: Abs. 5 Evaluation of Trauma Call Guidelines for trauma patients triaged to the resuscitation room of an emergency department in Hong Kong (Rainer TH et al)
1445: Abs. 6 Pre-hospital clearance of the C-spine – Does it need to be a pain in the neck? (Armstrong B et al)
1530: Abs. 7 Evaluation of prehospital trauma diversion in the New Territories of Hong Kong (Rainer TH et al)
1545: Abs. 8 What is the incidence of diagnostic radiological findings on presentation chest x-ray in patients with pulmonary contusion following blunt trauma? (Symington LR et al)
1600: Abs. 9 South West Elbow Extension Test (SWEET) (Appelboam A et al)
1615: Abs. 10 Randomized control trial of cast versus removable brace in children with low risk ankle fractures (Boutis K et al)
1630: Abs. 11 Effect of "time to definitive care" on major trauma outcomes in regional and remote Queensland (Myers C et al)
1645: Abs. 12 Effect of hospital capacity on major trauma outcomes in regional and remote Queensland (Myers C et al)

PAIN TRACK

1615: Abs. 13 Randomized controlled trial of patient controlled analgesia compared with nurse delivered analgesia for renal colic in an emergency department (Rehmani R et al)
1630: Abs. 14 Evaluation of the impact of a Paediatric Procedural Sedation Credentialing Program on quality of care (Krieser D et al)
1645: Abs. 15 Comparison of combination therapy of Tramadol and Panadol versus Ketorolac and Panadol in acute musculoskeletal pain in the emergency department (Lee et al)

PEDIATRIC TRACK

1330: Abs. 16 Can the Broselow tape be used for Korean children? (Jang HY et al)
1345: Abs. 17 A stand-alone community hospital paediatric short stay unit: effective, efficient & popular (Archer P et al)
1400: Abs. 18 Non-urgent presentations to a paediatric emergency department – parental behaviours, expectations and outcomes (Ryan M et al)
1415: Abs. 19 The CATCH rule: a clinical decision rule for the use of CT head in children with minor head injury (Osmond MH et al)
1430: Abs. 20 Limb fractures as an indication of non-accidental injury (Bayreuther J et al)
1445: Abs. 21 Alcohol related attendances in children – taking an initiative (Williams K et al)
1530: Abs. 22 Virtual reality as a distraction technique for children during minor medical procedures in a pediatric emergency department (Lange BS et al)
1545: Abs. 23 A brief screen for adolescent depression in the pediatric emergency department (Rutman MS et al)
1600: Abs. 24 Risk-taking behaviors and depression in adolescents seeking care in the pediatric emergency department (Rutman MD et al)

RESUSCITATION TRACK

1530: Abs. 25 Impact of a sepsis protocol for the management of patients with severe sepsis and septic shock in the emergency department (Stenstrom R et al)

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1545: Abs. 26 Location-specific cost effectiveness of public access defibrillation (De Maio VJ et al)
1600: Abs. 27 Randomized controlled trial of fixed versus escalating energy levels for defibrillation (Stiell IG et al)
1615: Abs. 28 Temporal changes in the left ventricular dimensions and the systolic function during CPR in patients with prolonged cardiac arrest (Hwang SO et al)
1630: Abs. 29 Is survival after cardiac arrest related to the incidence of cardiac arrests on a hospital ward? (Hou SK et al)

TRIAGE TRACK

1645: Abs. 30 Predictive validity of a computerized emergency triage tool (Dong SL et al)

Monday, June 5th: Oral Abstract Presentations

PATIENT SAFETY TRACK

1030: Abs. 31 Emergency department management of acute upper gastrointestinal hemorrhage following centralization of acute surgical services (McKechnie M et al)
1045: Abs. 32 Emergency recall of consultants to the hospital: the use of Green Warning Lights and how to 'Drive to Arrive' (Young RA et al)
1100: Abs. 33 Unexpected events during intrahospital transport from the emergency department (Papson JPN et al)
1115: Abs. 34 Adverse events related to emergency department care (Calder LA et al)
1130: Abs. 35 Medical error in the emergency department (Dankoff J et al)
1145: Abs. 36 They looked OK at triage (or did they?): characteristics of patients who deteriorate in the ED (Considine J et al)
1200: Abs. 37 Predictors of deterioration in emergency department patients (Considine J et al)
1215: Abs. 38 Maintaining patient safety during implementation of the Emergency Nurse Practitioner role: an Australian perspective (Jenkins J et al)

GERIATRICS TRACK

1230: Abs. 39 The fit and active elderly in the emergency department (Archer P et al)

Tuesday, June 6th: Oral Abstract Presentations

AIRWAY TRACK

1530: Abs. 40 Prospective multicentered study of relapses following emergency department discharge for low risk pneumonia (Rowe BH et al)
1545: Abs. 41 Accuracy of the physical exam in determining underlying etiology of respiratory distress (Brewer KL et al)
1600: Abs. 42 The prognostic factors of hypotension after rapid sequence intubation (Lin CC et al)
1615: Abs. 43 Endotracheal intracuff pressures in the prehospital setting: Is there a problem? (Svenson JE et al)

DIAGNOSTIC IMAGING TRACK

1330: Abs. 44 Controlled clinical trial to implement the Canadian C-Spine Rule (Stiell IG et al)
1345: Abs. 45 Emergency physicians can reliably assess patient cardiac output (Lam JMY et al)
1400: Abs. 46 A clinical decision rule to safely rule-out subarachnoid hemorrhage in acute headache patients in the emergency department (Perry JJ et al)
1415: Abs. 47 Computed tomography is a must in diagnosing appendicitis even though the Alvarado score is highly suggestive of appendicitis (Kim KS et al)
1430: Abs. 48 The use of emergency department bedside ultrasound to determine the correlation between increased intracranial pressure and the optic nerve sheath diameter (Larson JL et al)
1445: Abs. 49 Computerized tomographic pulmonary angiography compared with ventilation perfusion lung scanning as initial diagnostic modality for patients with suspected pulmonary embolism: a randomized controlled trial (Dreyer J et al)
1530: Abs. 50 The actual application of NEXUS and Canadian C-Spine Rules by emergency physicians (Weiner SG et al)
1545: Abs. 51 Implementation of a guideline to CT head imaging in head injury: a prospective study (Fong C et al)

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EMS TRACK

1530: Abs. 52 Contributing to the evolution of the Cochrane prehospital and emergency health field (Archer F et al)
1545: Abs. 53 Cultural diversity: a challenge for paramedics (Spencer C et al)
1600: Abs. 54 Lower mortality in patients with ST-elevation myocardial infarction triaged in the field and refered for primary percutaneous angioplasty by advanced care paramedics (LeMay M et al)
1615: Abs. 55 Comparison of German prehospital physician practice to paramedic protocols (MacDonald D et al)
1630: Abs. 56 Preliminary report of ketamine use by paramedics as an analgesic agent (Wilkes GJ et al)

TOXICOLOGY TRACK

1615: Abs. 57 Effect of pyridostigmine, pralidoxime and their combination on survival in rats exposed to the organophosphate paraoxon (Petroianu GA et al)
1630: Abs. 58 Non-invasive carboxyhemoglobin monitoring: carbon monoxide toxicity screening in the emergency department (Chee KJ et al)
1645: Abs. 59 Smoking in the ED: characteristics of individuals presenting with acute respiratory symptoms (Partridge RA et al)
1700: Abs. 60 Serum level of NT-ProBNP as an early cardiac marker of carbon monoxide poisoning (Davutoglu V et al)

Wednesday, June 7th: Oral Abstract Presentations

ADMINISTRATION TRACK

1330: Abs. 61 The impact of NHS Walk-in Centres on A&E services (Salisbury C et al)
1345: Abs. 62 The utility of clinical features in patients presenting with non-traumatic headache (Locker TE et al)
1400: Abs. 63 Are changes in ED attendances related to primary care changes? (Fisher JD et al)
1415: Abs. 64 The emergency department overcrowding impact study (Gilligan P et al)
1430: Abs. 65 Variation of consultation practice in urban emergency physicians (Curry DG et al)
1445: Abs. 66 Designing emergency departments for patient satisfaction and wellbeing (Kas PJ et al)
1530: Abs. 67 Do observation units (OBs) provide quality care? (Schneider SM et al)
1545: Abs. 68 Multicenter implementation of an emergency department asthma treatment protocol (Innes G et al)
1600: Abs. 69 Does caring for low-complexity emergency department patients delay the time to first physician contact for sicker patients? Results from the CROWDED study (Schull MJ et al)
1615: Abs. 70 An international survey of priorities of emergency physicians for future development of clinical decision rules (Eagles D et al)

INFORMATICS TRACK

1630: Abs. 71 Data collection on patients in emergency departments in Canada (Rowe BH et al)

CARDIOVASCULAR TRACK

1330: Abs. 72 If you were having a heart attack what would you want to know? (Skeoch S et al)
1345: Abs. 73 Can we reliably predict AMI in young adults presenting to the emergency department with chest pain? (Rosin A et al)
1400: Abs. 74 Cortisol levels as a marker for acute coronary events in emergency department patients (Watkins B et al)
1415: Abs. 75 Improving door-to-balloon times in primary PCI for acute STEMI: the value of an audit-driven quality initiative (Charles RA et al)
1430: Abs. 76 Factors related to prognosis and mortality in emergency stroke care (Bayır A et al)
1445: Abs. 77 Randomised trial on early stress nuclear scan for patients present to the emergency department with chest pain but non-diagnostic ECG (Lim SH et al)
1530: Abs. 78 Emergency department patient compliance with outpatient exercise stress test: a randomized controlled trial (Richards D et al)
1545: Abs. 79 Plasma fibrin D-Dimer for detection of acute aortic dissection in the emergency department (Cho GC et al)
1600: Abs. 80 Determining the ideal position for the wrist-cuff blood pressure device (Rosin A et al)

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DISASTER MEDICINE TRACK

1445: Abs. 81 Accelerated discharge of patients in the event of a major incident: observational study of a teaching hospital (Challen K et al)
1530: Abs. 82 Increased injuries and medical needs in concerts with mosh pits vs. standard spectator (Milzman D et al)
1545: Abs. 83 Rapid health assessment following the South Asia earthquake (Brennan RJ et al)
1600: Abs. 84 A review of the repatriation of Australian patients following the Bali bombings (Cooper DM et al)
1615: Abs. 85 Role of donor governments in humanitarian relief: review of Australia's assistance in the Asian tsunami disaster (Cooper DM et al)
1630: Abs. 86 An analysis of triage models during a counter-terrorism exercise in Australia (Cooper DM et al)

EDUCATION TRACK

1430: Abs. 87 Pharmacology in the emergency department: a consensus approach to determining curricular content for postgraduate trainees (Driscoll PA et al)
1445: Abs. 88 Core anatomical knowledge requirements for training and clinical practice in the emergency department: a national consensus curriculum strategy (Kilroy DA et al)
1530: Abs. 89 Effective health teaching for patient /caregivers in a children's emergency department (Devi I et al)
1545: Abs. 90 Diagnostic error in emergency medicine: the role of cognitive bias (Macpherson KJ et al)
1600: Abs. 91 Evaluating "ED STAT!": a novel and effective faculty development program to improve emergency department teaching (Sherbino J et al)
1615: Abs. 92 A comparison between the efficacy of lectures given by emergency and non-emergency physicians in an international emergency medicine educational intervention (Weiner SG et al)
1630: Abs. 93 Physician self-evaluation in an international emergency medicine educational intervention (Weiner SG et al)

INFECTIOUS DISEASE TRACK

1330: Abs. 94 Pandemic influenza - How can we cope? (Hughes TC et al)
1345: Abs. 95 Expression of the triggering receptor expressed on myeloid cells-1 mRNA in a heterogeneous infected population presented to the emergency department (How CK et al)

LABORATORY / BENCH TRACK

1400: Abs. 96 The observation of pro-ARDS findings in rat's lung using phase-contrast x-ray microscopy and micro-CT (Choi HS et al)
1415: Abs. 97 Capillary refill time: A reliable and reproducible test? (Dalton R et al)
1430: Abs. 98 Venous pCO2 cannot replace arterial pCO2 in emergency patients (Irwani I et al)

THERAPEUTICS TRACK

1530: Abs. 99 pH measurement via a non traditional site of capillary blood gas sampling agrees with arterial blood gas pH measurement in a normal population (Hall CA et al)
1545: Abs. 100 Dexamethasone in migraine relapses: a randomized, placebo-controlled clinical trial (Rowe BH et al)
1600: Abs. 101 Emergency department drug orders: Does drug storage location make a difference? (Conners GP et al)
1615: Abs. 102 Etomidate and Midazolam for procedural sedation in emergency department of a regional hospital in Hong Kong: a randomised controlled trial (Chan KL et al)
1630: Abs. 103 The Australasian haemostasis registry – experience with rV11a (Cameron PA et al)

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ICEM 2006
Poster Presentations Schedule

Sunday, June 4th: Poster Presentations

Viewing times:
1000h–1030h, 1230h–1330h, and 1500h–1530h

Track	Abstract No.
Disaster Medicine	104–109
Informatics	110–119
Injury/Trauma	120–153
Pediatrics	154–172
Resuscitation	173–183
Toxicology	184–203
Triage	204–205

Monday, June 5th: Poster Presentations

Viewing times:
1000h–1030h, 1230h–1330h

Track	Abstract No.
Infectious Disease	206–218
Pain	219–229
Therapeutics	230–231

Tuesday, June 6th: Poster Presentations

Viewing times:
1000h–1030h, 1230h–1330h, and 1500h–1530h

Track	Abstract No.
Administration	232–280
Airway	281–295
Bioethics	296
Diagnostic Imaging	297–310
Emergency Medical Services	311–337
Safety	338–346

Wednesday, June 7th: Poster Presentations

Viewing times:
1000h–1030h, 1230h–1330h, and 1500–1530h

Track	Abstract No.
Cardiovascular	347–368
Education	369–390
Geriatrics	391–392
Laboratory	393
Rural and Remote	394–398

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ICEM 2006
Scientific Abstracts

Disclaimer: The large number of abstracts submitted and the short time interval between submission and publication does not permit communication with authors, abstract revision, or editorial review. The following abstracts are presented as they were submitted to the ICEM Research Committee, with minimal editing. Abstract authors are from the department or division of emergency medicine of their respective universities unless otherwise specified.

Avertissement : Le grand nombre de résumé soumis et le court délai entre leur réception et la date de publication on empêché la communication avec les auteurs, la révision des résumés, ou l'évaluation par le comité de réduction. Les résumés qui suivent sont présentés tels qu'ils ont été soumis au Comité de Recherche de la CIMU, moyennant une légère révision. Les auteurs des résumés sont rattachés au département de médecine d'urgence de leur université respective, sauf indication contraire.

Sunday, June 4th: Oral Presentations

INJURY TRACK

1

Evaluation of new needle catching instrument for suturing simple wounds.

Breslin TM, Sheils D, Kennedy U, Geary U. Emergency Department, St. James's Hospital, Dublin 8, *Ireland*

Introduction: Our objective was evaluation of the impact of a new device on suturing technique safety, undertaken by video analysis. Subjective evaluation was also carried out in two centres using a questionnaire. The Needle Catcher™ comprises a tissue forceps with a "piston and barrel" system, which acts as a needle grasper on the closed end of the instrument. **Methods:** 6 physicians and 4 advanced nurse practitioners (ANPs), were videoed suturing a standard wound using their usual technique. After training and using the new instrument in the clinical setting over a ten-week period, they were re-videoed using the new instrument. Objective measures included total time it took to suture the wound; duration that the needle was not held by an instrument; and the number of unsafe practices such as grasping and dropping the needle. In two centres, operators were also surveyed about the impact of the device on their safety, after training and using the instrument in practice. **Results:** Video analysis of the junior doctor group showed needle grasping was reduced from an average of 8 to 1.5 episodes. The needle was secured in an instrument for an average of 51% of the duration of the procedure by standard technique, but this increased to 96% using the needle catcher. Results for the ANP group showed no difference. In the questionnaire study of 103 episodes of wound closure, operators indicated they perceived their safety to be increased in 88 episodes, neutral in 10 episodes and decreased in 5 episodes. **Conclusions:** The Needle Catcher™ demonstrated a measurable improvement in operator safety in suturing practice. Those less experienced in suturing demonstrated the greatest difference using the new device. Our results indicate the potential of the needle catcher to improve junior doctor's safety. We believe it will have a role in the reduction of risk of needle stick injury in the Emergency Department. **Key words:** injury, suturing, laceration

2

Why do UK emergency physicians ignore the Canadian CT head rule?

Townend WJ, Patterson J, Grundy K, Clark A, Tennant A. Department of Emergency Medicine, Hull York Medical School, Hull, *United Kingdom*

Introduction The 2003 National Institute of Clinical Excellence (NICE) guidelines for CT scanning after head injury are based on the Canadian CT head rule. They fundamentally changed the way head injured patients should be investigated in the UK. Little has been reported of how clinicians use them. We aimed to estimate clinician adherence with the NICE guidelines 12 months after their introduction, and to analyze the effect of printing the indications for scan on the patient record. We also aimed to identify which guideline discriminators and clinical factors related to the decision not to order a CT scan when one was indicated. **Methods:** Data was collected prospectively for two months from 04/08/04 in an urban teaching hospital department. Emergency Department (ED) clinicians treating head injured adults were asked to complete tick boxes for the NICE indicators for CT. A search of all adult attendees during this time identified missing data. We compared adherence with the NICE guidelines for those patients with and those without the guideline prompts completed (Chi-squared test). Logistic regression analysis was used to identify factors related to the decision not to perform a CT scan when indicated by NICE. **Results:** 625 adult patients (62.6% male) presented to the ED with head injury, 162 (26%) were eligible for CT scan. Forty-four (7%) were scanned. Clinicians had completed tick boxes of NICE indicators in 322 (51.5%) cases. Completion of these made no difference to adherence to the guidelines ($p=0.107$). In our regression model, significant ($p<0.05$), independent predictors were patients aged over 65 (2.89 [1.130-7.376]) and presentation at night (3.78 (1.447-9.869]). **Conclusions:** Clinicians ignore the NICE guidelines, despite recording positive indications. The use of tick boxes to inform decision-making made no difference. Clinical (low scan rates for those over 65) and process factors (lack of scan activity overnight) were found to be the most significant independent predictors of poor scan compliance. **Key words:** head injury, scoring, computerized tomography

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3

Is the Harborview Assessment for Risk of Mortality Score (HARM) an improved measure of patient mortality in Scottish trauma patients compared to TRISS?

Edward James, Jennifer Browning, Jenny Hendry, Alasdair Gray. *United Kingdom* and *Northern Ireland*

Introduction: Numerous methods of assessing patient injury assessment and outcome measurement have developed. Most have been developed in North America and therefore may not be applicable in the UK. The objective of this study was to create a working model of the HARM score from a UK dataset (UK-HARM), and then compare its accuracy with the Trauma & Injury Severity Score (TRISS). **Methods:** Patient data recorded by the Scottish Trauma Audit Group (STAG) was analysed using Logistic Regression. The patient's injuries, recorded using AIS-90 codes, were reclassified into 96 injury codes. These were included in the regression with mechanism of injury codes, age codes and two-way interaction terms. The results were then compared to a TRISS model that had been previously developed using the STAG database on a test dataset using Receiver Operator Characteristic (ROC) curves. **Results:** The logistic regression resulted in 46 different variables to form the UK-HARM score. The probability of survival for all of the patients was calculated and then modeled on ROC curves and the area under the curve (AUC) calculated for each. When this score was compared to TRISS it was found to be similar in accuracy at predicting patient mortality. **Conclusions:** This work supports original research suggesting this method of trauma scoring can accurately predict mortality. The UK-HARM score is equivalent to TRISS in predicting trauma mortality in a UK population. **Key words:** injury, scoring, mortality

4

Spinal injury in the adult trauma population: patterns of injury and associated risk factors.

Amin O, Bouamara O, Sieber R, Clancy M, Lecky F. Tarn. Clinical Sciences Building, Hope Hospital, Eccles Old Road, Salford, *United Kingdom*

Introduction: Injury to the spine or spinal cord is associated with a significant mortality and morbidity. Initial recognition and appropriate early management is crucial in order to minimize neurological disability and improve outcome. To determine the prevalence and distribution of spinal injury and relative risk factors for it occurrence in the adult trauma population. **Methods:** All adults with blunt trauma presenting to hospitals within the Trauma Audit Research Network between 1989-2003 were studied. Patients with spinal fracture with or without cord injury were identified using abbreviated injury scale (AIS) codes, enabling prevalence, distribution and risk factors to be identified. **Results:** 161,153 patients were identified; with 15,541(9.64%) patients with spinal injury. 69.71% of spinal injuries identified involved the thoracic and lumbar spine. Spinal cord injury occurred in 1657 patients (1.03%) of all trauma patients and 10.66% in those having sustained a spinal injury. Multilevel spinal trauma occurred in 8.9% of cases with spinal injury. Spinal injury patients were more likely to be male than the general trauma population, but the age ranges were similar. Glasgow Coma Score (GCS) <15 was not associated with any higher risk of spinal fracture/dislocation (relative risk = 0.98, 95% CI 0.93-1.03). However GCS<15 was associated with a higher risk of cord injury (relative risk=1.66, 95%CI 1.46-1.90). An Injury Severity Score (ISS) > 25 was associated with higher risks for both spinal fracture/dislocation and cord injury. Road traffic accidents (RTA) were significantly more prevalent in spinal injury patients, than the general trauma population. **Conclusions:** Spinal injury has a prevalence of 9.64% in the adult major trauma population, amongst those sustaining injury to the spine 10.66% have cord injury. RTA, ISS>25, male gender, GCS<15 are all associated with a higher risk of spinal cord injury. **Key words:** spinal injury, risk factors, epidemiology

5

Evaluation of Trauma Call Guidelines for trauma patients triaged to the resuscitation room of an Emergency Department in Hong Kong.

Rainer TH, Cheung NK, Yeung JHH, Graham CA, Yim V. Chinese University of Hong Kong, *Hong Kong*

Introduction: The aim of this study is to determine which criteria of trauma call activation most accurately predict poor morbidity and mortality, and to compare old and newly refined criteria guidelines. **Methods:** Retrospective study using data collected prospectively between January 2001 and February 2005 for trauma registry data from an academic trauma centre in Hong Kong. Patients dying before arrival at the ED were excluded. Trauma call is recommended according to one of 10 criteria. Fisher's Exact test and multivariate logistic regression were used to analyse data and to develop a prediction guideline. **Results:** 2 031 patients (mean age 40 years, SD21; 70% male; 94% blunt trauma) were included. Motor vehicle/bicycle crashes accounted for 980 (48%) and falls for 569 (28%) cases. 126 (6%) patients died. Trauma call was activated in 433 (21%) cases. The sensitivity and specificity of the initial 10 criteria for predicting poor Glasgow Outcome Score (GOS) were 38% and 96% and for mortality were 80% and 81%. Six of 10 factors predicted poor outcome and were assigned weighted scores (x): Haemodynamic instability (5), GCS ≤13 (23), Blunt injury to chest/abdomen (7), Spinal injury with paralysis (40), age >65 years (7) and comorbidity (2). At a cut off of 8, the areas under the ROC curve for poor GOS and mortality were 0.883 (sensitivity 78% and specificity 85%) and 0.907 (sensitivity 86% and specificity 82%) respectively. **Conclusions:** Trauma call activation criteria may be simplified to include four anatomical and physiological criteria, age and comorbidity with an improvement in prediction accuracy of GOS. **Key words:** trauma, triage, resuscitation

6

Pre-hospital clearance of the C-spine – Does it need to be a pain in the neck?

Bruce Armstrong; Howard Simpson; Charles Deakin. Emergency Department, North Hampshire Hospital, Aldermaston Road, Basingstoke, *United Kingdom*

Introduction: Cervical spine injury (CSI) occurs in 2% to 4% of all cases of blunt trauma. The incidence of spinal cord injury is low (0.7%) and the reported rate of missed CSI is very low (0.01%). However, because CSI can result in devastating morbidity and mortality, the traditional emergency medical services (EMS) practice has been to assume the presence of CSI in any patient with a potential for spinal injury and to proceed to triple immobilisation of the cervical spine. In the United Kingdom (UK), this means a cervical collar, head restraints and a long spinal board (LSB). The effects of "full immobilisation" may have significant implications to patients and costs to organisations. This paper aims to present the results of a pilot study to enable EMS technicians and paramedics to clear the cervical spine. **Methods:** Permission was gained from the Clinical Advisory Group of the EMS to carry out a pilot study. 17 EMS staff were trained (3 hours of skills stations and formative testing) in pre-hospital c-spine clearance using evidence based clinical guidelines by a faculty of 5 consultant emergency care practitioners. **Results:** 64 patients were identified during the audit period. 2 were excluded because of no data on the audit form. Of the 62 patients left in the audit, 69.4% (n=43) had their cervical spines cleared at scene. 11.3%

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(n=7) were taken to the local Emergency Department with other injuries, but were all discharged home the same day. 58.1% (n=36) were discharged at scene, with no clinical risk management complaints. 30.6% (n=19) did not have their cervical spines cleared at scene. Of which 3 patients self discharged and 16 were conveyed to an Emergency Department. **Conclusions:** Clearance of the cervical spine by EMS personnel can have significant impact on patient care and cost savings to organisations. **Key words:** trauma, pre-hospital, cervical spine

7

Evaluation of prehospital trauma diversion in the New Territories of Hong Kong

Rainer TH, Cheung NK, Yeung JHH, Chan JTS, Cameron PA, Graham CA. Chinese University of Hong Kong, *Hong Kong*

Introduction: The aim of this study was to assess the impact of trauma diversion (TD) in the New Territories of Hong Kong, 1. on delivery of patients to the most appropriate hospital, 2. time from injury to definitive care, 3. clinical service in the trauma centre, and 4. Mortality. **Methods:** Prospective observational study of patients undergoing primary and secondary trauma diversion (PTD and STD). **Results:** From 1st January to 31st August 2005, 2211 trauma patients were evaluated (complete forms in 99%), and 110 underwent TD (73 [0.3%] PTD and 37 [0.2%] STD). 8 cases were excluded. 32 (29%) patients had ISS>15. The correct decision was made in 2169 (98%) cases. Of 102 cases, 74 (73%) underwent correct diversion, 15 (15%) were under-diverted and 13 (13%) cases were over-diverted. PTD cases were delivered to TC an average of 100 minutes faster than STD cases. TD has resulted in an average of 3 extra admissions per week (including one orthopaedic and one neurosurgical case), one extra ICU bed every 2 weeks. The average hospital stay for admitted patients is 5 days, including 0.5 ICU beds per day. An additional two CT/MRI investigations and one surgical operation are required per week. The mortality rate was 5% (all unpreventable deaths, 4 expected and 2 unexpected deaths). Compared with US data, the W score was 0.5, M score 96% and Z score 0.28. **Conclusions:** The 'Right patient is delivered to the right hospital at the right time' in 98% all trauma cases, and 73% TD cases. The crews' assessment was correct in 72% cases resulting in a potential saving of 100 minutes to definitive care. The impact on hospital clinical service is manageable, and mortality generally equivalent to the US average. **Key words:** trauma, pre-hospital, diversion

8

Effect of hospital capacity on major trauma outcomes in regional and remote Queensland.

Myers C, Lang J. Queensland Trauma Registry, University of Queensland, *Australia*

Introduction: Much has been written about the requirement for major trauma patients to bypass small hospitals in order to present directly to a major trauma centre. In Queensland that is often not possible due to the decentralized population and the size of the state. Many hospitals are small and poorly resourced to manage major trauma patients. This study was designed to assess the variation in outcome for major trauma patients associated with the capacity of the hospital of first presentation. **Methods:** All patients who were entered into the statewide Queensland Trauma Registry database as "major" cases (death or ISS>15 and hospital stay >24 hours) between January 2003 and December 2004 were examined. The variable "hospital of first presentation" was assessed by regression analysis while controlling for common predictive variables such as age, sex, and ISS. Outcome was measured by mortality and length of stay (LOS) both in ICU and in hospital. **Results:** A total of 2541 major trauma cases were identified of which 2486 had complete data. Patients who presented first to a regional hospital (n=599, 24%) were 1.6 times more likely to die (95% CI 1.19-2.14) than those presenting first to a major hospital (n=1445, 58%) while patients presenting first to a rural hospital (n=442, 18%) had outcomes indistinguishable from those presenting to a major hospital. Length of stay for both ICU and hospital were unaffected by hospital of first presentation. **Conclusions:** Mortality rates for major trauma are higher in regional than major centers. Unexpectedly, mortality rates for those presenting first to a rural hospital are as low as a major center. This may be explained by the extremely high pre hospital mortality rate for rural trauma which has been well reported in the literature but not captured by this trauma registry. Trauma registries should be expanded to include all trauma related deaths notified to the coroner. **Key words:** trauma, outcome study, rural areas

9

South West Elbow Extension Test (SWEET).

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Introduction: There are no established rules as to which patients with elbow injuries require x-ray. Two previous small studies suggest that full elbow extension may rule out significant bony injury and has been proposed as a simple test to exclude the need for an x-ray. The aim of this study was to assess the sensitivity of this in adult patients with acute elbow injuries. **Methods:** We conducted a multicentre prospective validation study of the elbow extension test in adults. Consecutive patients presenting with elbow injuries who met the inclusion criteria were recruited in four centres over a 14-month period. All patients who could not fully extend their elbow were x-rayed. Those patients who could fully extend their elbow were not x-rayed, given simple analgesia, advice and contacted within 7-10 days. Those with continued pain, loss of function or any other concern were reviewed and x-rayed. **Results:** 608 patients were recruited. 139 were excluded (injury>72hrs, no history of trauma, multitrauma). The remaining 469 patients underwent the elbow extension test and of 160 patients who could fully extend their elbow, 1 patient had a fracture and 3 had an isolated effusion. Of the 309 non-extenders, 207 had no fracture, 33 had isolated effusions, and 102 patients had a fracture. In this population the elbow extension test had a sensitivity of 99.0% (95% CI, 94.7-99.8), specificity of 43% (95% CI, 38.3-48.6) and negative predictive value of 99.4% (95% CI, 96.0-99.9). **Conclusions:** In this study, the ability to fully extend the elbow following acute elbow injury ruled out significant fracture in 99% of adult patients. The elbow extension test may be a useful screening test particularly in minor injury units where x-ray facilities may not be available. **Key words:** injury, elbow, test

10*

Randomized control trial of cast versus removable brace in children with low risk ankle fractures.

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Introduction: Isolated distal fibular fractures in children are very low-risk for future complications. Standard therapy with casting carries risks, inconveniences, and use of subspecialty health care resources. In children 5–18 years with low risk ankle fractures, to determine if a removable ankle brace is at least as effective as casting with respect to recovery of performance of daily activities as measured by the Activities Scale for Kids (ASK) at 4 weeks post injury. Secondary objectives included determining differences in range of motion, pain scores, return to baseline activities, and patient prefer-

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ences. **Methods:** A non-inferiority randomized controlled, single assessor blinded, and single centre trial in a tertiary care pediatric ED. Sample size of 111 patients with low risk fractures was based on testing the null hypothesis (H0) that the brace is 5% less effective at the 5% level and having an 80% probability of rejecting H0 if brace and cast are equally effective. H0 was tested by a t-test for a non-zero difference. **Results:** Of 111 randomized patients, 104 were included in the final analysis, 54 brace and 50 cast. Follow up of the primary outcome completed in 99% of patients. The mean ASK at 4 weeks was 91.3% in the brace group compared with 85.3% in the cast group, a mean difference of 6.0%, with the lower bound of a one-sided 95% confidence interval = 1.13%, $p < 0.0001$. There were no differences in follow up of range of motion or pain scores at 4 weeks ($p > 0.05$). However, 80.8% of the children in the brace group returned to normal activities by 4 weeks compared with 59.5% in the cast group ($p = 0.038$). 54.0% of the children who received the cast would have preferred the brace versus 5.7% of children who received the brace would have preferred the cast ($p < 0.0001$). **Conclusions:** The removable ankle brace is no worse than the cast with respect to recovery of physical function and is superior with respect to returning to normal activities and patient preference. **Key words:** children, casting, ankle injury

11

Effect of "time to definitive care" on major trauma outcomes in regional and remote Queensland.

Myers C, Lang J. Queensland Trauma Registry, University of Queensland, *Australia*

Introduction: The importance of the Golden Hour and the minimization of time to definitive care has been the mantra of trauma systems over the past 30 years. In Queensland that is not possible due to the decentralized population and the size of the state. Transport is often by fixed wing aircraft over distances as far as 1600 km. This study was designed to assess the variation in outcome for major trauma patients associated with time taken to reach definitive care. **Methods:** All patients who were entered into the statewide Queensland Trauma Registry database as "major" cases (death or ISS>15 and hospital stay >24 hours) between January 2003 and December 2004 were examined. The variable "time to definitive care" was assessed by regression analysis while controlling for common predictive variables such as age, sex, and ISS. Outcome was measured by mortality and length of stay (LOS) both in ICU and in hospital. **Results:** A total of 2541 major trauma cases were identified for this study. The mean pre hospital time for patients transported directly to a definitive care hospital (n=1458, 57.4%) was 63 (SD 40.5) minutes. Patients transported urgently via another hospital (n=1083, 42.6%) took a mean of 392 (SD 142) minutes to arrive at definitive care (maximum cutoff time 12 hours). The likelihood of death for all patients decreased by 0.12% for each minute increase in time taken to definitive care. There was no effect on LOS in either group. **Conclusions:** Time to reach definitive care of up to 12 hours does not appear to be associated with increased mortality or morbidity for major trauma patients in this environment. However this data does not identify those patients who died prior to reaching a regional or major hospital. Thus rural trauma patients who survive the pre hospital and initial hospital resuscitation phase do as well as those patients who present directly to a much larger hospital. Trauma registries should be expanded to include all trauma related deaths notified to the coroner. **Key words:** trauma, outcome study, rural areas

12

What is the incidence of diagnostic radiological findings on presentation chest x-ray in patients with pulmonary contusion following blunt trauma?

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Introduction Studies looking at the use of CT imaging in blunt thoracic trauma have found pulmonary contusion not visible on plain films in 17-20% of patients. Our objective was to determine how many patients with a diagnosis of pulmonary contusion following blunt chest trauma had diagnostic changes on chest x-ray at presentation. **Methods:** We used STAG data collected in Scotland to identify patients with a diagnosis of pulmonary contusion. Patient case notes were retrospectively reviewed to see whether the attending emergency physician diagnosed pulmonary contusion from the admission chest x-ray. These films were then reviewed and reported by a radiologist who was blinded to the aims of the study. **Results:** We were able to identify and find case notes and x-rays for 37 patients. 31 RTAs, 4 falls from height, 1 crush by a tree and 1 quad bike injury. The attending emergency physician noted changes of pulmonary contusion in 21 of the presentation x-rays. The radiologist reported contusion in 20 cases. There was a 65% concordance in reporting between the emergency physician and the radiologist. Only 14 x-rays (37%) were interpreted by both as demonstrating contusion and 10 x-rays (27%) were reported by both to show no evidence of contusion. Eleven of the sixteen cases not identified by the emergency physician were found on CT scan, four by repeat chest x-ray and one at post-mortem. Time to diagnosis for these patients ranged from 2 hours to 120 hours (median 4hours). **Conclusions:** This study shows a lower rate of diagnostic changes on initial films than previously reported. The emergency physicians diagnosed only 57% and the radiologist diagnosed only 54% of these cases from the presentation x-rays. Failure of interpretation may have contributed, as there was only 65% concordance in reporting but it is important that physicians are aware that initial chest x-rays may not demonstrate clinically relevant pulmonary contusion. **Key words:** trauma, pulmonary contusion, radiology

PAIN TRACK

13

Randomized controlled trial of patient controlled analgesia compared with nurse delivered analgesia for renal colic in an emergency department.

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Introduction: The objective of our study was to compare effectiveness, safety, and patient satisfaction of patient controlled analgesia (PCA) with intravenous opioid injections for the management of renal colic in the emergency department. **Methods:** The study took place in the ED of a University hospital. Patients suffering from renal colic requiring opioid analgesia, and meeting other inclusion criteria, were randomized to either the study group or control group, after the consent. Patients in the study group were given morphine through the PCA system, whereas patients in the control group were given intravenous morphine. The primary outcome measure was the pain levels, measured by using a visual analogue scale. The secondary outcomes were the total amount of morphine use in both groups; patient satisfaction as assessed by Likert scale; and the adverse events. Both groups had their pulse, blood pressure, respiratory rate, oxygen saturations, Glasgow coma score, and pain scores monitored at 0, 15, 30, 45, 60, 90, and 120 minutes, and any adverse events were noted. Patients were followed up with a questionnaire asking about their experience of pain relief in the department. **Results:** 126 patients were recruited to the study, 63 in each group. The PCA group differ significantly in terms of pain relief (p = 0.033) and

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patient satisfaction (p = 0.028)when compared the with control group. The incidence of side effects did not differ significantly between groups. **Conclusions:** Although further research is needed to determine the conditions for optimal use of patient-controlled analgesia, it is concluded that it is a safe, effective and improved method for controlling pain of renal colic patients in an emergency department. **Key words:** pain, patient controlled analgesia, renal colic

14

Evaluation of the impact of a Paediatric Procedural Sedation Credentialing Program on quality of care

Krieser D, Priestley S, Babl F, Law A, Miller J, Spicer M, Tully M. Departments of Emergency Medicine and Paediatrics, Sunshine Hospital, Melbourne, *Australia*

Introduction: To describe changes in documentation, risk assessment and patient care resulting from implementation of a credentialing process for medical and nursing staff in PPS in two emergency departments – one an urban mixed emergency department and the other a specialist paediatric emergency department. **Methods:** Chart Review of 100 patients undergoing PPS prior to and following introduction of the PPS Program. Information was extracted from data collection sheets. Demographics, drugs used, procedure performed and important elements of the pre-procedural, intra-procedural and post-procedural care were compared pre and post implementation of the PPS program. **Results:** Rates of documentation of informed consent (15/100 pre-program vs 87/100 post-program, P < .0001), evidence of performance of a pre-procedural risk assessment (1/100 pre-program vs 87/100 post-program, P < .0001), and recording of appropriate vital signs (27/100 preprogram vs 58/100 post program, P < .0001) all improved significantly. There were also improvements in documentation of weight, allergies, fasting status, and recording of drug orders. There were no adverse events recorded in the pre program period and 6 recorded in the post program period. **Conclusions:** The implementation of a PPS credentialing program into these two emergency departments resulted in significant improvements in risk assessment, monitoring and documentation of important information related to safe PPS. These improvements are likely to be a proxy marker for improvement in quality and safety of PPS in these two EDs. **Key words:** pain, sedation, children

15

Comparison of combination therapy of Tramadol and Panadol versus Ketorolac and Panadol in acute musculoskeletal pain in the emergency department

Lee Ka Hing Herman. Emergency department, United Christian Hospital, Hong Kong, *Hong Kong*

Introduction: This study aims to compare the efficacy of intramuscular Tramadol and Ketorolac in combination with oral panadol in the emergency department setting. **Methods:** This is a randomized, double blind controlled trial. Patients aged 18 years or above attending our emergency department with moderate to severe musculoskeletal pain were recruited. Patients with known allergy, currently on psychiatric medication, alcohol or opioid dependent, pregnant or with a major systemic illness were excluded. Treatment was given as: intramuscular Tramadol 100mg or Ketorolac 30mg with oral panadol 500mg. Patients rested for 2 hours. Visual Analogue Scale (VAS) was evaluated before injection and 60 minutes after injection. Satisfaction score, vital signs and side effects were recorded. **Results:** 78 subjects were recruited from June to September 2005. Equal number of subjects in each arm. The mean age was 39.9 for Tramadol group and 43.9 for Ketorolac group. The majority suffered back pain (66.7%) and ankle and foot pain (11.5%). The VAS improvement in the Tramadol group was 3.12 and in the Ketorolac group was 2.24, with a difference of 0.88 (p= 0.01). However, there is no significant difference in satisfaction scores and the admission rate. In both groups similar number of patients had side effects (Tramadol: 19, Ketorolac: 17), such as dry mouth. None were major side effects. There was a significantly higher number of patients experienced nausea in the Tramadol group. **Conclusions:** Tramadol and Panadol combination is superior in analgesic effect when compared to Ketorolac and Panadol. Tramadol appeared to be safe to use in the emergency setting. **Key words:** musculoskeletal pain, analgesia, efficacy

PEDIATRIC TRACK

16

Can the Broselow™ tape be used for Korean children?

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Introduction: The Broselow pediatric emergency tape is used for obtaining a length-based estimate of a child's weight in emergency situations. We conducted a validation study of the use of the Broselow tape in Korean children. **Methods:** This study was performed at the Seoul National University Children's Hospital, a tertiary referral center. The anesthesia records of the children who were having elective surgery requiring orotracheal intubation were reviewed. The data collected was: body length (cm), body weight (kg) of the children, and the size (internal diameter) of the endotracheal tube (ETT) used. The measured weights of Korean children (measured weights) were compared with the weights estimated by the Broselow tape (Broselow weights). The used ETT size of each child was also compared with the ETT size guided by the Broselow tape and estimated by age-based formula. In both weight and ETT size, Bland-Altman analysis was used to determine the limits of agreement between the measured ones and the estimated ones. A ROC curve of sensitivity was acquired to obtain a cut-off weight for guiding application of the tape to Korean children. If the weight estimated by using the tape agreed with the measured one within the limits of agreement, it was regarded as 'sensitive'. **Results:** A total of 665 patients were enrolled and mean age of the subjects was 6.6±3.4 years. The measured weights were 1.55kg larger than the Broselow weights on the average (95% confidence interval 1.24, 1.85). The sensitivity of the correspondence was 100%, when the cut-off value of the heights was 102cm. In aspect of ETT size estimation, agreement of used ETT sizes with those guided by the Broselow tape was 84.9%, which showed superior result compared to age-based formula (79.4%). **Conclusions:** Broselow tape could be useful for estimating Korean children's weights and it was superior to age- based formula in selecting ETT size. **Key words:** children, weight, resuscitation

17

A stand-alone community hospital paediatric short stay unit: effective, efficient & popular.

Peter Archer, Sandy Hopper, Richard Breene, Penny Bolt, Luke Sammartino. Emergency Services, Maroondah Hospital, Victoria, *Australia*

Introduction: Paediatric illness and injury is particularly amenable to short stay medicine as children often have single system diseases which resolve rapidly with treatment. Maroondah hospital serves a population of 120,000 children in the Eastern suburbs of Melbourne. Previously all children requiring admission were transferred to other hospitals, with the attendant risks of transport, lack of continuity of care and family disruption. **Aim:** to describe set up, numbers, and

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quality indicators of consumer satisfaction. **Methods:** A prospective audit of attendances, admissions and discharge outcome of all children attending Maroondah Hospital's ED over the first 2 months, accompanied by a telephone consumer satisfaction survey. Paediatric Pathways were defined for the 20 top presentations. **Results:** There was total of 9,097 Paediatric ED presentations, with 862 admissions and 239 transfers. Major admission diagnoses included gastroenteritis, asthma and febrile illnesses. 90% of admissions were on pathways, median LOS< 1-2 days, 6% unplanned representations, with no deaths, few unplanned transfers. Parent satisfaction levels with the unit were high, rated good-excellent by 96% of the parents. **Conclusions:** A co-located Paediatric Short Stay Unit within an Emergency Department was a safe and viable alternative for Paediatric services to be delivered in a suburban setting. This model fit together well with the major tertiary referral centre, as a back up for longer stay and more complicated patients whilst reducing costly interhospital transfers for the majority of our patients. **Key words:** children, community medicine, observation

18

Non-urgent presentations to a paediatric emergency department – parental behaviours, expectations and outcomes.

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Introduction: Our objective was to identify factors which influence the attendance of children with non-urgent medical problems to a tertiary Paediatric Emergency Department and to define parental expectations of the hospital visit. **Methods:** A questionnaire was administered to a convenience sample of 200 parents / carers who attended the Paediatric Emergency Department over a 14-month period and whose children were categorised as having non-urgent problems which had been present for at least four weeks. **Results:** One hundred and sixty (80%) patients had visited a GP prior to their ED visit but remained unhappy with the outcome of the consultation. When asked directly about their expectations of their visit to the PED, 175 (87.5%) anticipated a definite diagnosis. One hundred and ninety eight (99%) wanted instigation of appropriate treatment and 149 (74.5%) anticipated referral to a specialist. The vast majority of patients (94.5%) presented during 'business' hours – between 8.00am and 6.00pm. Only 5.5% of patients surveyed presented out of hours. The median waiting time to be seen in the PED was 1.93 hours (CI 1.59-2.07), with 70 patients (35%) being seen in less than one hour. The median total time spent in the PED was 2.98 hours (CI 2.58-3.33), with 63 (31.5%) patients staying longer than 4 hours. When asked if, instead of waiting in the PED, they would accept an outpatient appointment in the next four weeks, 143 (71.5%) said they would not. However 114 (57%) did find the offer of a review by a consultant paediatrician within one week more acceptable. **Conclusions:** The expectations of parents who attend the Paediatric Emergency Department with children who have non-urgent chronic complaints are high. Rapid access to outpatient clinics may provide an acceptable alternative for these patients and free valuable Emergency Department resources. **Key words:** children, utilization, parents

19*

The CATCH rule: a clinical decision rule for the use of CT head in children with minor head injury.

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Introduction: As part of the Canadian Assessment of Tomography for Childhood Head Injury (CATCH) Study, the objective was to develop a clinical decision rule for the use of CT head in children with minor head injury. **Methods:** We carried out this prospective cohort study in the EDs of ten Canadian pediatric teaching hospitals and included consecutive children (0–16 years) who presented with a Glasgow Coma Scale (GCS) score of 13–15 and documented loss of consciousness, amnesia, disorientation, persistent vomiting or irritability. Physicians completed a 28-item assessment form prior to CT scan and in some cases a 2nd physician performed an interobserver assessment. The main outcomes were need for neurological intervention and brain injury as determined by CT and a 14-day telephone interview. Analyses included the kappa coefficient, appropriate univariate tests, and chi-square recursive partitioning. **Results:** The 3781 patients had the following characteristics: mean age 9.2; male 64.6%; GCS scores of 13 (2.5%), 14 (7.2%), 15 (90.3%); mechanisms: fall 44.5%, sports 22.5%, bicycle 8.5%, MVC 7.0%; admitted 12.9%; 4.5% had brain injury on CT; and 0.7% required neurological intervention. We derived a CT head rule consisting of four high-risk factors (failure to reach GCS of 15 within 2 h, suspected open skull fracture, worsening headache, and irritability on examination) and three additional medium-risk factors (large boggy scalp hematoma, any sign of basal skull fracture, and dangerous mechanism of injury). The high-risk factors were 100% sensitive (95% CI 86–100%) for predicting need for neurological intervention, and would require only 29.6% of patients to undergo CT. The medium risk factors were 98.3% sensitive (95% CI 95–99%) and 50.1% specific for predicting brain injury on CT, and would require only 49.9% of patients to undergo CT. **Conclusions:** We have developed the CATCH Rule, a highly sensitive decision rule that has the potential to significantly standardize and improve the use of CT in children with minor head injury. **Key words:** children, head injury, computerized tomography

20

Limb fractures as an indication of non-accidental injury.

Jane Bayreuther, Annabelle MacGregor, Tina Sajjanhar. Paediatric Emergency Department, Lewisham Hospital, Lewisham High Street, London, *United Kingdom*

Introduction: The recognition of non-accidental injury (NAI) in children is an area of concern for all emergency departments. Limb fractures in non-mobile children should alert clinicians to consider NAI. We looked into the practice in our own paediatric emergency department (PED) to identify if this was occurring. **Methods:** The study took place in a large PED, which sees 30,000 children a year. We carried out a retrospective review of the notes of all children less than 1 year of age presenting with a limb fracture over a 4.5 year period. We identified patients by their diagnosis and notes on our computerised PED system. **Results:** In the time period studied, 244 infants under 1 presented with limb injuries, of which 52 were found to have limb fractures. Of these 40 notes were available. Five infants had clavicular fractures, presumed to be birth injuries and were therefore excluded. Of the 35 remaining 7 were probable NAI and admitted for further management. A further 8 infants were referred to a senior paediatrician (specialist registrar or above) and of these 3 were subsequently referred to social services. This left 20 children under 1 year who were managed solely by a PED senior house officer. All were over 6 months. Only 2 infants had their developmental history documented. None were discussed with social services. In the opinion of the reviewing clinician 4 of these cases exhibited worrying features (2 delayed presentations, 2 inconsistent mechanisms) and should have been referred for further management. **Conclusions:** Limb fractures in non-mobile children account for a small proportion of PED attendances. There needs to be increased aware-

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ness of the potential for NAI in this population. To improve safeguarding children we feel that all children under 1 year of age with a limb fracture should be discussed with a senior paediatrician. **Key words:** children, abuse, injury

21

Alcohol related attendances in children – taking an initiative.

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Introduction: Young people under 16 years are drinking twice as much as their peers 10 years ago. The National Alcohol Harm Reduction Strategy (NAHRS) acknowledges that educating young people to drink responsibly is fundamental to any long term strategy aimed at minimising the detrimental effects of alcohol misuse on society. Emergency departments are a key place to recognise this vulnerable group of drinkers. An audit of alcohol related attendances to our large urban paediatric emergency department identified increasing attendances, weaknesses in information gathering and giving, inconsistencies in clinical treatment and poor follow up arrangements. As a result a clinical care pathway was formulated and a nurse led Brief Intervention Clinic was introduced. **Methods:** The Alcohol care pathway was introduced in spring 2004. All young people who presented to the Emergency Department with alcohol related problems were given an information pack and offered follow up at a Brief intervention clinic (BIC) run by specially trained nurses. Following the introduction of the pathway an audit of attendances was performed. **Results:** 253 children attended between May 2004 and May 2005. 79% were female and 29% male – a ratio of 3:1. Age range was 10 – 15 years. Over 10% attended with a Glasgow Coma Score of 8 or lower. 62% had drunk alcohol previously and 7% had previous alcohol related hospital attendance. 16% were hypothermic. None were hypoglycaemic. Co-morbidity included head injury, assault and alleged rape. 25% were admitted. Over 90% of families received information packs. 92% of young people had some form of follow up including BIC, mental health services, and school nursing. This is an increase of 30% from summer 2002. **Conclusions:** This continued audit confirms a steadily increasing trend of alcohol related attendances to our ED, predominantly in females. The introduction of the pathway has resulted in standardised clinical care and raised awareness. Young people have been given written information and offered follow up. This strategy has been proven to help in the early identification of young people with alcohol problems and has facilitated their access to specialist services. **Key words:** children, alcohol, utilization

22

Virtual reality as a distraction technique for children during minor medical procedures in a pediatric emergency department.

Lange BS, Williams MT, Fulton I, Craigie M. Division of Health Sciences, University of South Australia, *Australia*

Introduction: Non-pharmacological strategies for managing procedural pain have been reported to reduce pain and distress. The aim of this study was to determine if Virtual Reality (VR) is an effective distraction technique for children undergoing minor procedures in a Paediatric Emergency Department compared to watching an animated movie. **Methods:** Using a block randomized design, children (6-17 years) undergoing minor procedures (blood sampling, intravenous cannulae insertion, suturing) were offered either VR or an animated movie excerpt as a distraction technique. Pre, post and maximum scores were received for children's self report pain (coloured analogue scale) and anxiety (facial affective scale). Behaviour was scored using the brief behavioural distress scale. Children completed a questionnaire about intervention enjoyment. Parents and staff scored their perception of the child's pain and anxiety pre, during and post procedure and perception of the technique's effectiveness. **Results:** Eighty eight subjects (51M, 37F, mean age 11.3±2.9) have been recruited to date (VR=44, movie= 44). Preliminary analysis suggests no difference in self-reported pain or anxiety between techniques, however children using VR displayed significantly lower behavioural distress. In terms of level of enjoyment, interest/involvement and interaction, VR scored significantly higher than the animated movie. No significant difference in parent or staff's perception of the child's pain and anxiety existed, however, VR was perceived to provide more effective distraction by both staff and parents. Data collection is expected to be completed by December 2005 with final data analysis mid January 2006. **Conclusions:** These preliminary findings suggest that VR is at least as effective as watching an animated movie in reducing pain and anxiety in children during minor medical procedures. The lack of adverse effects suggests that VR may be employed within the Pediatric Emergency Department as a non pharmacological pain management tool. **Key words:** children, procedures, distraction

23

A brief screen for adolescent depression in the pediatric emergency department

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Introduction: Depression is a common psychiatric problem for adolescents. Nevertheless, adolescents are rarely formally screened for depression when being treated in the Pediatric Emergency Department (PED). We aimed to examine the sensitivity and specificity of one- and two-question instruments to screen for depression in adolescents in the PED. **Methods:** Prospective cross-sectional study of a convenience sample of adolescents 12-17 years of age presenting to an urban PED with sub-critical illness or injury. Participants completed a demographic questionnaire and three depression screens: the Yale-Brown one-question instrument, a two-question case finding instrument for depression that has been validated in adults, and the Center for Epidemiologic Studies 20-question screen (CESD). Data was analyzed using SPSS. **Results:** See Table 1. One hundred and eighty one patients were approached, of whom 130 (72%) agreed to be screened. Forty-six (35%) of the 130 patients screened positive on the CESD using a cutoff score of 16. A "yes" response to the one-question instrument had a sensitivity of 65% and specificity of 94% when compared to the CESD, while a "yes" response to one or both questions of the two-question instrument had a sensitivity of 76% and specificity of 86% when compared to the CESD. **Conclusions:** The two-question instrument is sensitive and specific for detecting depression in adolescents being treated in the PED. This screen takes less than one minute to administer, and is a practical addition to patient evaluation in the PED setting. **Key words:** adolescent, depression, scale

Table 1, Abstract 23

	Sensitivity, % (95% CI)	Specificity, % (95% CI)	PPV, % (95% CI)	NPV, % (95% CI)
1–question screen	54 (40–88)	94 (89–99)	83 (70–96)	79 (71–97)
2–question screen	76 (64–88)	86 (68–100)	74 (54–94)	86 (68–100)

PPV = Positive predictive value; NPV = Negative predictive value

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24

Risk-taking behaviors and depression in adolescents seeking care in the pediatric emergency department

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Introduction: To examine the correlation between depression and substance use, sexual activity, and other risk-taking behaviors in adolescents seen in a Pediatric Emergency Department (PED). **Methods:** Prospective cross-sectional study of a convenience sample of adolescents 12-17 years of age presenting to an urban PED with sub-critical illness or injury. Participants completed a demographic questionnaire and the Center for Epidemiologic Studies 20-question screen (CESD). Data was analyzed using STATA. **Results:** One hundred and eighty one patients were approached, of whom 130 (72%) agreed to be screened. Forty-six (35%) of the 130 patients screened positive for depression using a cutoff score of 16 on the CESD. Participants who screened positive for depression were more likely to have smoked cigarettes, used alcohol or marijuana, or had sexual intercourse than those who screened negative for depression (see Table 1). No significant difference in the rates of tattoos or piercing (non-earlobe) were reported. Logistic regression analysis shows that all of these behaviors are highly associated. Cigarette smoking remains the only significant variable when the other risk-taking behaviors, as well as age, are taken into account (p = 0.045, OR 5.10). **Conclusions:** There is a significant correlation between screening positive for depression and cigarette smoking, alcohol and marijuana use, and sexual intercourse in adolescents seeking medical care in the PED. These risk-taking behaviors are all highly associated, but cigarette smoking and depression are significantly associated independent of the other behaviors. **Key words:** adolescent, depression, utilization

Table 1, Abstract 24. Reported behaviours among screened adolescents

Behaviour	Positive CESD (*n* = 46)	Negative CESD (*n* = 84)	*P* value	Odds ratio
Lifetime cigarette smoking	10 (22%)	3 (4%)	0.001	7.98
Lifetime alcohol use	20 (43%)	18 (21%)	0.004	3.14
Lifetime marihuana use	15 (33%)	14 (17%)	0.028	2.55
History of sexual intercourse	17 (37%)	15 (18%)	0.012	2.81
Tattoos and/or piercing(s)	11 (24%)	11 (13%)	0.069	2.45

RESUSCITATION TRACK

25*

Impact of a sepsis protocol for the management of patients with severe sepsis and septic shock in the emergency department.

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Introduction: Early treatment of severe sepsis and septic shock with an emergency department (ED) protocol can decrease morbidity and mortality. In July 2005, our ED adopted a protocol based on early goal directed therapy (EGDT; Rivers et al). Our objective was to compare outcomes in patients with severe sepsis/septic shock before and after the adoption of this protocol. **Methods:** In an urban, tertiary care ED (65,000 visits/year) we adopted an EGDT protocol on July 1, 2005 for patients with severe sepsis (sepsis and 1 or more organ failure) or septic shock (SBP < 90 mm Hg after 20mL/kg fluid bolus). Protocol goals were: antibiotic administration within 60 minutes of patient identification, normal saline (NS) boluses to central venous pressure > 8 mm Hg, NS and/or norepinephrine to mean arterial pressure > 65 mm Hg, dobutamine and/or red blood cell transfusion for central venous oxygen saturation > 70%. 30 patients were enrolled in the protocol between July and December 2005 (protocol group). These 30 patients were compared to 20 randomly selected patients with the ED diagnosis of severe sepsis or septic shock (pre-protocol group). All patients were transferred from the ED to the ICU. Outcomes: 28 day mortality, time to: fluid bolus, antibiotic administration and resuscitation goals, and ICU length of stay (LOS). **Results:** The protocol and pre-protocol patients were similar for age, gender distribution, severity scores, baseline lactate level, and co-morbidity ($p > 0.10$). 28 day mortality in the pre-protocol patients was 8/20 (40%) versus 5/30 (16.7%) in the protocol group (RR = 0.4; 95% CI = 0.16–1.1). Times to fluid bolus, antibiotic administration, and resuscitation goals were shorter in the protocol group ($p < 0.05$). ICU LOS was significantly shorter in the protocol group ($p = 0.02$). **Conclusions:** Implementation of an ED protocol for severe sepsis and septic shock showed a trend towards decreased 28 day mortality and was associated with decreased ICU LOS and improved time sensitive goals. **Key words:** resuscitation, sepsis, shock

26

Location-specific cost effectiveness of public access defibrillation

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Introduction: The effectiveness of rapid defibrillation for cardiac arrest is undisputed, however little is known of the cost-effectiveness of wide-scale implementation of public access defibrillation (PAD). **Methods:** To determine the location-specific cost effectiveness of PAD we used data from adult out-of-hospital cardiac arrests of presumed cardiac etiology within 20 Ontario Prehospital Advanced Life Support (OPALS) communities from 1995 to 2000. The property assessment roll categorized event addresses and indicated the number of sites per location type. Decision analysis compared costs and life expectancy of treating patients with and without an on-site defibrillator by location. The Weinstein model determined survival and disease progression probabilities. Costs were based on resource utilization of incident coronary heart disease for a representative sample of Canadians. The benefit of PAD was determined from the adjusted survival rate when a defibrillator equipped vehicle arrived in ≤3 minutes within the OPALS sites (OR = 3.02). The incremental cost effectiveness ratio (ICER) was the additional cost per life year gained. **Results:** Overall, 7,667 (99.5%) cardiac arrests had valid addresses. Only 3 locations would be cost effective for PAD based on a willingness to pay threshold of $50,000 per life year gained: Location ICER: Casino $542 ; Non-acute hospital $30750 ;Nursing home $45926 ; Shopping mall $67690; Penal institution $128783; Hotel $143530; Golf course $205990; Recreation/community $205407; Restaurant/bar $347954; Airport/bus depot $368606; School/college $598210; Store/strip mall $925784; Medical office $955614; Office building $990511; Stadium/fairground $1910193. **Conclusions:** Despite the established benefit of PAD in certain high-risk locations, the cost-effectiveness of this modality is limited to few locations. The additional costs of this program may be most easily borne by the private sector. Public officials faced with limited resources may con-

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sider other more cost-effective health care initiatives. **Key words:** resuscitation, defibrillation, cost-effectiveness

27*

Randomized controlled trial of fixed versus escalating energy levels for defibrillation.

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Introduction: There is little clear evidence as to the optimal energy levels for initial and subsequent shocks in biphasic waveform defibrillation. This study compared fixed (FIXED) versus escalating (ESC) energy regimens for out-of-hospital cardiac arrest (OOHCA). **Methods:** This randomized controlled trial was conducted in 3 cities with BLS/ALS EMS services and first-responding firefighters. Enrolled were OOHCA patients who required automated external defibrillation (AED) provided by BLS EMS or firefighters. LIFEPAK 500 (Medtronic Inc) biphasic AED devices were randomly programmed to provide, blindly, either FIXED (150–150–150 J) or ESC (200–300–360 J) energy regimens. Outcomes included Conversion (return of QRS complexes within 60 sec), Termination (removal of VF ³ 5 sec), survival, and evidence of harm. We used chi-square and t-test analyses as appropriate. **Results:** We enrolled 221 patients with mean age 66.0 years, male 79.6%, witnessed 63.8%, bystander CPR 23.5%, initial rhythm VF/VT 92.3%. The FIXED (n = 114) and ESC (n = 107) cases were similar. Comparing FIXED to ESC, for first shocks, rates were similar for Termination (86.8% vs 88.8%, p = 0.81) and Conversion (38.4% vs 36.7%; p = 0.92). For subsequent shocks, however, rates favored ESC for both Termination (70.8% vs 84.8%; p = 0.01) and Conversion (23.6% vs 42.5%; p < 0.01). Survival was similar for FIXED and ESC, for return of spontaneous circulation (51.8% vs 48.1%: p = 0.59), 1-hour survival (50.5% vs 44.3%; p = 0.38), and discharge survival (16.2% vs 16.0%; p = 0.97). Harm was somewhat more common in FIXED than ESC groups for ECG ST elevation (64.8% vs 51.2%; p = 0.18), cardiac enzyme elevation (74.1% vs 66.7%; p = 0.40), left ventricular ejection fraction <35% (24.3% vs 8.1%; p = 0.06). **Conclusions:** This is the first randomized trial to compare FIXED and ESC biphasic energy regimens and found more successful termination and conversion for secondary shocks with ESC, no difference in survival between regimens, and a trend towards less harm with ESC. **Key words:** resuscitation, defibrillation, RCT

28

Temporal changes in the left ventricular dimensions and the systolic function during CPR in patients with prolonged cardiac arrest

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Introduction: The aim of this study is to investigate the changes in the left ventricular dimensions and the systolic function according to the time elapsed from CPR initiation. **Methods:** Forty-two adult patients with out-of-hospital cardiac arrest (31 males and 11 females; mean age: 56±16 year old) were enrolled in this study. Transesophageal echocardiography was performed during CPR. The left ventricular dimensions and the systolic function, immediate as well as those after 10, 20, and 30 minutes after initiation of CPR, were measured and calculated from the recorded image. **Results:** The thickness of the interventricular septum progressively increased with the time elapsed from CPR initiation (12.4±4.0, 13.7±3.8, 14.8±4.1, 16.0±3.3, p<0.05), and the left ventricular volume (LVV) at the end of the relaxation period, as well as the stoke volume (SV), and the ejection fraction (EF) of the left ventricle, progressively decreased (LVV: 80.4±45.0, 70.2±35.7, 63.6±33.0, 56.4±46.3 ml, p<0.05; SV: 37.4±20.8, 28.3±15.6, 21.3±14.4, 15.2±8.5 ml, p<0.05; EF: 48.5±16.0, 42.6±16.0, 35.5±17.6, 35.1±16.2%, p<0.05). The thickness of the interventricular septum immediate, and the thickness at 10, and 20 minutes after initiation of CPR were larger in patients without restoration of spontaneous circulation (ROSC) than those were in patients with ROSC (13.0±3.8 vs 8.3±3.0 mm, p<0.05; 14.4±3.4 vs 8.5±2.3 mm, p<0.05; 15.6±3.8 vs 9.2±3.0 mm, p<0.05). The SV at 10 and 20 minutes after initiation of CPR was smaller in patients without ROSC than it was in patients with ROSC (47.5±19.0 vs 25.3±13.5 ml, p<0.05; 43.2±19.1 vs 19.2±12.8 ml, p<0.05). **Conclusions:** The progressive increase in the interventricular septal thickness and the reductions in the left ventricular volume, stroke volume, and ejection fraction suggest the appearance of myocardial stiffness and might affect the efficacy of CPR in patients with prolonged cardiac arrest. **Key words:** resuscitation, systolic function, cardiac-arrest

29

Is survival after cardiac arrest related to the incidence of cardiac arrests on a hospital ward?

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Introduction: In spite of continuous improvements in training methods and equipment, the survival rates from in-hospital cardiac arrests have remained unchanged. There are still some systemic failures occurring during unexpected in-hospital resuscitation. The aim of the study was to investigate the outcome of patients of unexpected cardiac arrest initially resuscitated by first responders and those with support of cardiac arrest team (CAT). **Methods:** All unexpected cardiac arrest patients receiving in-hospital resuscitation with the activation of CAT in a tertiary-care teaching hospital over a 12-months period were recorded according to the Utstein criteria. We prospectively recorded various factors at resuscitation and retrospectively evaluated the outcome. Outcome measures included return of spontaneous circulation (ROSC), survival longer than 24 hours, and survival to discharge. **Results:** 76 emergency calls were registered and among these, 44 calls (58%) were cardiac arrests, including 8 ventricular tachycardia/fibrillation, 15 pulseless electrical activity and 21 asystolic event. The rate of ROSC was 61%, the rate of survival longer than 24 hours was 37%, and the rate of survival to discharge was 18%. The response time of our CAT was 271 seconds (4 min and 31 seconds) in average. Patients that collapsed on the ward had higher rate of appropriate BLS and ALS interventions received before CAT arrival (79 vs. 44 %, P=0.019) and increased chances of ROSC (75 vs. 38%, P=0.014), survival longer than 24 hours (54 vs. 13%, P=0.007), and survival to discharge (8 vs. 0%, P=0.036). **Conclusions:** In a large hospital with multiple separate buildings, first-responder resuscitation is essential while the arrival time of CAT was often longer than 3 minutes. Hospital wards with more than 5 cardiac arrests per year have a better survival than those with fewer arrests. This is despite all wards staff receiving the same level of training. **Key words:** resuscitation, survival, cardiac-arrest

TRIAGE TRACK

30*

Predictive validity of a computerized emergency triage tool.

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Introduction: Emergency department (ED) triage prioritizes patients based on urgency of care. A web-based triage tool (eTRIAGE©) has been developed. This study examined the validity of eTRIAGE© scores based on patient acuity, resource utilization, and cost. **Methods:** Each patient's triage score, resource utilization (measure by need for specialist consultation, computerized tomography, and ED length of stay), acuity (measured by admission to hospital or morgue), and ED and hospital costs were collected over six months. These data were collected from a database that captures all regional ED visits. Correlations between triage score and each outcome were measured with logistic regression models (categorical variables), univariate ANOVA (continuous variable), and the Kruskal Wallace analysis of variance (costs). **Results:** Over the six month period, 29,524 patients were triaged using eTRIAGE©. Compared to CTAS III, the odds ratios for specialist consultation, CT scan, and admission were significantly higher in CTAS I and II, and lower in CTAS IV and V ($p < 0.001$). Compared to CTAS II–V combined, the odds ratio for death in CTAS I was 664.18 ($p < 0.001$). The length of stay also demonstrated significant correlation with CTAS score ($p < 0.001$). Costs also correlated significantly with CTAS scores (median cost for CTAS I = $2,690, CTAS II = $433, CTAS III = $288, CTAS IV = $164, CTAS V = $139, $p < 0.001$). **Conclusions:** eTRIAGE© demonstrates excellent predictive validity for resource utilization, patient acuity, and hospital costs. **Key words:** triage, electronic, CTAS

PATIENT SAFETY TRACK

31

Emergency department management of acute upper gastrointestinal hemorrhage following centralization of acute surgical services.

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Introduction: Mortality from upper gastrointestinal hemorrhage (UGIH) is significant. With accurate triage and risk assessment, appropriate resuscitation, and access to diagnostic and therapeutic endoscopy, this mortality is steady in the face of an ageing population. Following regional acute service review and surgical re-design, St John's Hospital in Livingston, Scotland, a medium-sized district general hospital within NHS Lothian, lost both acute surgical and orthopaedic inpatient services overnight in October 2004. The Emergency Department (ED), with an annual census of 50,000 patients, accommodated this dramatic change by developing an Observation Ward (OW). This has empowered the ED staff to develop their own non-operative management of surgical patients, including UGIH. Without the facility for emergency endoscopy, a protocol was introduced to reduce unnecessary patient transfer to the tertiary surgical centre at The Royal Infirmary of Edinburgh. The protocol was based on the presenting Rockall score. The ratified Rockall scoring system accurately predicts mortality based on clinical criteria, but is highly dependent on endoscopic findings. One year after implementation, the ED and OW management of 110 patients presenting with UGIH was reviewed. **Methods:** Retrospective case record study over a single year in a district general hospital with a limited surgical service. Patients were identified by clinical coding. 110 patients were identified and data including presenting Rockall score, destination, endoscopic findings and outcome were recorded. **Results:** 49% of patients had a Rockall score of zero. 55% were admitted to the Observation Ward. 30% were transferred to the nearest tertiary referral centre. 49% of those admitted to the Observation Ward had an endoscopy within 24 hours. 20% did not require endoscopy after Consultant review. **Conclusions:** Our experience suggests that clinical triage and validated scoring of patients with UGIH is safe. On site emergency endoscopy service is not necessary to manage low risk patients effectively. **Key words:** upper gastrointestinal hemorrhage; ED observation ward; Rockall protocol.

32

Emergency recall of Consultants to the Hospital: The use of Green Warning Lights and how to 'Drive to Arrive'.

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Introduction: Consultants may be recalled out of hours to emergencies in their specialist areas. In the UK, medical practitioners attending an emergency are permitted to display a Green Warning Light (GWL) to ease their passage through traffic. We undertook a survey of the driving habits and use of GWL in such instances. We also surveyed senior police officers regarding the use of GWL and whether they would take action against consultants infringing traffic laws when attending emergencies. **Methods:** A 16-point questionnaire was sent to all Emergency Physicians, Obstetricians and Gynaecologists, and Paediatricians in the Yorkshire Deanery, UK. A 7-point questionnaire was sent to every Chief Constable in the UK (excluding Scotland). Data was collected over the time period December 2004 - March 2005. **Results:** 166/220 (75%) surveys were returned. Of those responding, 44% of Emergency Physicians, 20% of Obstetricians and Gynaecologists, and 7% of Paediatricians owned a GWL. GWLs were used on 99/490 (20%) recalls. Consultants using a GWL were less likely to ignore speed restrictions and red traffic lights. No-one was stopped by the police while using a GWL. 61/131 (47%) of consultants not using GWL occasionally speed and drive through red lights when called back in an emergency. 8 consultants have had an accident on emergency recall, 2 when using GWL. The Association of Chief Police Officers (ACPO) state "It would be quite illegal for any doctor returning in an emergency in his own car to exceed the speed limit or go through a red traffic light, even if under a GWL". However, 36% of all forces sent individual replies, some indicating a GWL would be a mitigating factor. **Conclusions:** Consultants indicate that they ignore traffic regulations and thereby risk both accident and prosecution. Doctors should consider the urgency of a recall, and use GWL to identify themselves as attending an emergency and to ease their passage through traffic. ACPO advises doctors to observe all traffic regulations and "Drive to Arrive". **Key words:** consultant recall; Green Warning Light; Drive to Arrive.

33

Unexpected events during intrahospital transport from the Emergency Department.

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Introduction: Transport of critically ill patients within the hospital is both a common and potentially hazardous exercise. It is a frequent occurrence for Emergency Department (ED) patients requiring diagnostic, operative or intensive care intervention. The literature reports up to 71% of transported patients suffer adverse effects; 45% of these relate to equipment. Little attention has been given to the intrahospital transport of ED patients. **Methods:** We undertook a prospective observational study to determine the frequency and nature of unexpected events (UE) that arise when transporting patients within the hospital from the ED. 339 patient transports between March 2003 and June 2004 were examined. Each patient transported had a data collection form completed immediately upon cessation of

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the transport. This detailed physiological, equipment, and invasive line related events. Whether the events required intervention or resulted in an adverse outcome were also recorded. **Results:** 230 (67.8%) of patient transports experienced an UE with a total of 591 separate events recorded. 277 (46.9%) of these events were equipment related and 156 (26.4%) related to lines. 476 (80.5%) events required actions to be performed by the transporting doctor. Adverse outcomes affected 30 (8.8%) of the patient transports. **Conclusions:** A large number of our patient transports experienced an UE, most of these being equipment or line-related. These events usually required intervention, but infrequently resulted in an adverse patient outcome. Guidelines for the safer transfer of patients should be devised. **Key words:** intrahospital transfers; transitions of care; adverse events; transfer guidelines.

34*

Adverse events related to emergency department care.

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Introduction: Previous population-based studies estimated that 3% of all adverse events (AEs) occur in the ED, suggesting it is a low priority area in patient safety. These studies may have underestimated the true rate due to their focus on inpatients. The purpose of this study was to determine the rate and type of AEs related to ED care. **Methods:** This prospective cohort study enrolled consecutive adults from non-ambulatory areas (Canadian Emergency Department Triage and Acuity Scale [CTAS] score I–III) of 2 tertiary care EDs. Critically ill or distressed patients were excluded. Discharged patients were interviewed at 14 days and admitted patients' charts were reviewed. Three emergency physicians, blinded to name of patient and treating physician, assessed all flagged outcomes (such as death, unscheduled ED visits) for AEs. A flagged outcome associated with health care management was an AE. Descriptive statistics with 95% confidence intervals were used. **Results:** Over 4 months, 504 patients were enrolled. Fifty percent were female; the mean age was 57. The most common CTAS scores were III (50.2%) and II (44.4%). Chest pain was the most common presenting complaint (26.3%) followed by abdominal pain (8.9%) and shortness of breath (8.7%). Most patients were discharged home (73.0%). Flagged outcomes were experienced by 20.6% of patients. The reviewers found that 47.4% (95% CI: 40.2%, 54.6%) of flagged outcomes were AEs. Thus, 11.1% (95% CI: 3.3%, 18.9%) of all patients experienced an AE. Preventable AEs accounted for 21.9% (95% CI: 12.4%, 31.5%). Almost half (48.4%) of AEs occurred in patients discharged home. The most common types of AEs were: management issues (13.0%), procedural complications (11.5%), and diagnostic issues (8.3%). Death accounted for 3.1% of AEs, 25.0% were unscheduled admissions and 17.2% were return ED visits. **Conclusions:** This is the largest prospective study conducted in ED patient safety to date. Our data suggest that AEs are more common than previously thought. Future studies will focus on devising strategies for prevention. **Key words:** adverse events; emergency department.

35*

Medical error in the emergency department.

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Introduction: The problem of medical error (ME) is well recognized in both Canada and the USA. The emergency department (ED) has been identified as a high-risk setting for ME and for adverse events (AE) because of the nature of the work (high volume, rapid intervention, patient movement, etc.) and the clientele (seriously sick, anxious, in crisis, etc.). This study aimed to assess the impact of patient (e.g. age), clinical (e.g. physician experience), and environment (e.g. occupancy) factors on AE in the ED. **Methods:** A retrospective case–control study was conducted at the SMBD–Jewish General Hospital in Montreal. Cases were patients who had suffered a ME which resulted in an AE. There were 2 control groups: GR1, ME without consequence and GR2, no ME. Cases and GR1 were collected from a database of Morbidity/Mortality/Medical Error rounds (1995 to 2005). GR2 were randomly selected from ED patient visits without ME of the same period. Multiple logistic regression analyses were used for comparisons. **Results:** Sample size consisted of 1276 patients visits: 341 cases, 505 GR1 and 430 GR2. When comparing cases to GR1, patients who suffered an AE tended to be older (OR 1.16, 95% CI 1.07–1.25), used the resuscitation room (OR 2.13, 95% CI 1.48–3.06), or presented with abdominal pain (OR 1.81, 95% CI 1.16–2.83). Patients with minor trauma (OR 0.55, 95% CI 0.32–0.94) or fracture (OR 0.31, 95% CI 0.1–0.98) had decreased risk of an AE. Gender, ambulance, weekday, shift, physician experience, training level, ED occupancy and length of stay were not related to AE. When comparing cases to GR2, patients with AE were older (OR 1.16, 95% CI 1.07–1.26), used the resuscitation room (OR 6.67, 95% CI 3.98–11.2), and were hospitalized (OR 2.35, 95% CI 1.61–3.43). **Conclusions:** Among patients with medical errors, age, use of resuscitation room, certain presenting complaints and diagnosis are associated with adverse events. Comparing cases to visits without medical error, age, use of resuscitation room and hospitalization are associated with the occurrence of adverse events. **Key words:** medical error; emergency department; adverse events.

36

They looked OK at triage (or did they?): characteristics of patients who deteriorate in the ED.

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Introduction: Triage to ATS categories 3, 4 or 5 implies the absence of a life-threatening state at triage; subsequent deterioration indicates a failure of the triage process to identify patients with life-threatening states. This study aims to identify the triage characteristics of patients from these ATS categories who died or deteriorated while in the ED. **Methods:** This was a descriptive cohort study. Inclusion criteria were: i) adult patients, ii) ED presentation between July 2004 and June 2005, iii) triage to ATS categories 3, 4 or 5 and iv) admission to ICU/CCU or death in the ED. Patients with not-for-resuscitation orders were excluded. **Results:** During the study period, 262 patients who were triaged to ATS categories 3, 4 or 5 died in the ED or required ICU/CCU admission. Six patients died in the ED, 110 required ICU admission, 139 were admitted to CCU, and 7 were excluded. Mean age was 59.67 (SD=17.72), 56.9% were males, and 52.5% arrived by private transport. The most common presenting problems were chest pain, dyspnoea, and abdominal pain. Of the 166 patients who had physiological data recorded at triage, 60% had at least one abnormal parameter recorded. The majority of patients (223/255) had at least one abnormal parameter recorded at first ED assessment and the average time to first ED assessment was 29 minutes. Only 6 patients with abnormal triage data had normal physiology at first ED assessment. Physiological abnormalities were recorded at the first ED assessment in 84% of patients who had no physiological data recorded at triage (76/90) and 82% of patients with normal triage data (54/66). **Conclusions:** The majority of ED patients had physiological abnormalities recorded at first ED assessment. The clinical significance of 'minor' physiological abnormalities is unknown however given that the majority of patients exhibited clearly abnormal signs prior to cardiac

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arrest, associations between specific physiological parameters and death or deterioration warrants further research. **Key words:** Emergency department; triage reliability; abnormal vital signs.

37

Predictors of deterioration in Emergency Department patients

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Introduction: Triage to ATS categories of low or moderate acuity implies the absence of a life-threatening state at the time of triage. Subsequent deterioration in the ED indicates a failure to identify life-threatening states during triage assessment. A significant number of patients triaged with low scores die in the ED or require admission to ICU or CCU. Thus, early identification of patients at risk of deterioration may improve patient outcomes. This study aimed to identify predictors of significant deterioration in ED patients. **Methods:** This was a cohort study with matched controls. The cohort was adult patients, triaged to ATS triage categories 3, 4 or 5 and who required ICU/CCU admission or died in ED. The first control group was matched by age, gender, presenting problem and triage category, and included patients admitted to general medical/surgical units. The second control group was matched by age, gender and presenting problem, and included patients who died in ED or required ICU/CCU admission. Patients with not-for-resuscitation orders were excluded. The following data were collected by retrospective medical record audit from either triage assessment or first ED assessment: age, gender, presenting problem, language, time to medical and nursing assessments, respiratory rate, respiratory effort, oxygen saturation, heart rate and conscious state. **Results:** There were 255 patients in the cohort; 6 died in the ED, 110 required ICU admission and 139 were admitted to CCU. Control group data collection will be complete in March 2006 and between-group differences will be presented. **Conclusions:** These data will be used to establish if there are specific physiological predictors of significant deterioration in ED patients that can be identified at triage. **Key words:** emergency department; triage assessment; deterioration predictors.

38

Maintaining patient safety during implementation of the Emergency Nurse Practitioner role: an Australian perspective.

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Introduction: The Northern Hospital (TNH) implemented the Emergency Nurse Practitioner (ENP) role in 2004 as part of a government initiative to establish ENP as an effective and sustainable model. Appointment of ENP candidates (ENPCs) occurred in parallel with preparation for endorsement. Patient safety was a key issue. This paper highlights potential patient safety issues arising from appointment of an ENPC and the outcomes of strategies used to safeguard patients. **Methods:** This study explored three major issues. First, ENP practice must be underpinned by evidence-based Clinical Practice Guidelines (CPGs). This raises issues about CPG development and review. Second, ENPs may utilise extensions to nursing practice (prescription of medications, diagnostic imaging and pathology, work certificates, patient admission, discharge and referral to specialists). There is no legislative framework currently supporting these extensions to practice for ENP. Organizational interim measures were required to enable ENPCs to be functional members of the ED team. Third, transition from senior ED nurse to ENP required acquisition of new skills and knowledge while concurrently providing patient care, so clinical supervision and assessment of practice were key outcome measures. **Results:** ENP CPGs were developed and subjected to multidisciplinary review. Data was collected on 476 patients managed by ENPCs. Waiting times for ENP patients were comparable with patients managed via usual ED processes. Emergency Physicians (EPs) rated ENPC prescriptions, imaging and pathology orders appropriate in all cases. Comparison of X-ray ordering patterns and documentation of patient care showed no significant differences between ENPC and ED medical staff. There were no adverse events (unplanned representations, missed fractures, or patient complaints). **Conclusions:** With a high degree of organizational support, clear reporting mechanisms and logical interim processes for extensions to practice, the ENP role can be successfully implemented in the absence of legislative frameworks. **Key words:** Emergency Nurse Practitioner; extended nursing practice; clinical practice guidelines; patient safety.

GERIATRICS TRACK

39

The fit and active elderly in the Emergency Department.

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Introduction: The Fit and Active Elderly Project was developed in response to the increasing numbers of elderly people presenting to our service and the inherent problems this group face in hospital. The elderly in the Emergency Department (ED) are at risk for a variety of factors including decline in both their physical and cognitive functions as well as nutritional deterioration that may impact on recovery time and prolong hospitalization. The project was multidisciplinary involving: Nursing Staff, Bed Managers, Care Coordinators, Dietetics, Physiotherapy, Occupational Therapists and Volunteers. The objective was to minimize the poor functional outcomes of the frail elderly by focusing on pressure care, physical and cognitive activities, as well as the nutritional well-being of clients 65 years and older. Equipment was purchased and interventions commenced in the ED which were not previously considered core business. **Methods:** Prospective audit of geriatric presentations admissions, length of stay (LOS), pressure care audits, and allied health interventions. **Results:** There were 8513 geriatric ED presentations, 4159 over a 12 month period. Specific outcomes were: ED LOS for the elderly was subsequently shorter than for the average patient; Maroondah Hospital achieved SALOS vs. previous year 10%; pressure sore rates, as assessed by an external evaluator, were reduced to 11% from the previous year's 19%; increased allied health early intervention rate occurred. **Conclusions:** Front-loaded holistic care for the elderly in Emergency Departments is worthwhile and reduces LOS and hospital complications. This project is now to be rolled out to other network hospitals in Eastern Victoria. **Key words:** ED elderly patients, multidisciplinary approach; interventional approach to ED elderly.

Tuesday, June 6th: Oral Presentations

AIRWAY TRACK

40*

Prospective multicentered study of relapses following emergency department discharge for low risk pneumonia.

Rowe BH, Blitz S, Campbell S, Clark S, Camargo CA Jr, for the MARC-16 Investigators. Department of Emergency Medicine, University of Alberta, Edmonton, Alta., *Canada*

Introduction: Community-acquired pneumonia (CAP) is a common

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emergency department (ED) presentation and risk criteria exist for admission. Risk factors for relapse after treatment for outpatient CAP are uncertain, and previous research has included limited data from EDs. Our objective was to determine the relapse rate after standardized ED treatment for CAP and factors associated with relapse. **Methods:** A multicenter, prospective cohort study was conducted in Canadian and US EDs. Using a standardized method for enrollment, 22 EDs enrolled patients ages 18+ who were discharged with CAP. Patients with a pneumonia severity index (PSI) of >III were excluded. All patients were treated with clarithromycin for 7 days and followed-up by telephone (2 wks) and in person (4 wks) to ascertain outcomes. Relapse was defined as any urgent visit to a Health Care Provider (HCP) reported at the 2 or 4 week follow-up visit for which a change in antibiotic treatment was initiated. Analysis included multivariate logistic regression. **Results:** Of 637 discharged patients, 53% were male, 71% had a primary HCP, and 36% were current smokers. Relapses occurred at a median of 8 days (IQR: 2–14) in 49 (7.7%) patients. Smoking, PSI class and age were not associated with relapse (all $p > 0.35$). A multivariate model, adjusting for PSI and smoking status, suggested that percussion dullness (OR = 3.1, $p = 0.01$) was associated with relapse. Symptoms of wheezing (OR = 0.3) and bacteria on sputum gram stain (OR = 0.5) reduced risk of relapse (both $p < 0.05$). **Conclusions:** Outpatient treatment of CAP is common, and empirical treatment is recommended with macrolides. When receiving clarithromycin, clinically important relapses are uncommon and patients appear to recover well in this setting. In these low-risk PSI groups, there are limited historical characteristics or physical findings that might assist emergency physicians with identifying patients at risk for post-ED relapse. **Key words:** community acquired pneumonia, antibiotics, randomized controlled trial

41

Accuracy of the physical exam in determining underlying etiology of respiratory distress.

Brewer KL, Nix AS, Richardson T, Huang A, Gough JE, Dept. of Emergency Medicine, East Carolina University, *USA*

Introduction: Respiratory distress represents a combination of symptoms that can be caused by common respiratory and cardiac diseases. While studies have addressed predictive values of distinct physical findings, none have examined the diagnostic accuracy of the physical examination in the evaluation of undifferentiated patients presenting in respiratory distress. The objective of this study was to determine if emergency medicine physicians can accurately predict the diagnosis of patients presenting in respiratory distress after the physical examination alone. **Methods:**This prospective study used a convenience sample of patients. Investigators identified patients presenting to the ED with a chief complaint of shortness of breath or respiratory distress. After examining the patient, and prior to receiving any laboratory or X-ray results, the resident or attending physician was asked to indicate on a standardized form if they believed the underlying etiology of the complaint was of cardiac, respiratory or other. Physician assessments were compared to final discharge or admitting diagnoses for each patient. **Results:** 148 questionnaires were completed (131 residents, 29 attendings) with 57.4% of the patients being correctly diagnosed by the physician after the physical exam. Asthma was diagnosed correctly 90% of the time. Correct diagnoses of CHF, COPD and pneumonia were given 59.5%, 53.3% and 41.7% of the time, respectively. Of the 63 cases in which the final diagnosis was predicted incorrectly, the general underlying etiology was accurate 63% of the time. In the remaining 37% of missed cases, a respiratory cause was predicted for a final cardiac diagnosis or vice versa. **Conclusions:**The physical exam alone is inconsistent at predicting the underlying cause of respiratory distress. The presence of asthma was most likely to be correctly identified based on physical exam. **Key words:** physical examination, respiratory distress

42

The prognostic factors of hypotension after rapid sequence intubation.

Lin CC, Chiu T, Chen J, Division of Emergency Medicine, Vhang Gung Memorial Hospital, Taipei, *Taiwan*

Introduction: Previous reports show high success and low complication rates for intubation for RSI in the emergency department. Immediate hypotension after RSI has been seen in many occasions. The purpose of this study was to find out the risk factors of developing immediate hypotension after RSI. **Method:** Patients admitted to the emergency department that needed emergency airway management and underwent RSI were enrolled in this study. Enrolled patients were then divided into 2 groups. Group 1, the hypotension group, consisted of patients whose blood pressure before RSI (PreSBP) was greater than 90 mmHg and blood pressure after RSI (PostSBP) was less than 90 mmHg. Group 2 patients were PreSBP and PostSBP both greater than 90 mmHg. The following variables were analyzed: age, gender, body weight, patients' underlying disease and ongoing disease, initial vital signs, and laboratory studies. Comparison between these two groups was then analyzed. After univariate analysis, statistically significant variables were considered to be prognostic predictors. All prognostic predictors were further quantified by multiple logistic regression analysis. A predicting model was established as a logistic model. **Results:** A total of 149 patients were enrolled in this study. There were 28 patients enrolled in group 1 and 121 patients in group 2. After univariate analysis of the above variables between these 2 groups, there were 4 risk factors identified. Those were COPD, sepsis, body weight less than 55 kgs and pre-intubation blood pressure less than 140mmHg. A logistic model was created as following: log p/g= -3.63+1.42 sbp group+ 1.56 ocopd + 2.29 osepsis + 1.19 body weight group+ e. **Conclusion:** COPD, low body weight and sepsis identify a the high risk group for developing hypotension after RSI. Further study is needed to validate the model and prevention therapy proposed. **Key words:** rapid sequence intubation, hypotension, emergency airway

43

Endotracheal intracuff pressures in the prehospital setting: Is there a problem?

Svenson JE, Lindsay MB, Section of Emergency Medicine, University of Wisconsin, Madison, WI, *USA*

Introduction: Cuffed endotracheal tubes are used to prevent gas leak and also pulmonary aspiration in ventilated patients. The pressure exerted on the tracheal wall is similar to the intracuff pressure. The perfusion pressure for the tracheal mucosa is 40 cm H2O. Cuff pressures over 40 cm H2O may cause various ischemic changes and complications. High cuff pressures have also been implicated in postoperative sore throat, and nonischemic complications. Post-intubation endotracheal tube cuff pressures are not routinely measured in the ED or prehospital setting. The time spent in these settings may be long enough for pressure induced tracheal mucosal injury to occur. The purpose of this study is to assess cuff pressures in intubated patients prior to aeromedical transport. **Methods:** All intubated patients transported by the University of Wisconsin Med Flight program during a four-month period were included in this study. Patients were intubated either by Med Flight physicians or prior to the helicopter arrival. Cuff pressure was measured using a manometer (Cuffpressure® (Posey Co. USA)). This measurement was recorded and correction performed, if necessary, to achieve a cuff pressure of 14-27 cm H2O, while preventing an air leak. Data were analyzed for

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the distribution of intracuff pressures and incidence of elevated pressure on first measurement and the need for correction. **Results:** There were 62 patients in this study. The mean first recorded pressure was 63 ± 34 cm H2O. Initial cuff pressures were over 40 cm H2O in 43 (70%) of patients and required correction. **Conclusions:** In this study the majority of cuff pressures exceeded safe pressure and required correction. Measurement of intracuff pressure is a simple and inexpensive procedure and should be done whenever a patient is intubated, in either the prehospital or hospital setting, since this may reduce long-term morbidity. **Key words:** endotracheal intubation, prehospital

DIAGNOSTIC IMAGING TRACK

44*

Controlled clinical trial to implement the Canadian C-Spine Rule.

Stiell IG, Clement C, Grimshaw J, Brison R, Rowe BH, Schull M, Lee JS, Brehault J, McKnight RD, Dreyer J, Eisenhauer MA, MacPhail I, Rutledge T, Letovsky E, Shah A, Clarke A, Ross S, Perry J, Wells GA, for the CCC Study Group, Department of Emergency Medicine, University of Ottawa, Ottawa, Ont., *Canada*

Introduction: We previously derived (n = 8,924) and validated (n = 8,283) the Canadian C-Spine Rule (CCR) to guide use of c-spine imaging (CSI) in trauma. The goal of this study was to evaluate the effectiveness of implementing the CCR into practice in multiple EDs. **Methods:** We conducted a matched-pair cluster design trial which compared outcomes during two 12-month 'before' and 'after' periods at 6 'intervention' and 6 'control' EDs, stratified by teaching or community hospital status. Enrolled were all alert, stable adults presenting after acute, blunt head or neck trauma. We randomly allocated sites to either intervention or control groups. During the intervention-site after-period, active strategies were employed to implement the CCR into practice, including education, policy, and 'on-line' reminders. Outcomes included CSI rates and missed injuries. Univariate analyses, appropriate for the data, were used. **Results:** We enrolled 11,104 patients with mean age 37.6 years, female 50.3%, MVC 71.6%, ambulance 59.4%, important c-spine injury 0.9%. Cases were similar, comparing before (n = 5,522) to after (n = 5,582) periods, and control (n = 4,298) to intervention (n = 6,806) sites. However, baseline CSI rates ranged from 33.1% to 73.9%. From the before to after periods, the CSI rate had a relative reduction of 12.4% at the 6 intervention sites from 61.2% to 53.6% ($p < 0.01$) but a relative increase of 10.3% at the 6 control sites from 53.8% to 59.3% ($p = 0.06$); this difference between groups was significant ($p < 0.01$). There were no missed c-spine injuries at the intervention sites. Non-injury patients who did not undergo CSI spent much less time in the ED than those who did (139.3 min vs 248.9 min; $p < 0.001$). **Conclusions:** Despite low baseline CSI ordering rates, active implementation of the CCR led to a significant decrease in use of CSI without missed injuries or patient morbidity. Widespread implementation of the CCR could lead to reduced health care costs and more efficient patient flow in busy EDs. **Key words:** trauma, diagnostic imaging, spine injury

45

Emergency physicians can reliably assess patient cardiac output.

Lam JMY, Tang CO, Tam MK, Graham CA, Rainer TH, Chinese University of Hong Kong, *Hong Kong*

Introduction: Cardiac output is important for diagnosing shock and monitoring the response to therapy. USCOM is a new, non-invasive, stand-alone device for measuring cardiac output using continuous wave coppler technology. The aims of this prospective study are firstly to determine the number of proctored studies necessary for skill acquisition, and secondly to evaluate the reliability of USCOM cardiac output assessments in the emergency department. **Methods:** Two emergency physicians (one has completed the credential training for emergency ultrasound and another is undergoing emergency ultrasound training) from a teaching hospital emergency department underwent 1 hour of training from an USCOM Ltd credentialed trainer. Each of them independently performed USCOM cardiac output assessments on a convenience sample of 15 emergency department patients. Records of the acoustic image were reviewed by two independent, accredited trainers using the Freemantle Protocol using validated six image-scoring criteria (gold standard). Skill acquisition was assessed at the 5th, 10th and 15th examinations. Two trained emergency physicians then each performed blinded protocolised, examinations on 44 emergency department patients. Inter-assessor reliability was evaluated. **Results:** During the training period, the average image score improved from 3.5/6 at the 5th assessment to 4.5/6 at the 10th assessment to 6/6 (maximum possible) at the 15th assessment. Subsequent analysis of 88 cardiac output assessments in 44 emergency department patients (demonstrated excellent inter-assessor correlation (r = 0.93, 95%CI (0.88 - 0.96)). **Conclusions:** Emergency physicians can be trained to obtain reliable cardiac output estimations upon emergency department patients with the USCOM over the course of 15 patient assessments. **Key words:** cardiac output, doppler

46*

A clinical decision rule to safely rule-out subarachnoid hemorrhage in acute headache patients in the emergency department.

Perry JJ, Stiell IG, Wells GA, Mortensen M, Sivilotti M, Bullard M, Symington C, Lesiuk H, Lee JS, Eisenhauer M, Wiesenfeld L, Caytak J. Department of Emergency Medicine, University of Ottawa, Ottawa, Ont., *Canada*

Introduction: It is unclear which emergency department (ED) patients with acute headache require investigation with computed tomography (CT) and/or lumbar puncture (LP) for subarachnoid hemorrhage (SAH). This study derived a clinical decision rule for the investigation of neurologically intact headache patients. **Methods:** This prospective cohort study was conducted at 6 university tertiary care EDs. Patients >15 years, with normal neurological exam, and a non-traumatic acute (<1 hour to peak) headache were enrolled over 5 years. Excluded were patients with histor of recurrent headaches, referral of confirmed SAH, papilledema, previous SAH or brain neoplasm. Physicians completed study forms prior to investigation. SAH was defined by any of: 1) SAH on CT, 2) xanthochromia in the cerebrospinal fluid (CSF), or 3) red blood cells in the final tube of CSF with positive cerebral angiography. Patients without both CT and LP had 1 month follow-up. Analysis included univariate analysis and multivariate chi-squared recursive partitioning. **Results:** There were 1997 enrolled patients with mean age 43.4 years, female 60.5%, median peak pain intensity 9/10 (IQR 8,10), and worst headache of life 78.5%. 80.3% underwent CT, 45.2% underwent LP,

Table 1, Abstract 46

Assessment	% SAH	% No-SAH	p value
Arrived by ambulance	57.0	6.7	<0.001
Vomited	57.9	26.4	<0.001
Diastolic BP ≥100 mm Hg	62.5	32.4	<0.001
Age ≥45 years	78.9	39.7	<0.001

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82.8% had either CT and/or LP and 128 (6.4%) cases had a final diagnosis of SAH. Table 1 shows percent of cases with SAH or no-SAH, and univariate p-values. This rule requires investigation for patients with one or more of the 4 variables. This rule had 100% (95% CI: 97–100%) sensitivity, 36% (95% CI: 34–39%) specificity for SAH and an absolute reduction in investigation of 17%. **Conclusion:** We derived a highly sensitive, clinical decision rule for the investigation of acute headache. Future studies will validate this rule in a new patient population. **Key words:** headache, decision rule, subarachnoid hemorrhage

47

Computed tomography is a must in diagnosing appendicitis even though the Alvarado score is highly suggestive of appendicitis.

KS Kim, GS Suh, JH Shin, JE Rhee, KS Kim, Department of Emergency Medicine, Seoul National University College of Medicine, *Korea*

Introduction: In cases of clinically evident appendicitis, many surgeons recommend that the patient should be taken directly for appendectomy. We determined whether multi-detector computed tomography (MDCT) is a must in diagnosing appendicitis even though the patient seems to have clinically evident appendicitis (Alvarado score of 8, 9, 10) to reduce the negative appendectomy (NA) rate. **Methods:** This was a prospective diagnostic study in a large city-center ED. One hundred fifty-seven patients with suspected appendicitis were prospectively enrolled between June and October 2005. We recorded Alvarado score on each patient and checked MDCT in all patients. Surgeons made a decision of urgent operation, close observation, or discharge from hospital with the readings of MDCT. Patients were followed to final surgical or clinical outcomes. McNemar test was used to compare the specificity of the MDCT with that of Alvarado score 8 or more in diagnosing appendicitis. **Results:** Of 157 cases, 91 had an operation and only 1 case (1.1%) was negative for appendicitis. Sensitivity and specificity of MDCT were 97.8% and 95.5% respectively. Positive predictive value (PPV) and negative predictive value (NPV) of MDCT were 96.7% and 97.0% respectively. Of the 52 cases which had Alvarado scores of 8 or more, 14 cases (26.9%) did not have appendicitis. One case was determined by operation and pathologic report and 13 cases were determined by clinical follow-up. With MDCT, we could prevent 13 cases of NA in cases with Alvarado 8 or more. In one case, the finding of MDCT was appendicitis, but biopsy revealed normal appendix. There was no false negative case of MDCT in group with Alvarado 8 or more. MDCT had a significantly higher specificity than Alvarado score 8 or more (0.96 vs 0.79, p=0.0045). **Conclusions:** To avoid negative appendectomy, routine MDCT is recommended even in clinically evident appendicitis (Alvarado 8 or more). **Key words:** appendicitis, computed tomography

48

The use of emergency department bedside ultrasound to determine the correlation between increased intracranial pressure and the optic nerve sheath diameter.

Larson JL, Fox JC, Arcila M, Neches E, Lulloff L, Tran M, Department of Emergency Medicine, University of California, Irvine Medical Center, Orange, Calif., *USA*

Introduction: The objective of this research study is to determine if emergency department (ED) physicians can use bedside ultrasound (BUS) to accurately diagnose elevated intracranial pressure (ICP). BUS does not expose patients to the radiation that a Computed Tomography (CT) scan does, and is a quicker and less expensive alternative to radiological imaging, the most common imaging modality for the diagnosis of elevated ICP. Elevated ICP often forms from intracranial hemorrhages, cerebral edemas, or intracranial masses such as tumors. There have been previous studies conducted that show a correlation between elevated ICP and an increase in the size of the optic nerve sheath diameter (ONSD); however, only a limited amount of research has been performed in which BUS is used to determine the ONSD. **Methods:** In this study BUS was used to measure the diameter of the optic nerve sheath. The BUS results were then compared to the head CT scan results to determine whether a correlation was evident between the BUS scan and any elevated ICP findings from the head CT scan. ED physicians were unaware of the head CT scan results, and radiology physicians were unaware of the BUS scan results in order to eliminate any biases that may result. **Results:** Both BUS and head CT scans suggest that a patient with an ONSD greater than 5.1mm may have elevated ICP. From April 2005 to September 2005, 100 patients met the study's inclusion criteria. The study results determined that the mean ONSD of the left and right eyes were 4.7869mm (Standard Deviation [SD] 1.1779) and 4.7364mm (SD 1.2381) respectively. Five of the study's patients were found to have elevated ICP, and the mean ONSD of their left and right eyes were 5.08mm (SD 1.3554) and 5.12mm (SD 0.8349) respectively. **Conclusions:** The results from this research study are ongoing, as not enough patients have been enrolled to positively conclude whether or not the measurement of the ONSD by use of BUS can be an effective modality in the diagnosis of elevated intracranial pressure. **Key words:** ultrasound, intracranial pressure

49*

Computerized tomographic pulmonary angiography compared with ventilation perfusion lung scanning as initial diagnostic modality for patients with suspected pulmonary embolism: a randomized controlled trial.

Dreyer J, Lang E, Kovacs G, Stiell I, Wells P, Kovacs M, Kahn S, Rodger M, Morrs T, Anderson D. Division of Emergency Medicine, The University of Western Ontario, London, Ont., *Canada*

Introduction: Ventilation–perfusion lung scanning (VQ) and computerized tomographic pulmonary angiography (CTPA) are competing strategies for initial imaging in suspected pulmonary embolism (PE). While considered accurate, these tests have never been compared in a randomized controlled trial examining patient outcomes. The objective of this study was to compare rates of symptomatic venous thromboembolism (SVTE) at 3 months using either a VQ or CTPA led approach. **Methods:** A prospective, randomized double blind trial (clinicians, outcome adjudicators) with concealed allocation was employed. Eligible patients (89% from an emergency setting) were suspected of PE and were "high-risk" by either a "likely" pre-test probability (Wells) or a positive d-Dimer. Patients were randomized to either V/Q followed by bilateral compression ultrasonography (CUS) in the event of indeterminate (non-high, non-normal) results or CTPA followed by CUS for all negative studies. The primary outcome was the development of SVTE at 3 months in patients in whom the diagnosis of PE had been excluded; all-cause mortality was also measured. This equivalence trial was powered to detect a 2.5% minimal clinically important difference in SVTE rates. **Results:** 1405 patients were randomized; 694 to CTPA and 711 to VQ scanning. 19.2% (133) of patients in the CTPA vs. 14.2% (101) were diagnosed with VTE in the initial evaluation period (difference 5.0%, 95% CI 1.1% to 8.9%). Of these, 0.4% (2/561) in the CTPA group vs. 1.0% (6/610) of patients undergoing VQ developed SVTE during follow-up (difference –0.6%, 95% CI –1.6% to 0.3%) including one with fatal PE in the VQ group. All cause mortality was higher at the 3-month follow-up for patients undergoing VQ scanning; 5.1% (36/711) vs. 3.2% (22/694) for CTPA; difference 1.9%, 95% CI –0.2% to 4.0%. Most of these deaths were from cancer.

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Conclusions: CTPA and VQ based diagnostic strategies are equally safe for the investigation of suspected PE in terms of 3-month SVTE rates. **Key words:** pulmonary embolism, ventilation–perfusion scanning, computerized tomography

50

The actual application of NEXUS and Canadian C-Spine Rules by emergency physicians.

Weiner SG & Nguyen TD, Tufts-New England Medical Center, Boston, MA, *USA*

Introduction: The NEXUS and Canadian C-Spine Rule (CCR) were designed to safely reduce the number of cervical spine x-rays obtained in the emergency department. We aimed to study the current usage of both of these rules, their reasons for not being used, and most importantly, if the rules are being applied in a correct fashion. **Methods:** A nine-question survey was offered to practicing Massachusetts emergency physicians. **Results:** A total of 61 physicians completed the survey instrument. 72% practiced primarily in an academic setting. 93% were either emergency medicine board certified or board eligible. Average length of practice since completing residency was 9.6 years. 34 respondents (56%) reported using NEXUS >75% of the time, while 6 (10%) reported using CCR >75% of the time. The most common reason cited for not using NEXUS was patient insistence on obtaining an x-ray. The most common reason for not using CCR was that it is too difficult to remember or use in real-time. When asked to write down the rule from memory, 21 of the 34 (62%) who used NEXUS >75% of the time reported the rule correctly, whereas 2 of the 6 (33%) who used CCR >75% of the time reported the rule correctly. **Conclusions:** The physicians in this study reported using NEXUS more often than CCR. The primary reason for this difference appears to be difficulty with remembering and applying CCR, though patient insistence on x-rays was frequently sited as a reason for not using either of these evidence-based tools. A significant proportion of physicians who reported using these rules often in their practice did not recall them correctly, indicating that either the cost-effectiveness or safety of their use may be questionable. **Key words:** decision rule, spine injury

51

Implementation of a guideline to CT head imaging in head injury: a prospective study.

Fong C, Chong W, Villaneuva E, Emergency Department, Monash Medical Centre, Victoria, *Australia*

Introduction: We adopted the Canadian CT head rule developed by Stiell et al in 2001, and introduced an evidence based head injury guideline in our ED. **Methods:** Eligible patients were assessed for the presence of 10 predictive factors according to our head injury guideline.The presence of any of these factors resulted in a request for head CT. If intracranial injuries were detected, a neurosurgical opinion was sought about further management. Patients lacking predictive factors, those who had no evidence of intracranial injuries on head CT, or were cleared following neurosurgical consultation were discharged with standard advice and were followed-up after 2 weeks. Pre-guideline implementation group : A random sample of patients attending the ED for head injuries over the past two years provided a baseline assessment of the extent to which diagnostic imaging services were used. Comparisons were made between this population and the prospectively collected information for differences in the outcomes of interest.Outcomes: Head CT ordering rate, guideline compliance, abnormal CT related to injury, rates of neurosurgical intervention and clinically important brain injury; mortality and morbidity on follow-up. **Results:** There were 311 patients in the pre-guideline group; the CT ordering rate in this group was 31.6% compared to 59% in the post-guideline group which had 326 patients. Abnormal head CT's were reported in 6.8% in the pre-guideline group and 5% in the post-guideline group (RR=0.88, 95%CI:0.44-1.51). We had a compliance rate of 87%. When we applied the Canadian CT Head Rule to the prospective group, 4 patients with clinically significant abnormal head CT's would not have been scanned. **Conclusion:** Our modified guideline was easy to use, safe, sensitive but not specific in diagnosing a significant head injury on CT. **Key words:** decision rule, traumatic brain injury, diagnostic imaging

EMS TRACK

52

Contributing to the evolution of the Cochrane prehospital and emergency health field.

Archer F, Rowe B, Sayre M, Cooke M, Smith E, Cochrane Prehospital and Emergency Health Field

At ICEM 2002, held in Edinburgh, the conference program included an informal meeting to enable participants interested in furthering the concept of establishing a pre-hospital health Field within the Cochrane Collaboration. 19 participants at the Edinburgh meeting, from 11 countries, attended the meeting and strongly supported the proposal. Subsequently, a formal half day workshop was held at the 13th World Congress on Disaster and Emergency Medicine, held in Melbourne in May 2003, which formally endorsed the proposal and established an interim, international steering group to prepare the necessary submission to the Cochrane Collaboration. During 2004, as a part of the international communications, the Field was widened to include emergency and disaster medicine and is now known as the 'Prehospital and Emergency Health Field'. This entity was formally registered with the Cochrane Collaboration in August 2004. Further information about the Field is available from the Field website www.cochranepehf.org. To this point, the Field has focused on prehospital care but now wishes to explore strategies and priorities in emergency and disaster medicine. The advisory board meeting held in Melbourne, in October 2005, and the subsequent international phone meeting for those board members unable to get to Melbourne, endorsed that it was timely to head in this direction. The aims of this paper are to: [1] outline the background, scope and current activities of the Field; [2] examine the relevance of Cochrane to prehospital and emergency health; and, [3] stimulate strategies and identify contributors, to determine directions, priorities and resources for emergency and disaster medicine within the Field.. Participants at ICEM 2006 have the opportunity to influence the course of this new Field, to improve the evidence-base of health care interventions in emergency health internationally, and to, hopefully, improve health outcomes from acute health events. **Key words:** Cochrane, prehospital, collaboration

53

Cultural diversity: a challenge for paramedics.

Spencer C. Monash University Centre for Ambulance and Paramedic Studies

Introduction: Current cross cultural models used in training paramedics to effectively manage acute health events in culturally laden situations are challenged in this paper. Globalisation and migration are commonly used reasons to justify an awareness of cultural differences in healthcare situations. The belief is that an understanding of a patient's cultural background achieves improved health outcomes. Such optimistic beliefs are admirable goals to aim for in the non-

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emergency, time-rich health arena where healthcare professionals have time to treat and know their patients. Conversely, paramedics treat patients in the emergency, time-poor arena in which speed is of the essence and culture is placed in the too hard basket. **Methods:** Qualitative research, particularly focus groups, identified cultural issues that may impact on optimal paramedic care. Focus groups included metropolitan and rural paramedics, community groups, emergency medical responders and trainers of health professionals. Transcriptions were coded using NVivo - a qualitative research tool. **Results:** Research results demonstrate that cultural factors adversely impact on paramedic emergency care, but not in expected or stereotypical ways. Firstly, a discrepancy exists between patient and paramedic understanding about what is an acute health event. Secondly, interaction, which includes communication, language barriers and the use of interpreters can undermine paramedic care. Thirdly, paramedic attitudes and organisational culture potentially impacts on care. **Conclusions:** These results question the usefulness of current cross cultural healthcare models for paramedics working in the prehospital emergency setting. A critical need for paramedic cultural awareness exists, but an additional level of complexity in an acute health event challenges the use of traditional models. Instead of placing cultural awareness in the too hard basket – a culturally responsive approach is proposed in the emergency setting and a method for achieving such an outcome is outlined. **Key words:** cultural diversity, emergency medical services

54*

Lower mortality in patients with ST-elevation myocardial infarction triaged in the field and refered for primary percutaneous angioplasty by advanced care paramedics.

LeMay M, Dionne R, Davies RF, Maloney J, Trickett J, So D, Ha A, Sherrard H, Glover C, Marquis J-F, O'Brien ER, Stiell IG, Labinaz M, Poirier P. Ottawa Heart Institute / University of Ottawa, Ottawa, Ont., *Canada*

Introduction: Speed of reperfusion is critical in ST-segment elevation myocardial nfarction (STEMI). We sought to determine the feasability and safety of an integrated regional approach in which advanced care paramedics (ACPs) read the pre-hospital electrocardiogram (ECG) and independently triaged STEMI patients to a designated centre for primary percutaneous coronary intervention (PCI). Method: We developped a protocol in which ACPs interpret pre-hospital ECGs and bring patients with suspected STEMI directly to a designated primary PCI centre, bypassing the city's emergency rooms. We compared the outcomes of these patients with a retrospective cohort consisting of 225 consecutive STEMI patients brought in by ambulance between July 2001 and January 2004 to the city's emergency rooms. **Results:** Between July 2004 and June 2005, trained ACPs triaged patients with chest pain, and referred 108 consecutive patients with STEMI directly to a designated PCI centre. Primary PCI was perfromed in 93.5% vs 8.9% in the control group, $p < 0.0001$. The median door-to-balloon time was 63 minutes vs 125 minutes respectively, $p < 0,0001$. Thrombolytic therapy was prescribed to 80.4% in the control group. The median door-to-needle time was 41 minutes. In-hospital mortality was lower in the ACP-refered primary PCI group, 1.9%, compared to the control group, 8.9%, $p = 0.017$. **Conclusions:** An integrated regional approach in which ACPs reading the pre-hospital ECG independantly triage and transport STEMI patients directly to a designated centre for primary PCI is feasable, and appears safe. This strategy was associated with very rapid and effective reperfusion, and lower in-hospital mortality compared to the usual strategy where patients are brought by ambulance to the nearest hospital emergency department. **Key words:** myocardial infarction, emergency medical services, angioplasty

55

Comparison of German prehospital physician practice to paramedic protocols

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Introduction: Pre-hospital care in Europe and America is rendered using two different models. In American systems, standing orders guide pre-hospital providers. In Germany, EMS physicians directly perform interventions. The objective was to determine whether the interventions performed by German EMS physicians are available in a typical U.S. city using indirect medical oversight. **Methods:** Consecutive patient care reports from EMS physicians in a district of Berlin were abstracted into a database, including demographics, presenting complaint, interventions, and diagnosis. Dispatches that resulted in patient contact and a diagnosis were included. Interventions for common diagnoses were compared to paramedic protocols in a U.S. city of 125,000 people. **Results:** 1105 run forms (97% of dispatches) were analyzed; 584 met inclusion criteria. The most common diagnoses were angina pectoris(13%), field pronouncement(12%), MI(10%), asthma/COPD (9%), arrhythmia(6%), hypoglycemic coma(6%), seizure(6%), pulmonary edema(5%), and trauma(5%). For angina pectoris (n=77), 402/455 interventions(88%) are available in the standing orders of the comparison U.S. city. Interventions not available include heparin (57% use in Berlin) and metoclopramide(12%). For MI/ROMI (n=48), 221/296 interventions(75%) are covered; not covered are heparin(85%), metoprolol(19%), thrombolysis(13%) and metoclopramide(40%). For asthma/COPD (n=51), 104/241 interventions(43%) are included in the paramedic protocols; not included are steroids(86%), terbutaline(41%), and theophylline(76%). For arrhythmia 110/123 interventions(89%) are covered. All interventions for hypoglycemic coma (81/81) are covered, as are 136/150 (91%) for pulmonary edema. In trauma, 117/144 (81%) are covered; exceptions are sedation(37%), colloids(31%), and RSI(9%). **Conclusions:** Interventions performed by German EMS physicians are available through standing orders in a typical U.S. system. Exceptions are found in asthma management; use of antiemetics; pre-hospital heparinization, thrombolysis, and beta-blockade in suspected MI; and rapid sequence intubation. **Key words:** emergency medical services, protocols

56

Preliminary report of ketamine use by paramedics as an analgesic agent.

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Introduction: Ketamine has become the agent of choice for many physicians pre-hospital for manipulation and splintage of fractures and analgesia for trapped patients when access is limited. Application by paramedics has not previously been reported. **Methods:** Ketamine was introduced for pain of traumatic origin where inhaled Methoxyflurane or intranasal Fentanyl were ineffective or inappropriate. Recommended dosage was 1-2 mg/kg IM, 0.5-1 mg/kg IV. IV use was limited to adults only. **Results:** 58 patients were treated. Average age 42y, range 7-92y with a 3 fold male predominance. IM and IV use were approximately equal. Over 70% of cases were for limb injuries. Methoxyflurane was used in 32% of cases, IN Fentanyl in 20%. On review, use of Ketamine was considered inappropriate in 2 cases (1 stabbing, 1 blunt abdominal trauma). In 4 its use as a first line agent was questionable, in 7 the dose was considered too high and one case the timing was inappropriate. Overall results demonstrate significant reduction in pain scores. Analgesic effect was rated as "good" in 50 (89%) and "partial" in the remaining 6 (11%). Average pain scores (95%CI) pre and post Ketamine were 9.0 (8.7-9.4) and 1.6 (0.8-2.3).

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All patients achieved at least 2 point reduction in pain scores, 80% dropped 7 points or more and 34% went from 10 to 0. The most frequent side effect was dissociation, which was apparent in 10% of cases and likely in a further 20%. No patient required pharmacological treatment. Dissociation was more common in initial cases and with higher doses. There was a lower incidence with IV use and higher incidence when used in combination with Methoxyflurane. Transient apnoea was noted in two patients following IV use. **Conclusions:** Ketamine use by Paramedics for analgesia IM and IV prehospital is effective and relatively safe with pain score reductions superior to other agents. The principle side effect of concern is dissociation which is present in up to 30% of patients but less with lower doses and with IV use. **Key words:** ketamine, analgesia, emergency medical services

TOXICOLOGY TRACK

57

Effect of pyridostigmine, pralidoxime and their combination on survival in rats exposed to the organophosphate paraoxon.

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Introduction: Organophosphorus compounds (OP) are widely used substances. Accidental and suicidal exposures are frequent. Nerve agent OP were also involved in a terrorist attack in Tokyo in 1995. The inhibition of esterases by OP leads to an endogenous ACh poisoning. The standard therapy is described by the mnemonic A FLOP (Atropin, FLuids, Oxygen, Pralidoxime). Recently the FDA approved oral pyridostigmine (PSTG) for pre-exposure treatment of some nerve agents; the concept is to block the cholinesterase reversibly using the carbamate in order to deny access to the active site of the enzyme to the irreversible imhibitor (OP/nerve agent) on subsequent exposure. This study compared in a prospective, non-blinded study in a rat model of acute high dose OP (paraoxon; POX) exposure the protection confered by standard oxime (pralidoxime; PRX) treatment and pyridostigmine (PSTG) pretreatment with the effect of their combination (PSTG pretreatment + PRX treatment). **Methods:** There were 6 groups of rats in each cycle and each group contained 6 rats. The procedure was repeated 6 times. Statistical analysis was performed using Kaplan Meier plots. All substances were applied ip. Group 1 1 microM POX (» LD75), Group 2 1 microM PSTG + 30 min later POX, Group 3 PSTG + 30 min later POX+ 50 microM PRX, Group 4 POX + PRX, Group 5 PSTG, Group 6 PRX. The animals were monitored for 48 hours and mortality was recorded at 30 minutes, 1, 2, 3, 4, 24 and 48 hours. **Results:** Both PSTG and PRX statistically significantly decreased organophosphate induced mortality in the described model. While the same applies to their combination the decrease in mortality when using both PSTG and PRX is less than that achieved with their single use (but not significantly so). **Conclusions:** While certainly further work using different organophosphorus compounds and animal species are needed before a final conclusion is reached, the animal data presented does not support the combined use of PSTG and PRX. **Key words:** organophosphate, pyridostigmine, pralidoxime

58

Non-invasive carboxyhemoglobin monitoring: carbon monoxide toxicity screening in the emergency department.

Chee KJ, Suner S, Partridge RA, Sucov A, Jay GD, Department of Emergency Medicine, Rhode Island Hospital, Brown Medical School, Providence, RI, *USA*

Introduction: Patients with CO toxicity (COT) often present to emergency departments (EDs) with nonspecific complaints, and some cases may go unrecognized. Standard detection of COT relies on elevated serum levels of carboxyhemoglobin (COHb). The objective of this study was to assess baseline COHb concentrations in ED patients using a non-invasive device and to correlate these levels with known clinical and demographic data. **Methods:** Patients presenting to an urban ED (> 80,000 annual adult census) over an 11 day period had COHb levels assessed at triage by a non-invasive spectral analysis co-oximeter (Rad 57, Masimo, Inc.). Baseline COHb levels were correlated with gender, age, mode of transportation, smoking, and vital signs. **Results:** Of 2372 consecutive ED patients, 1323 (55.8%) had COHb levels documented at triage. The mean level was 3.50% + 3.18% with a range of 0-18%. 48.3% were female and the mean age was 43.2 + 19.0 years. Gender was not associated with COHb levels (3.72% + 3.38% for males vs. 3.47% + 3.14% for females, p=0.27). There was no correlation between COHb level and age (r=-0.15) or oxygen saturation (r=-0.008). 61.0% arrived at the ED by walking or by private vehicle. The mean COHb level was 2.92% + 3.01% for ambulance patients, 3.71% + 3.30% for patients arriving by private vehicle, and 3.86% + 3.08% for patients arriving on foot. 30% of patients smoked and exhibited higher levels of COHb (5.22% + 3.65% vs. 2.77% + 2.64%, p<0.00001). There were 3 cases of unsuspected COT identified using this screening tool and confirmed with serum values. **Conclusions:** Smokers have significantly elevated levels of COHb compared to nonsmokers. Ambulance patients did not show elevated COHb levels. There is no correlation between triage vital signs and COHb levels. Simple, non-invasive testing for COT can be performed at ED triage and may detect unsuspected COT. **Key words:** carbon monoxide, spectral analysis, cooximeter

59

Smoking in the ED: characteristics of individuals presenting with acute respiratory symptoms.

Partridge RA, Becker BM, Trask P, Bock B, Department of Emergency Medicine, Brown Medical School, Providence, RI, *USA*

Introduction: Cigarette smoking is the single most important risk factor for the development of Acute Respiratory Illness (ARI). This study identified salient characteristics of smokers presenting to the ED with ARI. **Methods:** A convenience sample of adult smokers (>8 cigarettes/day) presenting to an urban ED for treatment of ARI. A research associate collected demographic information on all participants and assessed nicotine dependence, motivation to quit smoking, confidence in quitting, decisional balance, risk perception and depressive symptoms using validated instruments. **Results:** Investigators enrolled 655 participants, 388 of whom were women (59.2%);mean age was 37.5 years (range 18-80), 50.7% white, 18.9% black, 17% Hispanic, 13.4% mixed/other. Participants smoked a mean of 15.3 cigarettes/day. Most reported having thought about quitting smoking or had quit in the past 6 months. 23% quit in the past 30 days. Motivation to quit was moderate (Ladder of Change mean = 4.62). Pro's and Con's of smoking were equal (10.32 versus 10.56). Mean self-efficacy was 33.15 (S.D. = 6.67). 24% were extremely confident that they could quit in 6 months (mean = 5.3). Confidence ($r = 0.128$, $p < 0.001$), motivation to quit($r = 0.151$, $p < 0.0001$), and nicotine dependence ($r = 0.621$, $p < 0.0001$) were significantly correlated with cigarettes/day smoked. Patients advised to quit by the ED doctor (n = 255) were more likely to believe their symptoms were related to smoking (OR = 1.34). **Conclusions:** Symptoms of ARI may focus the smoker's attention on breathing and smoking. In this study smokers with ARI demonstrated motivation to quit, confidence in quitting, and experience quitting. The ED clinician can leverage the smoker's respiratory symptoms and illness in this teachable moment to increase their mo-

tivation and self-efficacy, and undermine the pro's of smoking, thus maximizing the probability of a successful quit. **Key words:** smoking cessation, life style modification

60

Serum level of NT-ProBNP as an early cardiac marker of carbon monoxide poisoning.

Davutoglu V, Gunay N, Kocoglu H, Gunay NE, Yildirim C, Cavdar M, & Tarakcioglu M. Assoc. Prof., Gaziantep University, Medical Faculty, Department of Cardiology, Gaziantep, *Turkey*

Introduction: Acute carbon monoxide (CO) poisoning may cause cardiotoxicity. The natriuretic peptides, including atrial natriuretic peptide, brain natriuretic peptide (BNP), N-BNP, and NT-proBNP, are endogenous cardiac hormones that may be secreted upon myocardial stress. The aim of this study was to asses the plasma NT-proBNP level in acute CO poisoning, and to compare it with healthy controls. **Methods:** After approval of the ethics committee, 15 healthy controls and 15 patients admitted to the Gaziantep University Hospital (Gaziantep, Turkey) with the diagnosis of carbon monoxide poisoning were studied. Echocardiography was performed to all patients. Serum NT-pro BNP, creatine kinase (CK), creatine kinase-MB (CK-MB), and Troponin-T were also analyzed together with the carboxyhemoglobin (COHb) level. The correlation between serum NT-pro BNP and COHb level was investigated. All tests were performed other than COHb in the blood of healthy volunteers. ECG was performed to all patients and healthy controls, and the results were compared. **Results:** Troponin, CK and CK-MB levels were statistically insignificant between bgroups ($p>0.05$). The level of NT-proBNP and COHb were found to be increased in the study group. There was a positive correlation between the COHb and the NT-proBNP ($r=0.829$, $p<0.01$), and between the COHb and the CK ($r=0.394$, $p<0.01$). There was no difference in other parameters between groups all of which were within normal range. **Conclusions:** Measuring the plasma NT-proBNP level may contribute to the early diagnosis of cardiotoxicity in patients with carbon monoxide poisoning, contributory to the conventional methods. **Key words:** carbon monoxide poisoning, natriuretic peptide

Wednesday, June 7th: Oral Presentations

ADMINISTRATION TRACK

61

The impact of NHS Walk-in Centres on A&E services.

Salisbury C, Chalder M, Hollinghurst S, Montgomery A, Cooke MW, Munro J, Lattimer V, Sharp D. University of Bristol, Bristol, *United Kingdom.*

Introduction: A new wave of NHS walk-in centres (WICs) opened during 2004, many co-located with Emergency Departments (EDs). To evaluate the impact of new A&E focused WICs. **Methods:** A controlled before and after study of all 8 WICs co-located with EDs compared with matched EDs with no co-located WIC. Information was derived from 1) site visits or telephone interviews, 2) data on patient throughput and admissions, 3) data from anonymized patient records, 4) postal questionnaire, and 5) economic data. **Results:** From the perspective of patients the service is not visibly different. There were concerns that this service would increase demand. At most sites patients could not directly walk in to the new centre. Patient throughput increased during the study, at both types of sites. The point estimate suggested that there was a greater increase in throughput at WIC sites, but this estimate had a wide confidence interval. The mean visit duration reduced at both sites with and without WICs, with no significant difference. There was no difference in achievement of the 4 hour total time target. The process of care appears similar in sites with and without WICs, although WIC patients are more likely to be managed by a nurse. The cost of a site with a WIC was greater than that without a WIC, but the cost per patient was very similar. For relatively few people was attending a WIC an active choice. A third of those seen in a WIC would rather have been seen in an ED. Those consulting in WICs did express fewer problems than those consulting in the co-located A&E departments with regard to a number of aspects of their care and their consultation; almost half the people in this study had a re-consultation about the same problem in the four weeks after they attended the hospital with no difference between type of site. There was also no evidence of differences in patient outcomes. **Conclusions:** Most of these WICs are providing a slightly different organizational environment, with a greater role for nurse management of patients but other care has changed little. **Key words:** walk-in centres, administration, emergency departments

62

The utility of clinical features in patients presenting with non-traumatic headache.

Locker TE, Thompson C, Rylance J, Mason SM. School of Health and Related Research, University of Sheffield, *United Kingdom.*

Introduction: When patients to present to an Emergency Department because of non-traumatic headache, they are often a diagnostic challenge. This study aimed to examine the utility of clinical features in detecting serious underlying causes of non-traumatic headache in adult patients presenting to an Emergency Department. **Methods:** A prospective observational study of alert adult patients presenting to one UK Emergency Department over a period of fourteen months was conducted. Patients were excluded if their headache was related to trauma or they had been previously recruited into the study. A standardised data collection form was used to record details of the history and examination findings. Investigation and management were conducted according to existing departmental protocols. Patients were followed up for three months following their initial presentation. Each factor in the history and examination was examined for its ability to predict a serious underlying cause of headache. **Results:** 589 patients were included in the study with complete follow-up details obtained on 558 (94.7%). 75 (13.4%) were found to have a serious pathological cause of their headache. Four features were found to be significant independent predictors of serious pathology, these were age >50 years (likelihood ratio (LR) =2.34), sudden onset, (LR=1.74), any abnormality on neurological examination (LR=3.56) and presentation due to associated features (LR=2.27). Taken in combination, the presence of any one of the first three features has a sensitivity of 98.6% and specificity of 34.4% (Positive LR= 1.50, Negative LR=0.04). **Conclusions:** Three features, age greater than 50, sudden onset, and an abnormal neurological examination, are identified as significant independent predictors of serious pathology, which, in combination, can exclude the presence of such pathology in adult patients presenting with non-traumatic headache. **Key words:** administration, headache, clinical features

63

Are changes in ED attendances related to primary care changes?

Fisher JD, Cooke, MW. Warwick Medical School, The University of Warwick, Coventry, *United Kingdom.*

Introduction: In the UK the delivery of out of hours primary care has radically changed with the provision of local centres and less

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home visits. There has been debate in the medical media about whether this change has produced changes in emergency department attendances. In the Netherlands studies have shown that the model most similar to the current UK model was associated with the most increase in ED attendances. **Methods:** In order to determine the reason for the increase in new attendances we undertook a secondary analysis of routinely collected data by one Acute Trust over four time periods: October 2003, April 2004, October 2004, and April 2005. **Results:** There has been a steady increase in total number of new attendances over the four time periods with the biggest increase for the last time period demonstrating a rise from 11,957 patients in October 2003 to 14,176 in April 2005. There has been a steady increase in out of hours attendance but the normal working hours show fluctuations in attendances. Out of hours week days have steadily increased. In hours initially appeared to be decreasing but in the last period increases at a similar rate as the weekday Monday to Friday. For out of hours attendance the increase is for those who are less severely ill; the numbers of the more seriously ill has remained stable. There has also been an increase in the number of self referrals. **Conclusions:** There has been an increase in attendances, mostly seen in the less severely ill cases and in the out of hours period. This supports the hypothesis that increased work is originating from primary care cases. Present research is looking specifically at attendances of children with minor respiratory illness and the changes in attendances at one of the local out of hours centres and will be presented with this data. Discussion will illustrate possible reasons for these changes. **Key words:** administration, primary care, emergency

64

The emergency department overcrowding impact study.

Gilligan P, Winder S, Gupta V, Singh I, Kelly PO, Houlihan P, Gleeson A. Dublin, *Ireland*

Introduction: The aim of this study was to examine the effects of overcrowding on the running of the Emergency Department (ED) and on the morbidity and mortality of patients who have protracted stays in the ED. **Methods:** Patient information was examined for the period January 2004 to July 2005. Overcrowding in the ED was measured by calculating the number of patients awaiting admission at 9 a.m. Regression techniques, assessing the effects of overcrowding in ED on waiting times and admissions were used. Mortality and morbidity outcomes associated with overcrowding were modeled using logistic regression techniques. **Results:** During the study period, 13,357 patients were admitted through the ED. The average number of patients awaiting hospital admission in the ED at 09:00 a.m. was 20.4 (range 0 to 45). The average duration of stay in the ED following decision to admit was 16.1 hours (range 0 to 161 hours). The total duration of stay in the ED increased as overcrowding increased (P<0.001). Older patients requiring emergency medical admission waited longer in the ED (P<0.001). Admission rates were not affected by overcrowding in the ED (P=0.187). The number of patients that did not wait to be seen was not affected by overcrowding (P=0.77). The time waiting to see an Emergency Doctor revealed a trend towards reduced wait in the context of overcrowding but this did not quite reach statistical significance (P=0.057). The likelihood of dying during admission was increased by rapid admission from the Emergency Department (P<0.001). On multifactorial analysis the likelihood of being diagnosed with MRSA during admission did not increase with overcrowding in the ED (P=0.550). **Conclusions:** The admission rate was not affected by overcrowding in the ED. Increased risk of mortality and morbidity is associated with age and inpatient stay rather than waiting time and overcrowding in the ED. **Key words:** administration, emergency department, overcrowding

65*

Variation of consultation practice in urban emergency physicians.

Curry DG, Wang DM. Department of Emergency Medicine, Calgary Health Region, Calgary, Alta., *Canada*

Introduction: Emergency department patient flow is affected by multiple factors, including time waiting for a consultant's assessment. Limited published data exist describing consultation practices of emergency physicians (EPs). This study assessed EP consultation practice variability and relation to patient acuity, training path and years of practice. **Methods:** We assessed the consultation practice of 91 EPs practicing over a 1 year period in three urban adult EDs with admission rates from 15% to 24%. Consult Rate (CR) (% of patients seen by an individual EP for whom consultations were requested) and Consult with Admit Rate (CwAR) (% of consulted patients subsequently admitted) were calculated, based on a computerized database collected during each patient visit. The Student's T test was used to analyze differences between groups. **Results:** Consultation practices for the same EPs varied significantly when working at the highest versus lowest acuity sites (see Table 1). There was no statistical difference between EPs with different training paths after 5 years of practice or between FRCP trained EPs regardless of length of practice.($p > 0.05$). When stratified by training path, CCFP-EM trained EPs who had practiced more than 5 years had a lower CR and significantly higher CwAR than CCFP-EM trained EPs in their first 5 years of practice (see Table 2). **Conclusions:** Consultation practices of EPs are variable and related to patient acuity and years of practice, but not to their training path. Further study is required to determine if less efficient consultation practices can be modified with feedback to improve patient flow. **Key words:** emergency department, administration, consultation

Table 1, Abstract 65. Consultation practice: highest acuity vs. lowest acuity sites

	Highest acuity	Lowest acuity	*p* value
CR (%; SD)	28.10 (6.62)	21.35 (7.29)	0.000
CwAR (%; SD)	67.92 (6.17)	63.98 (11.12)	0.007

Table 2, Abstract 65. Consultation practice of CCFP-EM: years in practice

	>5 yrs (*n* = 32)	<5 yrs (*n* = 23)	*p* value
CR (%; SD)	22.39 (5.50)	25.03 (5.45)	0.08
CwAR (%; SD)	67.54 (5.28)	64.63 (4.10)	<0.05

66

Designing emergency departments for patient satisfaction and wellbeing.

Kas PJ. Department of Emergency Medicine, St. Vincent's Hospital, Melbourne, *Australia.*

Introduction: Patient satisfaction and well being is influenced by the built environment. Emergency Department design presents a unique challenge due to the continued expansion and development of the specialty and in the techniques used for patient management. The perception of the Emergency Department as transient accommodation for patients often leads to basic necessities of design that can contribute to patient satisfaction, decreased lengths of stay, improved staff working conditions and efficiency, being overlooked. **Methods:** A review of all MEDLINE, and Architectural literature

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was conducted for the years 1985-2005 in the area of design for patient wellbeing. The resultant information was used to determine how closely major University Hospitals in Australia observed literature recommendations. The areas studied were: 'patient reception design' including ambulant and ambulance patient reception, as well as designing patient areas in terms of 'way finding', 'privacy', 'lighting', 'ventilation', and 'environmental distracters'. **Results:** Emergency Department design lacks consistency in an approach to design for patient satisfaction and well-being. Newer departments provide more appropriate designs although this does not appear to be due to evidence based best design guidelines. **Conclusions:** A basic set of performance related guidelines for design for wellbeing is required to guide architects and design teams in their approach to Emergency Department Design. These guidelines can improve patient satisfaction and wellbeing, and can contribute to improved staff performance, and efficiency. **Key words:** design, emergency department, well-being

67

Do observation units (OBS) provide quality care?

Schneider SM, Dick R. Department of Emergency Medicine, University of Rochester, Rochester, *USA.*

Introduction: Measuring quality of care is elusive. One method is to return rates to traditional inpatient systems. Our hypothesis is that 30 day return rates for patients cared for in OBS will be similar to inpatient services. **Methods:** Setting: a university hospital with 700 inpatient beds and 24 OBS (staffed by ED physicians). All admissions through the Emergency Department (ED) were screened by InterQual criteria. Patients felt by the ED attending to require admission, but who failed InterQual inpatient criteria, were admitted to OBS. A database of all patients admitted to OBS between 1/14/04 and 12/31/04 was queried for return visits to ED, OBS or inpatient service within 30 days of the OBS admission. One author compared the chief complaint of the repeat visit to the reason for the initial OBS admission. The hospital information system gave the 7 day repeat admissions for inpatient units. A literature review of published 30 day readmission rates for inpatient units was completed using Medline. **Results:** Of 6384 OBS admissions, 620 visits had a repeat visit within 30 days (9.7%), readmission rate was 4.0%. Overall hospital 7-day readmission rate for medical/surgical patients was 8% (10% for medical patients). The 30 day readmission rate in the literature ranged from 8-14%. There were 826 repeat visits; 32 directly admitted and 794 returned to the ED. Of patients who returned to the ED, 539 (68%) were discharged and 255 (32%) admitted. Of the 826 repeat visits, 594 (75%) were for a different diagnosis. The 620 OBS admissions were by 548 patients. In 13 cases, the second (or third) OBS visit occurred within the 30 day period but each OBS visit was assumed to start the 30 day clock again. **Conclusions:** The return rate for OBS within 30 days compares favorably with the 7-day readmission rate for the hospital and with published norms. The majority of patients returned for a new problem. If return visit rates are a measure of quality, care received in OBS is comparable to traditional inpatient care. **Key words:** observation units, emergency, administration

68*

Multicenter implementation of an emergency department asthma treatment protocol.

Innes G; Holmes A; Schmidt B; Reeves L; Mendel D; Grympa M; Cunningham W; Mackenzie J; Finkler J. Dept of Emergency Medicine, St. Paul's Hospital, Vancouver, BC, *Canada*

Introduction: Many clinical protocols have been developed, but relatively few have been successfully implemented. Protocol implementation remains a challenging task. Our goal was to develop a protocol implementation strategy that EDs can use to introduce new care protocols, and to test this strategy by implementing a patient care protocol in several diverse EDs. **Methods:** Based on the consensus of front-line staff, the provincial ED Protocol Working Group selected acute asthma as the target syndrome for the first provincial ED protocol. We developed an implementation toolkit containing a project overview, a description of roles and responsibilities, a suggested implementation process, asthma algorithms and order sets, educational material and patient discharge tools. Six diverse emergency departments, ranging from 4000 to 52000 visits per annum, were selected as pilot sites. Measured outcomes included staff satisfaction, ease of implementation, perceived impact on patient care, and four clinical process measures: time to bronchodilator, steroid given, peak flow measurement obtained, and asthma education follow-up referral made. **Results:** All six pilot sites successfully implemented the protocol over an 8-week period and 74 ED staff completed the protocol evaluation. The sites studied 135 patient visits before implementation and 180 visits during the 8-week post-implementation phase. ED staff reported that the protocol was easy to implement, that it increased ED efficiency, and that it facilitated better patient care. After implementation, mean time to bronchodilator fell from 53 minutes to 18 minutes ($p < 0.01$), the proportion of patients receiving steroids rose from 52% to 73% ($p < 0.01$), the use of peak flow measurement increased from 61% to 94% ($p < 0.01$), and the proportion of patients referred to an asthma clinic or educator rose from 2% to 52% ($p < 0.01$). **Conclusions:** This systematic approach to ED protocol implementation was successful in diverse EDs and will guide future provincial protocol implementation efforts. **Key words:** asthma, protocol, emergency

69*

Does caring for low-complexity emergency departments patients delay the time to first physician contact for sicker patients? Results from the CROWDED study.

Schull MJ, Kiss A, Katic M. Institute for Clinical Evaluative Sciences, Toronto, Ont., *Canada.*

Introduction: Caring for low-complexity emergency department (ED) patients may delay care for other patients. We sought to determine whether the number of low-complexity patients presenting to an ED is associated with delayed time to first physician contact for higher complexity patients. **Methods:** We obtained administrative records on all ED visits to all Ontario hospitals from April 2002–March 2003, excluding very low volume EDs. Variables for each ED were computed for consecutive 8hr intervals. The primary outcome was the mean time from triage to first physician contact (TTMD) for medium and high complexity patients, per 8hr interval. The main predictor was the number of low complexity ED patients (defined as ambulatory arrival, and triage level IV or V, and discharged) presenting in each interval. Covariates were the number of new high complexity (defined as admitted) and medium complexity (defined as neither high or low) patients, mean patient age, sex distribution, hospital teaching status, time of day and day of week, and total patient-hours, all per 8-hr interval. Auto-regressive modeling was used given correlation in the data. **Results:** 1095 consecutive 8-hr intervals at 110 EDs were analyzed. 4.7 million patient visits occurred, 49% of patients were male and mean age was 38.4 years. Low, medium and high complexity patients represented 55%, 34% and 11% of all patients. Median TTMD was 31.8, 43.2 and 36.0 minutes for high, medium and low complexity patients respectively. In adjusted analyses, every 10 low complexity patients arriving per 8 hrs was associated with a 5.4 minute ($p < 0.0001$) increase in mean TTMD for medium and high complexity patients. In contrast, 10 additional high complexity patients per 8hrs were associated with a 73

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minute increase ($p < 0.0001$) in TTMD for medium and high complexity patients. Results were similar for lower and higher volume EDs. **Conclusions:** Low complexity ED patients are associated with a negligible delay in the time to first physician contact for other ED patients. **Key words:** low complexity, first physician contact, delay

70*

An international survey of priorities of emergency physicians for future development of clinical decision rules.

Eagles D, Stiell IG, Clement C, Brehaut J, Kelly AM, Mason S, Kellermann A, Perry J. Department of Emergency Medicine, University of Ottawa, Ottawa, Ont., *Canada*

Introduction: The use of clinical decision rules is widely accepted in emergency medicine. This study compared the clinical priorities of emergency physicians (EPs) working in Australasia, Canada, the UK and the US for the development of future decision rules. **Methods:** We administered a prospective email and postal survey to members of 4 national EP associations using a modified Dillman technique. Random samples of members from ACEM (Australasia), CAEP (Canada), BAEM (UK) and ACEP (US) were selected. A pre-notification letter and 4 surveys were sent to optimize response. Analyses included univariate and descriptive statistics with 95% CIs. **Results:** Overall, 1043 (35%) responses were received: Australasia 53%, Canada 57%, UK 12% and US 41%. The respondents were male 74%, mean age 46 years and mean experience 16 years. The clinical problems most often identified by % of physicians and ranking were: % of physicians / rank and Clinical Problem ACEM CAEP BAEM ACEP: Central/serious vertigo: 44/1, 44/1, 27/7, 41/1; Imaging for TIA: 38/3, 40/2, 27/6, 36/4; Febrile child: < 36 mo 41/2, 32/3, 40/2, 27/9; Anterior chest pain: 35/5, 27/6, 39/3, 37/3; CT Angio for PE: 35/4, 22/10, 29/5, 28/8; Bleeding–early pregnancy 29/6, 26/8, 23/10, 31/7; Suicidal risk: 26/8, 30/5, 40/1, 19/13; Weakness in elderly: 18/10, 31/4, 24/9, 33/5; CT for abdominal pain: 27/7, 24/9, 13/18, 32/6; Febrile child < 3 mo: 20/9, 27/7, 17/13, 37/2. **Conclusions:** Among the study countries, there is consistency in identification of clinical problems but considerable variation in prioritization. The top priorities overall were identification of central/serious vertigo and imaging for TIA. These results should help researchers target relevant areas for future development of clinical decision rules in emergency medicine. **Key words:** clinical decision rules, international, survey

INFORMATICS TRACK

71*

Data collection on patients in emergency departments in Canada.

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Introduction: The lack of uniform reporting of data from hospital emergency departments (ED) impairs the ability of institutions and governments to quantify overcrowding. Relatively little is known about the ability of EDs, and regional, provincial and federal governments to quantify ED activity in Canada. The main objectives of this study were to determine the use of electronic data capture in Canadian EDs and the accessibility of provincial data on ED visits, and to identify the data elements and methods of EDIS data collection at the national level. **Methods:** Two cross-sectional studies were conducted: a survey of 243 Canadian ED directors and all provincial and territorial representatives with knowledge about ED data. Descriptive data are presented with counts and proportions. **Results:** Of the 243 ED directors contacted, 158 completed the survey (65% response rate). Overall, only 39% of all ED Directors reported using an electronic ED information system (EDIS). Though triage is performed in nearly all responding EDs, electronic triage is available in only 19% of these. All 13 provincial, territorial and federal government representatives completed the survey (100%). While nine provinces and territories (69%) collect ED data, the source of this information varies. Five provinces and territories (38%) collect triage data, yet only Alberta, the Yukon and Ontario (23%) have a comprehensive, jurisdiction-wide, population-based ED database. Only Ontario and the Yukon contribute this comprehensive data to a national database. **Conclusions:** A large number of institutions do not track patients within their EDs using electronic methods. Variations exist among provinces regarding the type and source(s)of ED data collected. Serious limitations exist with respect to accurate documentation of the degree of ED activity, and, therefore, ED overcrowding in Canada. There is an urgent need for regions to collaborate on a strategy to collect ED data and monitor the magnitude and trends in ED overcrowding in Canada. **Key words:** overcrowding, emergency department, electronic ED information system

CARDIOVASCULAR TRACK

72

If you were having a heart attack what would you want to know?

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Introduction: Patient autonomy is one of the cornerstones of medical ethics and informed consent acts to protect this principle. For elective treatment informed consent is easily obtained however in emergencies it role is ill defined. In situations such as acute myocardial infarction (AMI) patient competency may be compromised and the time available for discussion limited. This often makes obtaining informed consent to treat virtually impossible. The aim of this study is to test the null hypothesis that patients with chest pain do not want to know the about treatment options or risks, if they were having an AMI. **Methods:** Patients over sixteen years of age attending the Emergency Department with chest pain of possible cardiac origin (not AMI) were invited to complete a questionnaire regarding information they would want to know about treatments and their risks if they were having an AMI. **Results:** 51 consecutive patients were interviewed. All patients wanted to know about treatment options but only 68% wanted to know their mechanism of action. All wanted to know the possible benefits of treatment and what the doctor thought was best. 94% wanted to know the risks of death and 92% wanted to know the risks of disability. There was no statistical difference between men and women and those under and over 55 years. **Conclusions:** It appears that patients with non-AMI chest pain, in the event of an AMI would want to know the treatment options, their benefits and the doctor's opinion. The majority of patients wanted to know the risks whilst fewer were interested in the mechanisms of action. The null hypothesis that patients do not want to be informed is thus rejected. **Key words:** myocardial infarction, patient autonomy, informed consent

73

Can we reliably predict AMI in young adults presenting to the emergency department with chest pain?

Rosin A, Christensen J, Chathampally Y. Darnall Army Community Hospital, FT Hood, Texas, *USA*

Introduction: To define a set of clinical features that will identify a subset of patients (pts) under the age of 40 with AMI. **Methods:** This was a retrospective cohort study from the years 2001 to 2004. Adults between the ages 19 to 40 years admitted with a primary diagnosis of ACS were included. Pts with renal failure and no available Troponin-I levels or initial electrocardiogram (ECG) were excluded. Records were reviewed by one reviewer and data was extracted for demographics, cardiac risk factors, associated symptoms, radiation, character and duration of pain, chest radiograph results, and any abnormality on the initial ECG. Multivariable analysis was performed using the logistic regression model (LRM). Receiver-operating characteristic (ROC) curve analysis was performed to evaluate the ability of the independent variables to discriminate with respect to AMI. **Results:** 1830 pts were admitted for chest pain during the study period. 175 met the inclusion criteria, and 15 met the exclusion criteria. The mean age and female sex for the pts with and without AMI were 33.6, 33.4, 56%, and 52% respectively. Of the 46 variables evaluated, only hyper-acute t wave (HATW) (correlation coefficient r = 0.261, p = 0.001), and radiation of pain to both arms (BA) (r = 0.160, p = 0.044) or left arm (LA) (r = –0.158, p = 0.047) were statistically significant on the Spearman Rank Correlation. Pain radiation to BA was the first factor to be eliminated on backward elimination. Composite index included HATW and pain radiation to LA. Areas under ROC curves were 0.540 (95% CI: 0.411-0.669, p = 0.527), 0.545 (95% CI: 0.415 to 0.674, p = 0.478), 0.601 (95% CI: 0.487-0.715, p = 0.111), 0.0625 (95% CI: 0.506-0.743, p = 0.048) for HATW, pain radiation to BA or LA, and composite index. Sensitivity and specificity of the LRM were 0.800 (95% CI: 0737-0.863) and 0.402 (95% CI: 0.325-0.479), respectively. **Conclusions:** In patients under the age of 40, clinical features individually or as composite index were poor discriminators of AMI. **Key words:** myocardial infarction, prediction, young adults

74

Cortisol levels as a marker for acute coronary events in emergency department patients.

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Introduction: Standard methods for the detection of acute cardiac events in the ED include EKG and cardiac enzymes. There remains a need to identify potential markers for acute events so that ED physicians can effectively recognize and treat these patients in a timely manner. The objective of this study was to determine if serum levels of cortisol are altered in patients experiencing an acute cardiac event. **Methods:** A convenience sample of patients between the ages of 35 and 70 who presented to the ED with chest pain were eligible to be enrolled in this study. After obtaining informed consent, serum cortisol levels were drawn. Patient charts were reviewed to determine the final diagnosis given the patient as well as EKG findings, initial and maximum troponin levels, duration of pain and disposition of the patient. **Results:** Thirty-two patients were enrolled from June 1st to July 12th, 2005. Eleven patients had elevated cortisol levels (>20ug/dl). Those with a diagnosis of infarct had significantly higher cortisol levels (28.4 ± 0.64 ug/dl) than all other diagnoses (13.11 ± 8.12 ug/dl; p=0.05). Patients with new EKG changes and/or an initial elevated troponin also had significantly higher cortisol levels. However, two patients diagnosed with an acute MI did not have an initial elevated troponin, but did have abnormally high levels of cortisol. **Conclusions:** Cortisol levels were significantly higher in patients diagnosed with MI, and levels were increased sooner than traditional cardiac enzymes. This suggests that cortisol could be a valuable predictor of cardiac disease and could potentially be used as cardiac markers for MI and ACS in the emergency setting. **Key words:** cortisol, infarction, emergency department

75

Improving door-to-balloon times in primary PCI for acute STEMI: the value of an audit-driven quality initiative.

Charles RA, Kwok BWK, Wee SL, Wong P, Kadir HA ,Tan CGP, Ling ML, Egoda W, Lim SH, Chua T, Anantharaman V. Department of Emergency Medicine, Singapore General Hospital, *Singapore.*

Introduction: Primary PCI is a highly effective but time-dependent treatment for STEMI, the mortality benefit of PTCA hinges on prompt time to treatment and especially the door-to-balloon time. Numerous strategies can be used to reduce door-to-balloon times and thus improve clinical outcomes with primary PCI. Our aim was to evaluate the effect of continuous quality improvement methods, monitoring of time delays to reduce door-to-balloon delay in primary PCI. **Methods:** A multi-disciplinary team (emergency medicine physicians, cardiologists, nurses, CVL staff and quality management) conducted a baseline evaluation over 3 months with passive monitoring of time intervals. Workflow processes and treatment protocols were adapted or amended in response to the audit process. **Results:** The median door-to-balloon time improved from 130.5 minutes to 109.5 minutes (p<0.001) over a period of twelve months of study. Significant reductions in timing were seen in three areas: time to inform the cardiology registrar via paging, time taken for cardiology registrar to arrive in the ED, and time from patient's arrival in the CVL to angiographic reperfusion. **Conclusions:** Through this audit, our multidisciplinary team has developed a guideline-based, institution-specific written protocol for triaging and managing patients who present to the ED with symptoms suggestive of STEMI. This has resulted in shortened door-to-balloon times with better clinical outcomes without compromising safety or efficacy. **Key words:** PCI, door-to-balloon times, quality

76

Factors related to prognosis and mortality in emergency stroke care.

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Introduction: The purpose of this study was to compare demographics (age, gender), vital signs (tension arterial {TA}, body temperature), biochemical parameters (blood glucose level, urea, creatinine), hematological parameters (CBC, PT, PTT, fibrinogen, fibrin degradation products ({DP}, D-dimer), ECG findings and cranial CT findings to Glasgow Coma Score (GCS) and mortality in the emergency care of patients with stroke. **Methods:** All patients were evaluated in the emergency department for acute stroke and were seen within the first 3 hours. Age, gender, TA, body heat and GCS were recorded and blood glucose, urea and creatinine were obtained from a central laboratory. Venous blood samples were used to determine the blood counts, PT, PTT, fibrinogen, FDP and D-dimer levels. The ECG and cranial CT were obtained. The patients were followed in the Emergency Intensive Care Unit. The results were compared with GCS and mortality and all p-values of <0.05 were considered significant. **Results:** Ninety eight patients were enrolled; 52 (54%) were female and the average age was 62±3 (ranging from 36-81). Twenty one of the patients died during the follow-up. Only one of them had the GCS over 8. The average body temperature of the lost patients was 38.3±1.1. The TA average of the lost patients was found to be systolic 195 (systolic) and 100(diastolic) mm/hg. There was a positive association between age, TA and body heat and GCS as well as mortality (p<0.05). The relationship between blood glucose level, PT, PTT and fibrinogen with GCS and mortality was also positive (p<0.05). Forty nine of the patients had pathologic findings in their initial ECG . No positive relationships between ECG findings and GCS or mortality were identified. **Conclusions:** In

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acute stroke care, high TA, high body temperature and high blood glucose level are the factors which negatively influence the outcome. Also, disorders of blood clotting tests may be important for prognosis. **Key words:** stroke, mortality, prognosis

77

Randomised trial on early stress nuclear scan for patients present to the emergency department with chest pain but non-diagnostic ECG.

Lim SH, Anantharaman V, Chua T, Sundram F, Yo SL, Zhu M, Charles R. Department of Emergency Medicine, Singapore General Hospital, *Singapore*

Introduction: To compare the incidence of adverse cardiac events (ACE) among patients discharged after evaluation through short stay chest pain evaluation protocol with mandatory stress nuclear scan and conventional protocol. **Methods:** Design Randomized controlled trial. Participants patients presenting to Emergency Department (ED) with chest pain or symptoms suggestive of angina with 12 lead ECG non-diagnostic for myocardial ischemia or infarction (AMI). Intervention ECG and blood test fr CKMB and Troponin T were done at 0, 3, 6 hours. Patients in the study group who had a negative 6 hours evaluation underwent tetrofosmin scan within 24 hours, and those with positive result were admitted. End points, all patients were followed up at 1 year for ACE such as cardiac death, ventricular fibrillation, AMI, cardiogenic shock, or coronary revascularization (CR) procedures. **Result:** 1,005 patients were randomised to mandatory nuclear scan and 504 patients to the control group. There were no significant difference in the rate of ACE or CR between the study group (5.0%) and the control group (6.5%). There was a higher admission rate in the group (17.5%) vs study group (10.1%). **Conclusions:** Diagnostic strategies incorporating acute stress nuclear scan will lead to reduction of hospital admissions for ED patients with chest pain. The 1 year ACE rate for patients with negative 6 hour evaluation is small. Further analysis needs to be done to identify those patients for whom mandatory stress nuclear scan is most cost-effective. **Key words:** nuclear scan, AMI, non-diagnostic ECG

78*

Emergency department patient compliance with outpatient exercise stress test: a randomized controlled trial.

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Introduction: Patients are commonly assessed in the emergency department for symptoms suggestive of acute coronary syndrome and subsequently discharged if found to be at low risk. Exercise stress testing after discharge is the recommended investigation for these patients. We sought to determine if compliance rates with exercise stress tests were higher in patients for whom the investigation was ordered at the time of discharge compared to those patients who were advised to arrange for the test through their family physician (the standard practice). **Methods:** In this randomized controlled trial, the intervention group had a requisition faxed to the exercise stress test lab which contacted the patient, while the control group was advised to contact their family physician to arrange for the test. The primary outcome was a completed exercise stress test at 30 days confirmed through contact with the patient and test facility or the patient and the FP office. **Results:** Of the 238 patients, 231 (97.1%) were included in the intention-to-treat analyses. By 30 days, 87/120 (72.5%) patients in the intervention group and 62/111 (55.9%) patients in the control group had an exercise stress test resulting in an OR of 2.08 (1.21, 3.98). **Conclusions:** When emergency department staff orders a follow-up exercise stress test for patients upon discharge following investigation for potential acute coronary syndrome, the odds that patients will complete the test in 30 days are twice that when patients are advised to follow-up with their family physician for the investigation. Therefore, this strategy may help identify those with coronary heart disease earlier then the usual practice. **Key words:** exercise stress test, randomised controlled trial, outpatient

79

Plasma fibrin D-Dimer for detection of acute aortic dissection in the emergency department.

Cho GC, Kim W, Oh BJ, Lim KS. Division of Emergency Medicine, University of Ulsan, Seoul, *Korea*

Introduction: Plasma fibrin D-dimer (D-dimer) has been suggested as a potential screening marker for acute aortic dissection (AAD) in the emergency department(ED). However, the appropriate thresholds of D-dimer for AAD are not defined yet. Moreover, studies reporting determinants of D-dimer concentrations in AAD are scarce. **Methods:** Data were collected retrospectively from patients with D-dimer assay and enhanced abdominal computed tomography (CT) performed for differential diagnosis in the ED. The D-dimer assay used was the quantitative latex agglutination assay. The study was conducted in a university ED with an annual census of 65,500 between April 2004 and November 2005. Receiver Operating Characteristics curve were used to derive the optimal cutoffs of D-dimer to predict AAD in the ED. Multivariable linear regression analysis was used to identify factors associated with increased D-dimer concentrations in AAD. **Results:** Enrolled patients (n=100) were divided into 2 groups according to enhanced CT findings: an AAD group (n=61) and a non-AAD group (n=39). Mean D-dimer level was higher in the AAD group (10.5±13.0 ug/ml) than in the non-AAD group (0.6±0.3 ug/ml) ($p<0.001$). The D-dimer test showed 91.8% sensitivity, 82.1% specificity, 88.9% positive predictive value, 86.5% negative predictive value and 88.0% accuracy for detection of AAD at a discriminate level of 1.0 ug/ml. Age, smoking, extent of dissection, complications associated with AAD and the time interval from symptom onset to D-dimer testing are independently associated with D-dimer concentrations in AAD. In fact, five patients with AAD were missed using D-dimer test: all cases were uncomplicated AAD. Among the patients, 2 were thorax-limited AAD. **Conclusions:** At a discriminate level of 1.0 ug/ml, D-dimer is a sensitive and specific test for the detection of AAD in the ED. D-dimer concentrations in AAD were significantly associated with Age, smoking, extent of dissection, complications associated with AAD and the time interval from symptom onset to testing. **Key words:** D-dimer, aortic dissection, diagnostic test

80

Determining the ideal position for the wrist-cuff blood pressure device.

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Introduction: The wrist blood pressure device (WBPD) may have significant utility in trauma. The efficacy of these devices has been questioned and their use limited in the emergency department. Position of the device and wrist is postulated to be the reason for the discrepancy in measurements when compared to the manual bicep cuff (MBC) but has not been adequately evaluated in the literature. **Methods:** This was a prospective, sequential pilot study. Healthy adult volunteers were enrolled. Patients were excluded if either bicep was too large for the MBC, wrist too large to place the device, or skin lesions on the areas where cuff will be placed. Wrist and device positions, specific arm, and the initial cuff used were randomized. All the MBC measurements were performed in the standard manner by one physician. WBPD measurements were performed with the patient in the supine position and were performed at, below, above

heart level, and with wrist in flexion and extension at heart level. Each wrist measurement had a corresponding MBC measurement. Statistical analysis included descriptive statistics and linear regression. **Results:** 20 participants were enrolled, the mean age was 30±4.2; 13 (65%) were male. Mean difference between MBC and WBPD were 6.1 ± 5.6, 1.4 ± 12.2, 3.5 ± 13.3, 12.2 ± 10.1, -32.4 ± 24.5 for systolic measures with the wrist in neutral, flexed, extended at heart level, and wrist neutral above and below the heart. Mean difference between MBC and WBPD were 5.8 ± 6.4, 5.8 ± 9.7, 7.2 ± 7.6, 13.2 ± 6.9, -18.8 ± 11.5 for diastolic measures with wrist neutral, flexed, extended at heart level, and wrist neutral above and below the heart. The best correlation coefficient for the mean difference between systolic ($r=0.813$, $r2=0.661$, $p<0.001$) and diastolic ($r=0.531$, $r2=0.282$, $p=0.016$) MBC and WBPD was with the wrist in the neutral position at heart level. **Conclusions:** The WBPD did not correlate well with the MBC, but had the least variability with the wrist in neutral position at heart level. **Key words:** blood pressure, wrist, manual bicep cuff

DISASTER MEDICINE TRACK

81

Accelerated discharge of patients in the event of a major incident: observational study of a teaching hospital.

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Introduction: Since October 2002 UK Primary Care Trusts (PCTs) have had statutory responsibility for having and maintaining a Major Incident plan and since 2005 they have been obliged to co-operate with other responders to an incident. We aimed to establish the number of beds in our Acute Hospital Trust which could be freed up over set periods of time in the event of a major incident and the nature and quantity of support which might be required from our local PCTs in order to achieve this. **Methods:** Repeated survey over 12 days in 3 months of hospital bed occupancy by type of condition and discharge capacity in an 855-bed tertiary teaching hospital also providing general secondary care services in North West England. Outcome measures were bed spaces which could be generated, timescale over which this could happen and level and type of PCT support which would be required to achieve this. **Results:** A mean of 78 beds were immediately available, a mean of a further 69 in 1-4 hours and a further 155 in 4-12 hours, generating a total of 302 beds (36% of hospital capacity) within 12 hours of an incident. This would require support from a PCT of 150,000 population of 10 nursing care beds, 20 therapy-supported intermediate care beds, and 25 care packages in patients' own homes. **Conclusions:** In order to fulfill their statutory requirements under the Civil Contingencies Act 2004, PCTs should plan to have surge capacity in the order of 30 residential placements and 25 community support packages per 150,000 population to support Acute Hospital Trusts in the event of a major incident. **Key words:** discharge, disaster, accelerated

82

Increased injuries and medical needs in concerts with mosh pits vs. standard spectator.

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Introduction: Moshing as an allowable format for concert viewing with such events as 'crowd surfing' and limited stage diving most notably. Despite many large case series and much personal experiences reports, there are no true direct comparisons of controlled evaluations of the impact of moshing on injuries and needs assessments for event medicine planners. The objective of this study is to better define injury patterns and provide needs assessment for future concert venues. **Methods:** A 10-year review of consecutive events at a outdoor venue with a 60,000 seat capacity which hosted NFL, MLB, and both MOSH and NORMAL spectator style concerts was evaluated. A singular group of Emergency Physicians, Nurses and EMT-P staffed 5 first aid stations. Records of all Medical contacts were kept and analyzed based on illness/injury and outcomes in a population-based analysis. **Results:** This is a comparison on 16 NORMAL events with >45,000 and 10 MOSH events with > 50,000 attendees. Further comparison was made with NFL and MLB games for illness/injury and outcomes. The mean age for MOSH was 22.8 with 60% female of those seeking care. 33% were for injuries directly related to moshing activities: Rate 2.1/1,000 spectators. MOSH events had nearly a tenfold increase in EMS transports to hospital and injuries compared to NORMAL events. The NORMAL spectator events had similar EMS transport rates to NFL and MLB games. Overall, Dehydration accounted for 20% of all medical visits at MOSH and only 4% at Normal. Intoxication also occurred more often in MOSH VS. Normal and Sporting Events. 20% of MOSH required treatment for musculoskeletal trauma for a rate of 2.4/10,000 spectators. **Conclusions:** MOSH events were predictably found with high rates of trauma and resulted in many more EMS transports. The ability to respond to the unknown catastrophic injury may be prove excellent training for disaster preparedness. Rates have been established to plan for MDs, RNs and EMS units when planning such events. **Key words:** mosh pits, injury, concerts

83

Rapid health assessment following the South Asia earthquake.

Brennan RJ, Khan T, Rosborough S, Pant A, Brahmbhatt D, Subbarao I. International Rescue Committee, New York, *USA*

Introduction: On October 8, 2005 a 7.6 magnitude earthquake struck northern regions of Pakistan and India. Rapid health assessments were required to help guide relief efforts. Teams from the International Rescue Committee completed assessments in 23 communities and 17 health facilities within three weeks of the earthquake. Sites were selected following consultations with local officials and United Nations agencies. Assessment objectives were to: determine major health problems and threats; identify health service gaps; and assist in prioritization of health interventions. **Methods:** Data was collected via: direct observation; interviews with key informants; reviews of medical records. Standardized data collection checklists were used throughout. A convenience sample of 211 children was chosen to estimate nutritional status. **Results:** Community assessments: Population of 23 communities: 231,000 (median = 2,000). Mortality: 800 – 900 total deaths due to impact of earthquake; no elevation in mortality 2 weeks following earthquake. Causes of morbidity: acute respiratory infections (48%), skin infections (11%), injury (10%), diarrhea (5%). Houses non-habitable > 90%; households living in normal structures <10%; population with access to a toilet= 0%; communities with access to protected water source= 67%. Global acute malnutrition rate= 20.3%. All communities reported limited access to health care. Prioritized needs identified by communities were: tents, food, blankets, water, sanitation, and health care. Health facility assessments: 82% of facilities damaged or destroyed; 6% non-functional; 76% conducting clinical services outdoors; 43% of relevant facilities providing inpatient care; 57% of relevant facilities have medical doctor; 47% have adequate drug supply. **Conclusions:** Two weeks following the earthquake, major threats to public health had evolved. Health priorities had shifted from emergency trauma care to communicable disease prevention and control, and reactivation of essential

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health services, including child and reproductive health care. **Key words:** earthquake, Pakistan, repaid health assessment

84

A review of the repatriation of Australian patients following the Bali bombings October 1, 2005.

Cooper DM, Lown S, Allsopp C. NSW Health Counter Disaster Unit, Rozelle, *Australia*

Introduction: Three explosions took place in Bali at around 1930 on 1 October 2005 (one at Kuta Square and two at Jimbaran Bay) causing 26 deaths and injuring 102. Of the Australians affected, 4 died and 16 were admitted to hospital, 5 of the injured were evacuated to Singapore and a further 11 were evacuated to Darwin in Australia. The attack came almost exactly three years after terrorists bombed Kuta nightclubs on October 12, 2002, which led to 202 deaths, including 88 Australians. Since the first Bali bombing in 2002, Australia has developed national arrangements to ensure the timely repatriation of injured Australians (OSMASSCASPLAN) and the subsequent utilization of trauma centres across the nation when necessary (AUSBURNPLAN). Under the arrangements the Royal Darwin Hospital has been upgraded to stage severely injured patients into Australia, prior to redistribution to other States. Of the 11 patients evacuated to Darwin, all were from the city of Newcastle in New South Wales. Following stabilization in Darwin, 10 patients were repatriated to John Hunter Hospital in Newcastle and 1 to Prince of Wales Hospital in Sydney for ongoing treatment. **Methods:** The types of injuries suffered and the injury severity scores of the 11 patients evacuated to Darwin are analysed in the context of the epidemiology of blast injury from previous terrorist bombing events. The Australian national evacuation arrangements were activated and reviewed following the event. **Results:** Of the 11 patients, 4 (36%) had injury severity scores greater than 15 and 7 (64%) had injury severity scores less than 15. Most of the injuries included ruptured tympanic membranes, eye injuries, shrapnel injuries and lung and abdominal trauma, consistent with the epidemiology of other terrorist bombing events. 3 of the patients developed compartment syndrome as a result of shrapnel and required fasciotomies. **Conclusions:** Australia has developed robust national plans to deal with terrorist attacks both internally and internationally. **Key words:** Bali, bombings, disaster

85

Role of donor governments in humanitarian relief. Review of Australia's assistance in the Asian tsunami disaster.

Cooper DM. NSW Health Counter Disaster Unit, Rozelle, *Australia*

Introduction: The Asian tsunami disaster of December 26, 2004, killed over 220,000 people and left approximately 2 million homeless. The Australian Government received requests from Indonesia, Sri Lanka, Thailand and The Maldives for assistance. Assistance provided included, medical teams, population health assessment teams and disaster victim identification/forensics capability. Significant debate continues to occur in regard to the role of donor governments in regard to humanitarian assistance and to the type of assistance provided. This particularly applies to acute response capabilities and the need for population health intervention strategies. **Methods:** The assistance provided by the Australian Government is reviewed in the context of outcomes. **Results:** 8 teams of 124 civilians were deployed over the first 6 weeks following the disaster. The teams were multidisciplinary in nature, initially tailored to emergency medicine and surgical care but later for reconstructive surgery, primary health care and population health. The first 28 member team that deployed to Banda Aceh, undertook 90 surgical procedures, and treated over 300 patients in 8 days. **Conclusions:** There is a need to continue to develop capacity in developing nations in the Asia Pacific region. There is scope for a "light" multidisciplinary team for acute response. An appropriate acute phase response as well as a focus on population health can be implemented concurrently. Detailed needs assessment is important focusing on specific problems faced by crisis affected populations, including psychosocial, gender equity, children's' health care issues. There continues to be debate over the ethics of military deployments which cannot always be guaranteed or be diplomatically appropriate. The on-going development of inter-operability between Defense and the civilian medical community remains important. Co-ordination of non-government organizations and donor offers within existing sovereignty arrangements also remains difficult to manage. **Key words:** tsunami, humanitarian relief, disaster

86

An analysis of triage models during a counter-terrorism exercise in Australia.

Cooper DM, Cloughessy L, Allsopp C. NSW Health Counter Disaster Unit, Rozelle, *Australia*

Introduction: Triage systems should identify patients to receive priority treatment for lifesaving intervention in the field and identify patients who will most benefit from trauma centre care. The largest counter-terrorist exercise held in Australia (EXERCISE EXPLORER) was held over 3 days May 31 to June 2 2004. 3 triage tools were trialed. **Methods:** In phase One, 288 patients were assessed in the field and the triage tags allocated were collected and studied. Primary and secondary triage was undertaken. In phase 2, 140 of the patients were randomly allocated to be assessed by a tabletop exercise. A panel of 20 doctors, nurses and paramedics experienced in disaster management were asked to allocate triage categories to the patients studied. The NSW Institute of Trauma and Injury Management (ITIM) blinded to the triage categories allocated injury severity scores to each of the 140 patients. The three groups were then studied to compare, different groups for injury severity score and to the need for life-saving intervention in the field. **Results:** Primary Triage. Red label as predictor of ISS >16 (Sensitivity, Specificity, PPV): MIMMS Tabletop 0.40, 0.93, 0.62; Standards Australia Tabletop: 0.39, 0.89, 0.54; Standards Australia Field Test 0.27, 0.85, 0.27; Binary Model: 0.65, N/A, 0.75. Primary Triage: Red as predictor for LSI (Sensitivity, Specificity, PPV): MIMMS Tabletop 0.95, 0.58, 0.82; Standards Australia Tabletop: 0.89 0.67 0.70 ; Standards Australia Field Test 0.83, 0.27, 0.60; Binary Model 0.98, 0.58, 0.94. Secondary Triage: Red label as predictor of ISS >16 (Sensitivity, Specificity, PPV) - MIMMS Tabletop: 0.31, 0.93, 0.85; Standards Australia Tabletop: 0.55, 0.89, 0.40; Standards Australia Field Test: 0.27, 0.80, 0.27; Binary Model: 0.65, N/A, 0.96. **Conclusions:** The original Standards Australia tool was rejected and the binary model of primary triage is to be further trialed in Australia. The MIMMS model while reasonably sensitive and specific, is too time consuming in its implementation. **Key words:** triage, terrorism, model

EDUCATION TRACK

87

Pharmacology in the Emergency Department: A consensus approach to determining curricular content for postgraduate trainees.

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Introduction: Clinical practice in Emergency Medicine demands knowledge of a range of pharmaceuticals. Postgraduate specialty ex-

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aminations, both in the UK and elsewhere, incorporate pharmacology in their question banks. Reformed undergraduate teaching styles have reduced the time available for learning of pharmacology, yet it remains important in the workplace. There is a need to determine core pharmacology curricular content for trainees entering the specialty in terms of both safe clinical practice and success in postgraduate diplomas. We report our progress in establishing this core content based upon a national consensus methodology. **Methods:** The pharmaceutical stock lists of six large UK Emergency Departments were collated into a single document. From the same Departments, the anonymized drug histories of 50 patients were transcribed and cross-tabulated to form a master stock list. This was then formatted into a Delphi methodology with its content divided into 3 subsections. For each, a 3-round Delphi exercise will be undertaken based upon 120 randomly-sampled UK Fellows of the College of Emergency Medicine. Iteration of the Delphi process allows consensus to be achieved. The final combined document will form a robust and consensus-based content framework for the basic sciences curriculum. **Results:** To date, the amalgamated stock lists and drug histories have enabled us to devise a Delphi platform document of 526 drugs. The first phase of national Delphi inquiry will take place in January 2006. We aim to produce the iterated consensus document in May 2006 and translate this into formal curricular content for UK Emergency Medicine trainees shortly thereafter. **Conclusions:** Employing a structured approach to the development of curricular content allows core pharmacology requirements for safe autonomous clinical practice in Emergency Medicine to be established. The principles and methodology have application in other knowledge areas within the specialty and on an international basis. We advocate such an approach in any attempt to rationalize required knowledge and produce clear, unambiguous curricula. **Key words:** pharmacology, education, emergency department

88

Core anatomical knowledge requirements for training and clinical practice in the Emergency Department: a national consensus curriculum strategy.

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Introduction: Revisions to medical undergraduate curricula have significantly reduced the time allocated to the teaching of anatomy and other basic sciences. Safe postgraduate clinical practice and success in specialty examinations in Emergency Medicine demands a thorough grasp of key anatomical facts. The scope of knowledge actually required has not previously been established. We report the results of a national consensus strategy to determine those aspects of anatomy considered essential for the specialty based upon expert group Delphi methodology. **Methods:** During 2004, a random sample of 120 Fellows in Emergency Medicine from the national UK database were asked to participate in a 3-round Delphi process. Three cohorts of 40 participants each considered different regions of topographical anatomy. Each participant ranked the importance of lists of basic anatomy against a 4-part Likert scale. Iteration occurred between rounds to refine the questionnaires. The final iterated responses from each cohort were combined to produce a national anatomy training document. This document was carried forwards to act as the knowledge base for question-setting in the diploma of College Membership and to act as a web-based learning resource for trainees in the specialty. **Results:** Overall cohort response rates ranged from 78% (limbs) to 66% (head & neck). The initial Delphi questionnaires for each cohort contained between 155 and 222 discrete anatomical items dependent upon topographical region. Iteration of the Delphi rounds generated a final consensus document containing 204 key items of anatomy which had each attracted at least 80% support over 3 rounds of iterated questioning. **Conclusions:** Anatomy remains a key knowledge requirement for autonomous clinical practice in Emergency Medicine. The scope of required knowledge has been established using a national expert consensus methodology. Postgraduate learning and assessment has been facilitated as a result. We are now extending this approach to other aspects of basic science. This approach to curricular content is transferable to other aspects of key knowledge and is applicable internationally. **Key words:** anatomic, emergency, curriculum

89

Effective health teaching for patient /caregivers in a children's emergency department.

Devi I, Low C, Tham LP, Kanchana TLP, Wang XT, Zhou XQ, How S, How J. Children's Emergency, KKH Women's and Children's Hospital, *Singapore*

Introduction: The Children's Emergency (CE) of KK Hospital has an annual attendance of 100 000. With a high turnover, patient education is an important aspect in the management of our patients. In February 2004 – April 2005, a team of doctors and nurses from the department embarked on a Process Improvement Project on Effective Health Teaching for parents/caregivers. **Methods:** The team utilizes PDCA cycle (Plan, Do, Check and Action) to determine and address the problem. **Results:** We brainstormed and utilized a matrix diagram to identify and select the problem based on the following criteria of cost-effective service, teamwork and productivity, smooth workflow in the work area and high quality care. Two sets of pre-implementation data were collected from patients - records of patients' attendance volumes of the past three years (to note a rising trend in CE re-attendance) and the volume of health teaching. After analysis, we embarked on workable solutions to reap tangible and intangible benefits for the patients/staff/department. The team revised the workflow to initiate health teaching starting from the point of triage and developing in-house videos on fever and gastroenteritis management - screened at waiting area. Doctors and nurses conducted further heath education after consultation. From this pilot implementation by means of questionnaires, staff documentation into electronic medical records gave a positive outcome of 77%. We have since implemented this as part of our workflow with all new staff orientation. Monthly audits on oral/written feedback from parents, electronic database log and record of re-attendance are monitored. **Conclusions:** PDCA cycle was used to expand and improve patient education in our department. This has benefited our patients. Knowledge of our staff increased through in-service education talks with better communication fostered resulting in better rapport and customers' satisfaction. **Key words:** health, care, teaching

90

Diagnostic error in emergency medicine: the role of cognitive bias.

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Introduction: Human error is associated with adverse medical events that have a high degree of preventability. In this research the relationship between cognitive bias and diagnostic error in emergency medicine interns and consultants is investigated. Drawing on cognitive psychology, a model of clinical decision-making is described. **Methods:** Five intern volunteers at a large teaching hospital in Sydney, Australia provided written responses to a common emergency case scenario; and to a test of critical thinking ability. Using 'think aloud' protocols, three interns and five emergency medicine consultants later provided audiotaped analyses of the case. Consultants were asked to comment on errors that interns might make in their response. **Results:** With one exception, interns scored well on the critical thinking

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test. However, intern responses to the case exemplified several biases identified both in the literature (Croskerry 2002) and by participating consultants, including anchoring (focusing on specific features too early); Sutton's slip (going for the obvious); and representativeness restraint (simplistic pattern recognition). Conversely, consultants' recognition of the significance of ancillary features of the presentation meant that they did not overlook less obvious but important issues. **Conclusions:** Cognitive biases impact detrimentally on diagnostic outcomes, even in interns with sound critical thinking ability. For reasons explained in the decision-making model proposed, these errors are not always identified by system checks. Superior diagnostic outcomes achieved by consultants appear to be consequent on the interplay factors that include an ability to engage metacognitive functions to audit decision quality. Two recommendations for medical education follow: firstly, that explicit instruction in the action of cognitive bias should be incorporated; and secondly, that teaching strategies designed to develop metacognition may expedite the acquisition of essential thinking skills in novice clinicians. **Key words:** diagnostic error, cognitive bias, human error

91*

Evaluating "ED STAT!": a novel and effective faculty development program to improve emergency department teaching.

Sherbino J, Frank J, Lee C, Bandiera G. Division of Emergency Medicine, University of Toronto, Toronto, Ont., *Canada*

Introduction: Effective clinical teaching in the emergency department presents unique challenges. There are no validated approaches to enhancing the teaching of emergency medicine (EM) faculty. We evaluated the effectiveness of a novel, evidence-based, skills-oriented program tailored to EM teachers called ED STAT! **Methods:** We conducted a before–after single group evaluation with informed, written consent. We assessed participants' knowledge change as well as teaching behavior change using a multiple choice question (MCQ) and short answer question (SAQ) exam and a teaching behaviors questionnaire. Participants were surveyed for satisfaction in important domains. Data was gathered before, immediately after, and 1 month post course. **Results:** 28 of 31 individuals participated in the pre and post evaluation. 22 participated in the 1 month post evaluation. Overall, 96.3% of participants would recommend ED STAT! to a colleague. Knowledge increase was sustained from pre to 1 month post course: MCQ scores increased by 15.1% (Wilcoxon signed ranks test = 3.85; $p < 0.001$) with a large effect size (d = 1.53). SAQ scores increased by 17.2% (Wilcoxon signed ranks test = 3.22; $p = 0.001$) with a large effect size (d = 0.90). At 1 month post ED STAT!, 55% of participants had increased their amount of teaching, 86% perceived this teaching to be of a greater quality, and 82% had shared new teaching strategies with colleagues. **Conclusions:** EDSTAT! improves participants' knowledge about ED-specific teaching strategies and this improvement is maintained at 1 month. Participants reported high satisfaction and a positive increase in teaching behavior. **Key words:** faculty development, teaching, emergency medicine

92

A comparison between the efficacy of lectures given by emergency and non-emergency physicians in an international emergency medicine educational intervention.

Weiner SG, Ban KM, Sanchez LD, Grifoni S, Berni GC, Gensini GF. Tufts-New England Medical Center and Beth Israel Deaconess Medical Center, Boston, *USA*

Introduction: The Tuscan Emergency Medicine Initiative is a comprehensive international collaboration designed to create a lasting emergency medicine training and credentialing process in Tuscany, Italy. Part of the program involves training and licensing all emergency physicians currently practicing in the region. This certification process includes didactic lectures, clinical rotations and practical workshops for those who already have significant ED experience. Because there was not a sufficient number of qualified EPs to teach the entire didactic curriculum, lectures were given by both EM and non-EM faculty. We hypothesized that faculty who worked clinically in the ED would give more effective lectures than non-EM faculty. **Methods:** 51 emergency physicians from the hospitals surrounding Florence completed the course, which included 48 one-hour lectures. Twenty lectures were given by practicing EPs and 28 were by non-EM faculty. Participants completed an evaluation at the end of each session using a five-point Likert scale describing the pertinence of the lecture to EM, the efficacy and clarity of the presentation, the accuracy of the information and the didactic ability of the lecturer. **Results:** A mean of 38.5 evaluations was completed for each lecture. Every factor was significantly higher for lectures given by EM faculty: the pertinence of the lecture to emergency medicine (4.46 vs 4.16, $p<0.001$), the efficacy of the faculty (4.10 vs 3.91, $p<0.001$), the accuracy of the lecture content (4.16 vs 3.96, $p<0.001$) and the didactic ability of the instructors (4.02 vs 3.85, $p=0.001$). **Conclusions:** Evaluations of lectures were higher for lectures given by EM faculty than by non-EM faculty in this training intervention. We recommend involving as many EPs as possible in the didactic portion of an international emergency medicine training program. **Key words:** lectures, education, faculty

93

Physician self-evaluation in an international emergency medicine educational intervention.

Weiner SG, Sanchez LD, Ban KM, Pini R, Berni GC, Gensini GF, Anderson PD. Tufts-New England Medical Center and Beth Israel Deaconess Medical Center, Boston, *USA*

Introduction: The Tuscan Emergency Medicine Initiative is a comprehensive international collaboration designed to create a lasting emergency medicine training and credentialing process in Tuscany, Italy. The first phase of the project, Train the Trainers, was a nine-month long course involving clinical rotations, didactic lectures and workshops. The participants were practicing physicians who worked in academic and community EDs throughout the region. Our goal was to create of a cadre of teachers who could train other physicians and future residents in the complete body of emergency medicine knowledge. **Methods:** A 51-question survey instrument was administered to course participants at the beginning and end of the course. The survey asked four categories of questions: the types of patients seen in the participant's ED, a 4-point scale describing ability to treat a variety of emergency department-type patients, a 4-point scale describing ability to perform various emergency procedures, and questions about quality assurance and journal review. Statistics were performed with Mann-Whittney rank sum and chi-squared. **Results:** 51 of 57 physicians (89%) who finished the course completed both the pre- and post-course surveys. When asked to describe ability to diagnose and provide initial treatment for several types of patients on a four-point scale, there was significant improvement ($p<0.05$) in 13/20 (65%). Self-reported ability to perform emergency procedures significantly improved ($p<0.05$) for 7/16 (44%). Since the beginning of the course, significantly more participants began participating in quality assurance and journal club programs within their departments. **Conclusions:** Self-reported ability to care for a variety of types of emergent patients and perform emergency procedures improved after our training course. We are confident that our participants can serve as competent emergency medicine trainers after completion of this course. **Key words:** self evaluation, international, education, intervention

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INFECTIOUS DISEASE TRACT

94

Pandemic Influenza - How can we cope?

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Introduction: An influenza pandemic is likely in the near future. As the situation and potential dangers are being appraised, there is guidance about planning for a pandemic at a Public Health 'top-down' level. Although the situation is constantly changing, there is a need for a theoretical and practical framework for dealing with the problem which is informed by significant Emergency Department experience. **Methods:** Usual medical practice in developed countries assumes sufficient medical resources to cope with medical need. In pandemic influenza this is unlikely to be the case, and therefore it is vital to have established a guide to the allocation of resources in this situation to do the most good for the most people. A novel framework, derived from one of the author's front-line WHO experience with emerging infectious disease, is described. This framework complements guidance from Government organizations, enabling appropriate decisions when local resources are limited. The key strategy that will be discussed is the importance of establishing a 'Hierarchy of Care' to guide the allocation of resources. This becomes particularly important in clinical practice as resources become scarce. The principles of the 'Hierarchy of Care' have been used successfully to guide the management of highly infectious viral hemorrhagic fevers (e.g. Ebola) in the field, and are thus likely to be relevant in the Emergency Department in pandemic influenza. The 'Hierarchy of Care' includes: 1) Establish safe environment for staff, patients, visitors; 2) Establish treatment principles: simple safe supportive care, non-invasive respiratory care, minimal parenteral therapy, and provide invasive respiratory care only if all above needs are met and staff available; and 3) Predict and manage social and anthropological issues. **Conclusions:** The human issues related to the pandemic such as adequate staff protection and ensuring good staff morale are crucial in maintaining emergency department function. **Key words:** pandemic, influenza, public health

95

Expression of the triggering receptor expressed on myeloid cells-1 mRNA in a heterogeneous infected population presented to the emergency department.

How CK, Chern CH, Hsieh SL, Wang LM, Huang CI, Lee CH. Emergency Department, Taipei Veterans General Hospital, Taipei, *Taiwan*

Introduction: The triggering receptor expressed on myeloid cells (TREM)-1 is recently discovered receptor of the immunoglobulin superfamily, which plays an important role in myeloid cell-activated inflammatory response. TREM-1 appears to be exclusively implicated only in cases of infection. However, the pathogens of sepsis are diverse. This study is to investigate the TREM-1 expression in a heterogeneous infected population. **Methods:** A prospective, non-interventional study of 127 patients with at least 2 criteria of the systemic inflammatory response (SIRS) was performed. The TREM-1 mRNA expression was assessed by real-time quantitative reverse transcription-polymerase chain reaction in peripheral blood of patients. **Results:** The SIRS only was diagnosed in 41 patients (32%), and sepsis was diagnosed in 86 patients (68%). Among the septic patients, 79 were caused by extracellular bacteria or fungi and 7 were caused by intracellular bacteria or viruses. TREM-1 mRNA expression was significantly high in septic patients caused by extracellular bacteria or fungi (103.2 [17.3-588.1]), compared to those caused by intracellular bacteria or viruses (16.2 [6.5-48.5], $p<0.001$) and those of SIRS only (38.0 [4.2-147.0], $p<0.001$). After excluding the septic patients with intracellular pathogen, the area under the receiver-operating characteristic curve when TREM-1 mRNA expression ratio was used to differentiate the presence from the absence of infection increased from 0.78 (95% confidence interval [95% CI], 0.7 to 0.86) to 0.82 (95% CI, 0.74 to 0.89). A TREM-1 mRNA expression ratio cutoff value of 47.2 had a sensitivity of 81%, a specificity of 71%, a positive likelihood ratio of 2.8, and a negative likelihood ratio of 0.27. **Conclusions:** The high discriminative role of TREM-1 to rapidly identify those with infection is only present among sepsis caused by extracellular bacteria or fungi. The different ability of extracellular and intracellular pathogens to induce TREM-1 expression may provide a potential marker for differential diagnosis. **Key words:** myeloid cells, inflammatory response, sepsis

LABORATORY / BENCH TRACK

96

The observation of pro-ARDS findings in rat's lung using phase-contrast x-ray microscopy and micro-CT.

Choi HS, Hong HP, Ko YG, Je JH. Department of Emergency Medicine, School of Medicine, Kyung Hee University, Seoul, *Korea*

Introduction: Recently, we have succeeded in observing rat's interalveolar wall thickening (IAWT) caused by ischemia-reperfusion injury with the use of phase-contrast x-ray micro-CT. This study was planned to see whether or not IAWT is the initial change to the progression of ARDS. **Methods:** The authors used 42 male Sprague-Dawley rats, and were divided into two groups; 6 rats in the control group without surgical procedures, and 36 rats in the study group that was injured by ischemia-reperfusion of SMA. The study group was divided into mild, moderate, severe IAWT, 12 rats each, determined by interalveolar wall thickness, decided in our previous study. The composition of X-ray microscopy followed the methods used by Je, et al (2004). The MDCT and micro-CT were obtained from 4 rats in each assigned group after getting the desired grade of IAWT confirmed by x-ray microscopy and then the rats were sacrified to visualize the pathologic findings of lung tissue. The rest were bred, photographed every day with X-ray microscopy until ARDS was observed in MDCT and then tissue samples were obtained. **Results:** Five rats out of the rest (63%) showing mild IAWT progressed to ARDS, and progression time was approximately 73 hours while 7 rats (88%) showing moderate IAWT progressed to ARDS, and progression time was 49 hours. Eight rats (100%) showing severe IAWT progressed to ARDS, and the time of progression was 25 hours. The decline of IAWT was observed in rats that did not progress to ARDS. The Field of view (FOV) was 580 μm (x150). These results were the same as the pathologic findings in the grade of wall thickness. **Conclusions:** We observed the grades of IAWT with x-ray microscopy, most progress to ARDS, hence IAWT can be called pro-ARDS. The higher the grade of IAWT, the faster the progression to ARDS, therefore the severity of pro-ARDS is higher as the grade rises. If this technology could be applied to humans, early detection of pro-ARDS could prevent progression to ARDS. **Key words:** ARDS, pathology, intra-alveolar wall thickening

97

Capillary refill time: A reliable and reproducible test?

Dalton R, Fitzsimmons CR, Burke DP. Emergency Department, Sheffield Children's Hospital, Sheffield, *United Kingdom*

Introduction: Capillary refill time (CRT) is a commonly used clinical measure of tissue perfusion, and hence of haemodynamic status. Its use is particularly advocated in paediatric medicine, but there is little evidence to support its reproducibility or reliability. We undertook a

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prospective study to determine whether CRT has a reproducible end point and whether normal CRT could be reliably distinguished from abnormal by ED junior doctors, (Senior House Officers, SHOs). **Methods:** A series of twenty different video clips were recorded, showing CRT being measured on a volunteer, the depicted CRT being varied by the use of tourniquets, ice packs and a warm water bath. The video clips were merged into 2 separate sequences and each was shown to 25 ED SHOs. The SHOs were asked to record whether they thought the depicted CRT was normal or abnormal, (the first sequence), and then they were asked to time the CRT in the second sequence using a stopwatch. Data were entered onto a Microsoft Excel spreadsheet for analysis. Inter-observer reproducibility was tested using the mean CRT, (and standard error of the mean was calculated using CIA software). Reliability was tested using Chi2 to compare the clinical assessment of normal/abnormal against the measured CRT of greater than, equal to, or less than 2 seconds. **Results:** There was a highly significant association between an assessment of normal CRT and timed CRT of less than/equal to 2 seconds, (Chi2=141.07, p< 0.001, df=1). The standard error of the mean varied between 0.03 seconds, (mean= 0.63sec, 95%CI=0.57-0.70sec), and 0.17 seconds, (mean= 4.13sec, 95%CI= 3.78-4.48sec). **Conclusions:** Overall, measurement of CRT by ED SHOs appears to be both reproducible and reliable. Its clinical usage, especially its use as an indicator of an "unwell" patient remains the topic of debate and should be evaluated further. **Key words:** capillary refill, test, reliability

98

Venous pCO2 cannot replace arterial pCO2 in emergency patients

Irwani I, Ooi SBS, Chan YH. Emergency Medicine Department National University Hospital, *Singapore*

Introduction: Blood gas analysis plays an important role in the evaluation of patients in the Emergency Department. Compared to venous puncture, the arterial puncture is more painful, technically more difficult and has more complications. Essentially, a blood gas analysis measures the pH, pO2 as well as the pCO2.All other indices in a blood gas result are derived from these values. Several studies showed a high correlation and agreement between oxygen saturation measured by the pulse oximetry and that measured on the arterial blood gas. Studies on venous pH also showed high degree of correlation and agreement with the arterial value. Regarding pCO2, however, the findings were mixed and none had used bedside point of care testing (POCT).The purpose of this study was to determine whether peripheral venous pCO2 values predict arterial values accurately enough to replace them in a clinical setting. **Methods:** A prospective, observational cohort study. We recruited patients who were deemed by the attending Emergency Physician to be requiring arterial blood gas analysis to determine their ventilation or acid-base status. A venous and an arterial blood gas sample were drawn from the patient, temporally as close to each other as possible. Both samples were then analyzed using the same bedside blood gas analyzer immediately after collection. **Results:** 122 paired samples were obtained. The strength of the association between arterial and venous pCO2 is 0.838 (p=0.001). The Bland-Altman bias plot methods for agreement showed a mean difference of -3.3mmHg with 2 SD limits of agreement being -17.37 to 23.90. pCO2 values fell within 2 SD in 93.5% of the samples. 51% of the paired samples showed clinically important mean difference of pCO2 (i.e., +6.6mmHg as suggested by a previous study). Arterial puncture may be avoided if the venous pCO2 is less than 30 mmHg (NPV 100%) and more than 55 mmHg (PPV 80%). **Conclusions:** The study showed that venous pCO2 cannot substitute for arterial pCO2, however, some arterial punctures may be avoided. **Key words:** venous CO2, arterial CO2, comparison

THERAPEUTICS TRACK

99*

pH measurement via a non traditional site of capillary blood gas sampling agrees with arterial blood gas pH measurement in a normal population.

Hall CA, Huffman J, Jordan D, Handley G, Fick GH. Department of Emergency Medicine, Calgary Health Region/University of Calgary, Calgary, Alta., *Canada*

Introduction: Evaluation of acid-base disturbance in agitated patients has been limited by lack of a functional sampling method. Traditional sampling is difficult in agitated patients because of the technique (ear lobe sampling, venipuncture) or because of the effect of restraints (cap gases). This study determines whether serum pH measurement of non-arterialized capillary blood samples from the scapular region (scapgas) achieves clinically acceptable agreement with radial arterial blood gas (ABG) measurement in normal, healthy volin matched pairs of ABG and scapgas samples. 50 subjects were enrolled. 9 sample pairs were not evaluated: 2 because of unsuccessful ABG attempt and 7 because of co-oximeter run time errors. Serum pH in the remaining 41 pairs was evaluated: Pearson's product moment correlation coefficient, mean difference, standard deviation and 95% confidence intervals for the pH difference were calculated. Bland Altman plots were constructed and evaluated for pH agreement. A pH difference between samples of < 0.05 was considered clinically acceptable. **Results:** Pearson's product-moment correlation coefficient between arterial and capillary values for pH was 0.54. Bland Altman plots indicated agreement between the samples. The mean difference between ABG and scapgas pH was –0.006 (SD 0.025); 95% CI for the difference (–0.014, 0.002). **Conclusions:** Serum pH measurement comparison in ABG and scapgas samples demonstrated fair correlation and had clinically acceptable agreement. While further study is required to determine whether the results are similar in patients with altered blood pH, there is potential for scapgas measurement to evaluate serum pH in agitated patients. **Key words:** capillary blood gas, scapula, correlation

100*

Dexamethasone in migraine relapses: a randomized, placebo-controlled clinical trial.

Rowe BH, Blitz S, Colman I, Edmonds M. Department of Emergency Medicine, University of Alberta, Edmonton, Alta., *Canada*

Introduction: Migraine is a common presentation in the emergency department (ED). Inflammation is thought to play a role in migraines and there is conflicting evidence regarding the effect of corticosteroids on reducing early recurrences. We designed a randomized clinical trial to test this hypothesis. **Methods:** Consenting adults (older than 17) presenting with acute migraine at 4 Alberta EDs were enrolled. In addition to standard intravenous (IV) abortive therapy, patients were randomized to receive similar appearing IV dexamethasone (DEX; 15 mg) or placebo (PLA) using concealed allocation and in a double-blind fashion. Follow-up telephone interviews were conducted 48–72 hours and 7 days after ED discharge. Relapse was defined as a return to the ED, an urgent clinic visit or a headache that precluded normal activity at the 48–72 hour follow-up. An interim analysis was conducted after 60 patients had completed follow-up. Intention to treat was used for this final analysis. **Results:** 130 patients were randomized; 126 patients are included in the analysis (1 patient left prior to treatment and 3 enrolled twice). Mean age was 35 ± 10.5 years, 81% were female; most (77%) suffered from headaches at least monthly. Overall, 64 received DEX and 62 received PLA. On a scale of 0 (no pain) –10 (worst pain),

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median pain score at presentation was 8, and 2 at discharge. At 48–72 hours, relapses occurred in 14/64 (22%) and 20/62 (32%) in the DEX and PLA groups, respectively (p = 0.19; OR = 0.6; 95% CI: 0.3–1.3). By day 7, 18/64 (28%) in the DEX group had relapsed, compared to 25/62 (40%) in the PLA group (p = 0.15). Controlling for treatment assignment, relapse was more common when headache pain was > 2 at discharge (OR: 2.24; 95% CI: 1.1, 5.4). **Conclusions:** The overall relapse rate differed from those previously reported; however, DEX failed to reduce headache relapses after ED discharge. Further research is needed to determine the factors associated with migraine relapse. **Key words:** dexamethasone, clinical trial, migraine

101

Emergency department drug orders: Does drug storage location make a difference?

Conners GP, Hays DP. Department of Emergency Medicine, University of Rochester, Rochester, *USA*

Introduction: Many Emergency Departments (EDs) have access to an extensive central hospital pharmacy-based drug formulary, and to a limited drug set via an ED-based automated medication management system (ED AMMS). ED physicians may preferentially order drugs available from an ED AMMS. We hypothesized that: 1. adding drugs to our ED AMMS would alter the frequency with which they are ordered; 2. actually filling orders after the ED AMMS inclusion date from the ED AMMS versus the central hospital pharmacy (due to possible ED AMMS drug access issues) would influence the magnitude of this effect. **Methods:** We identified all drugs / formulations available in 1 of several Pyxis™ ED AMMS units in our large academic ED that were: added to the ED AMMS in the previous 3 years; not directly affected by hospital formulary/practice changes; and previously available from the hospital central pharmacy. Using an existing pharmacy database, we retrospectively compared drug order frequencies, after versus before their ED AMMS inclusion, and the location from which each post-ED AMMS drug order was filled. The study was granted Institutional Review Board exemption. **Results:** Four drugs / formulations met study criteria. All were significantly more commonly ordered after ED AMMS inclusion. The magnitude of these order increases strongly correlated (correlation coefficient = 0.95) with order filling (after the date of ED AMMS inclusion) from the ED AMMS rather than from the central hospital pharmacy. Post/pre ED AMMS order frequency % filled from ED AMMS: Moxifloxicin injection 5.6 ($p < 0.0001$) 79%; Moxifloxicin tablets 8.5 ($p = 0.0004$) 75%; Azithromycin injection 8.7 ($p < 0.0001$) 80%; Pantoprazole injection 26.3 ($p < 0.0001$) 94%. **Conclusions:** Drugs / formulations are more frequently ordered in the ED after inclusion in an ED AMMS. The more readily drugs are dispensed from an ED AMMS than the central hospital pharmacy, the larger this increase. Selective inclusion of drugs in an ED AMMS may influence ED physician prescribing patterns. **Key words:** drug storage, drug orders, location

102

Etomidate and Midazolam for procedural sedation in Emergency Department of a regional hospital in Hong Kong: A randomised controlled trial.

Chan KL, HO HF. Department of Accidents and Emergency, Queen Elizabeth Hospital, *Hong Kong*

Introduction: This is a prospective, double-blinded, randomized clinical trial to compare the effectiveness and safety of Etomidate against Midazolam for procedural sedation and analgesia(PSA) in a regional hospital in Hong Kong. **Methods:** The study is conducted in the Emergency Department (ED) of Queen Elizabeth Hospital. The study period is from 1st November, 2005 to 30th June 2006. Adult ED patients of age equal to or over 18 years old who require PSA will be included. Exclusion criteria are geriatric patients with age more than 80 years old, patients who are unable to give informed consent, pregnancy, and haemodynamically unstable patients. Patients are randomized into two groups, and either etomidate or midazolam will be used for sedation. Both the doctor and the patient are blinded to the study drug. The primary outcome measure is the time for onset of action, PSA duration and the length of stay. Secondary outcome measures will include adverse events, pain control and patient satisfaction. Vital parameters and depth of sedation are closely monitored until patients are fully conscious. **Results:** There were 23 patients recruited and analysed from 1st November to 18th December, 2005. Mean patient age was 58; 44% were male patients and 56% were female patients. Twelve patients were midazolam group and eleven patients were etomidate group. Mean time for onset of action was 4.9 minutes and 1.0 minutes in midazolam group and etomidate group respectively. Mean PSA duration was 22.1 minutes and 14.7 minutes in midazolam group and etomidate group respectively. Mean length of stay was 185 minutes and 522 minutes in midazolam group and etomidate group respectively. In this preliminary results, etomidate had shorter time for onset of action (p=0.002) and shorter PSA duration (p=0.002). The mean length of stay was longer in etomidate group but the difference was not statistically significant (p=0.241). **Conclusions:** This is an on-going study. The results will be finalized upon completion of the study. **Key words:** procedural sedation, etomidate, midazolam

103

The Australasian haemostasis registry - experience with rV11a.

Cameron PA, Philips L, McNeil JJ, Isbister J. Department of Epidemiology and Preventive Medicine, Monash University, Melbourne, *Australia*

Introduction: Recombinant activated factor VII (rFVIIa, NovoSeven) is approved for the treatment of spontaneous and surgical bleeding in patients with haemophilia A or B and with antibodies to either factor VIII or factor IX. Recently rFVIIa has increasingly been used for indications outside the approved areas, particularly in trauma, cardiac surgery and other critical bleeding episodes. Use in these areas remains controversial. **Methods:** Monash University has established the Haemostasis Registry (with an educational grant from NovoNordisk) to monitor the use of rFVIIa throughout Australia and New Zealand. More than 20 hospitals are contributing data to the Registry. It is anticipated that virtually all the major users of rFVIIa will contribute to the registry. **Results:** Over 500 cases have been reported to the Register. In those where complete data has been received, major areas of use are cardiac surgery (40%), other surgery (17%) and trauma (13%). The reported efficacy of rFVIIa was high (>75% cases reported bleeding decreased or stopped) while the reported Adverse Events were relatively low (<4%). Despite suffering from conditions where mortality is high, the survival rate in rFVIIa recipients was >65% at 28 days post treatment. These results will be compared with international experience and published trials. **Conclusions:** Although randomized controlled trials are important in establishing the safety and efficacy of new treatments, they do not replace the need for registries, especially for treatments where clinicians believe that withholding treatment may be unethical because of potential life threatening consequences. This problem is made more difficult where there are a wide range of applications. As more data becomes available, the Haemostasis Registry data will help to elucidate the safety and efficacy of rFVIIa and provide important feedback to doctors and hospitals. **Key words:** rVIIa, hemostasis, registry

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Sunday, June 4th: Poster Presentations

DISASTER MEDICINE TRACK

104

A systematic review into the decontamination of chemically contaminated casualties.

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Introduction: In the event of a chemical incident, whether the consequence of an accidental or deliberate release of toxic industrial chemicals or chemical warfare (CW) agents, there is a requirement for first responders to decontaminate potentially contaminated casualties. The purpose of the decontamination process is to physically remove, neutralize or destroy, or reduce to an acceptable level any chemical contaminant present, thereby preventing / reducing harm to the casualty and the secondary contamination of first responders. The aim of this study was to determine the most effective approach to the decontamination of chemically contaminated casualties; specifically the need for and timing of decontamination, the effectiveness of clothing removal as the initial step in the decontamination process, the effectiveness of different decontaminants and the effectiveness of different decontamination methods. **Methods:** A number of specific three part questions were compiled to address the aims of this systematic review. The resources accessed to identify the literature available in the public domain were: The Cochrane Library, Medline, Embase, Cinahl, Science Direct, ISI Web of Science, ISI Proceedings, The Batelle Memorial Institute Mass Casualty Decontamination Database. The resources accessed to identify the (potentially) classified literature not available in the public domain were: United Kingdom – Defence Science & Technology Laboratories (Dstl) Knowledge Services, United States – Department of Defence (DoD) Chemical Biological Information Analysis Centre (CBIAC), Canada – Defence Research & Development Canada (DRDC) Defence Research Reports Database, Australia – Defence Science & Technology Organisation (DSTO) Research Library. Commercial manufacturers were also contacted. Studies were selected for inclusion based upon their relevance to the specific three part questions. The studies could be published or unpublished scientific papers or technical reports. Two reviewers independently selected the studies for inclusion and extracted relevant data. This data has been abstracted into evidence tables and appropriate conclusions have been drawn in the form of a series of clinical bottom lines for each of the specific three part questions. **Results:** The results of the completed process will be presented. **Conclusions:** A systematic review has determined the most effective approach to the decontamination of chemically contaminated casualties. The outcomes can be used to formulate best practice guidelines and advise first responders on the efficacy of the processes they already have in place and any changes which might be required to improve these. Additionally, areas where further research is required have been identified. **Key words:** systematic review, decontamination, chemical warfare

105

Pandemic influenza planning in New South Wales, Australia.

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Background: Significant attention has been given to the possibility of an international influenza pandemic following the H5N1 avian influenza outbreak in Asia and Europe. Both the Australian and New South Wales Governments have dedicated significant effort to planning for an influenza pandemic. **Methods:** The planning arrangements in place for influenza pandemic in Australia and New South Wales are described. **Results:** The planning arrangements described include the development of a containment strategy and quarantine, the management of the antiviral stockpile, personal protective equipment, work force and the utilization of infectious disease hospitals, fever clinics and staging facilities. The ethics of the acute management of severely ill influenza patients in the context of finite resources during a pandemic are debated as is …. who should get the antivirals? **Conclusion:** Australia is well advanced in preparing for influenza pandemic but much work remains to be done. **Key words:** pandemic, influenza, administration

106

Effect of application of the nexus and Canadian C-spine rules in patients brought in by ambulance after MVC.

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Introduction: The NEXUS low-risk criteria and Canadian C-spine Rule (CCR) were designed to help physicians safely reduce the number of cervical spine x-rays ordered for trauma patients. The articles published describing these rules state that they reduce x-ray ordering by 13% and an estimated 15%, respectively. We aimed to see if implementation of the rules would lead to decreased ordering in our ED specifically for patients who arrived via EMS after MVC. We evaluated how the rules compared with standard clinical judgment. **Methods:** All patients who arrived via EMS with a chief complaint of MVC between September and December 2004 were eligible for analysis. A total of 124 patients were included for retrospective chart review. Charts were evaluated for applicability of the NEXUS and CCR rules, and actual physician radiograph ordering rates were obtained. **Results:** Our physicians ordered cervical spine x-rays for 56 of 124 patients (45%). Application of the NEXUS rules would have lead to ordering of x-rays in 43 of 124 patients (35%), a reduction of 23%. Application of the CCR would have led to radiographs for 97 of 124 patients (78%), an increase of 73%. The most common reason for requiring an x-ray with the CCR was the lack of having a "simple rear-end MVC", which was the case in 67 of the 124 patients (54%) who presented via ambulance. None of the patients in whom x-rays were obtained had new fractures either on emergency physician or final radiology reads, and no patients in this cohort had repeat visits for a c-spine related complaint. **Conclusions:** In this study of patients brought to the ED by EMS after MVC, application of the NEXUS rule would have reduced c-spine x-ray ordering by 23% while the CCR would have increased ordering by 73% when compared with actual physician practice. While NEXUS would have reduced x-ray ordering, the CCR may not be cost-effective in this patient population. **Key words:** clinical decision rule, emergency department, emergency medical services

107

Fostering the development of international standards and guidelines for the education and training in disaster medicine.

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Introduction: The 13th World Congress on Disaster and Emergency Medicine, held in Melbourne in May 2003 requested the World Association for Disaster and Emergency Medicine (WADEM) to investigate and report on 'fostering the development of international standards and guidelines for 'disaster medicine''. This paper reports on progress to date on this international initiative. **Methods:** Following the Melbourne Congress, the internationally based education committee of WADEM met on four occasions in different European cities to examine this issue and prepare

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an issues paper which was circulated internationally through the WADEM website and called for submissions. Subsequently, a 3-day, international consensus meeting was held in Brussels, Belgium in October 2004, and included 50 participants from 18 countries representing approximately 20 healthcare disciplines. **Results:** This task of global contemporary significance was complex given the lack of an agreed scientific framework or conceptual models within which to examine 'disaster medicine'. The meeting modified a model previously published by Bradt et al. which it believes has utility as a framework for 'disaster medicine'. The issues paper identified 7 levels of education from the community through to researchers at doctoral level. The international consensus meeting recommended the three highest priorities for which standards and guidelines be developed were: a core program for all undergraduate health professional students; a graduate certificate as an initial competency based program for practicing professionals involved in this field; and, a university masters degree for those wishing to be recognised as 'disaster health specialists'. The meeting left unresolved many contentious issues for later resolution. **Conclusions:** WADEM has taken the first step in leading international standards and guidelines for education in this new field and seeks continuing input from the international disaster health community to bring this challenging task to an effective output. **Key words:** disaster medicine, education

108

A critical assessment of training of the emergency medical services of Bogotá, Colombia for disaster preparedness to mass casualties from a major earthquake.

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Introduction: The current geopolitical status of the world intensifies the likelihood that disasters will increase in terms of numbers, type and complexity. The important lesson that disasters teach is the need for preparedness. Colombia has a long history of natural disasters. In Bogota, the capital city of Colombia faced with a high seismic risk, a major earthquake can cause approximately 270,000 casualties. Therefore, training for mass casualty events and preparedness of local emergency medical services is vital. We aim to critically assess the level of training for disaster preparedness of the emergency medical services of Bogota. **Methods:** A sample of search and rescue services, ambulance services and hospitals and the District Health Emergencies and Disasters Office were surveyed using a checklist based on medical earthquake preparedness criteria. The checklists were developed in consultation with experts from the Kandilli Observatory and Earthquake Research Institute,U.S. Department of Health and Human Services and the Israeli Trauma Society. A mixed methods model was used. In total, thirty-nine organizations were included. From 29 March- 25 April 2005, the questionnaires were administered in Bogotá after pilot testing. The statistical analysis was executed using SPSS and Microsoft Excel **Results:** The emergency medical services surveyed are not prepared to respond to the mass casualties from a major earthquake in Bogota. Training in different aspects of medical response to earthquakes and disaster scenarios was rated as insufficient and considered the weakest point in the total score of the emergency medical services studied. Probable reasons for the deficiencies are explored and future recommendations are made. **Conclusions:** The emergency medical services studied must improve the current level of earthquake preparedness in order to enhance their ability to respond to the medical demands of the casualties after a major earthquake. Particular emphasis must be placed on training in mass casualty management. **Key words:** emergency medical services, disaster preparedness, education

109

Beyond the infrastructure, are we ready for terror attack?

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Introduction: "It may begin with a blast, at you own yard. It will create chaos. Even if you have previous experience, it will strike you with the silence at first, then with the shouts, smells, and sights. Then you will function, and will give all of yourself, trying to focus on your professional tasks, until it will end, and you will return back to what you have seen, to the people behind the faces, to the names, to the children and parents". **Results:** So how can we deal with this? How can we provide the best medical care in a terror attack over and over again? How would we be there without breaking down, and how will we return to live a normal life when it all ends? How will we keep our strength to continue and take care of our patients and team? Every Mass Casualty Incident creates challenges for the medical response on the field and in the hospitals. The main challenges include: [1] Providing unique medical care due to the specific cause (blast, shrapnel, ect,), [2] Supporting our patients and team in order to avoid Post Traumatic Stress Reaction; [2] Preserving the mental strength of the medical team while providing quality medical care. This poster will share our accumulated experience in Mass Casualty Incident and will focus on the emotional function of the survivors as well as the team who took care of the injured. We will present our recommendation for "Return to Routine " in a way we believe can reduce of Post Traumatic Stress Reaction. **Key words:** disaster medicine; post traumatic distress, mass casualty incident.

INFORMATICS TRACK

110

A national emergency medicine clinical database: development and initial implementation in Israel informatics.

Halpern P, Aharonowitz G, Assaf J, BarHaim S, Ben Yehuda Y, Cohen V, Darawsha A, Hay E, Haklay Z, Hecht R, Kaplan G, Shahar A, Waisman Y, Barel V, Green M. Department of Emergency Medicine, Tel Aviv, *Israel*

Introduction: Emergency Medicine (EM) clinical data bases are important for health systems management and for disease surveillance vis a vis epidemics and bioterrorism. **Methods:** We built a national EM clinical database based on 3 principles: (1) a limited but representative "hit list" of ICD-9 codes; (2) modified ICD-9 terminology to common physician-usage terminology; (3) mandatory use. Phase 1: A representative expert panel developed the list according to the following principles: (a) include both diagnoses and signs and symptoms; (b) choose diagnoses based on frequency of occurrence and/or importance; (c) use only ICD-9 and e-codes; (d) create data transfer and data repository systems; (e) ensure privacy of data and secure access. Registration clerks were instructed not to discharge ED patients without a code. Phase 2: Six EDs were assessed (1,765 charts) comparing ED coding to explicit criteria: 58 % were completely accurate, 35% partly accurate and only 7% inaccurate. A final list was agreed upon, and pediatric and OB/GYN lists were developed. Phase 3: The Ministry of Health mandated use of the system. A centralized database was created, and procedures for data transfer were developed and implemented. Currently, 85% of EDs have implemented the system. **Results:** Transfer of data to the Ministry of Health IT branch is not always timely and some hospital IT systems have yet to implement data transfer. Compliance by some ED physicians is not complete and accuracy varies. Quality control

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has not been ongoing, due to budget limitations. **Conclusion:** Israel now has a National Emergency Medicine Clinical Database, which – even if not yet perfect, provides a basis for a powerful tool for both health care management and coping with unexpected mass events, be it terrorism or natural public health emergencies. **Key words:** medical informatics, emergency department, public health

111*

Using personal digital assistant-based electronic forms to facilitate research data collection at the point-of-care.

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Introduction: Data collection in research typically involves paper forms with manual entry into database software. Personal Digital Assistant (PDA) database development software can electronically replicate paper forms. Our objective was to develop an electronic data collection form (DCF) to facilitate practice-based research data collection with a PDA at the point-of-care. **Methods:** Internet and medical databases were searched to identify available database development software for Operating System (OS). Features of the identified software were ®the Palm evaluated according to OS compatibility, cost, development platform, field capacity, local area network (LAN) synchronization capability, data-sharing was ®functionality, back-end data management, and security. Pendragon Forms chosen for its cost, non-technical development interface, and integration with . Data collected on the PDA is transferred to a database ®Microsoft Access program on a Personal Computer (PC) via a cable connection and execution of the PDA synchronization function. Multiple PDA users can also transmit and share data via LAN. The data can then be analyzed with PC-based software. Data on the PDA is secured with password access control and encryption. **Results:** We developed electronic DCFs to facilitate data collection for several research initiatives. Data entry consists largely of drop down menus of structured responses. PDA-based data collection enabled us to characterize drug-related problems that pharmacists identify during routine care and to evaluate the workload of our Intravenous Resource Nurse Service. We also utilized this technology to study patients experiencing drug related hospitalizations at our institution and we have a protocol in place to investigate drug-related visits to our ED. **Conclusion:** PDA-based DCFs can replace paper forms for practice-based research. Electronic data collection increases efficiency by rendering data in analyzable format and eliminates transcription from paper forms to analysis software. **Key words:** medical informatics, emergency department, pharmaceuticals

112*

Toward a tailored web-based information system for minor head injuries.

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Introduction: Last year the IWK Emergency Department (ED) had approximately 820 visits for head injuries (3% of total visits). The majority of these are classified as minor head injuries. Upon discharge from the ED, parents are provided with verbal instructions and a head injury handout. Unfortunately, at the time of discharge parents may not fully comprehend verbal instructions and the head injury pamphlet is not tailored to the individual patient. Therefore these discharge instructions may not meet the informational needs of every patient or his/her caregiver. These gaps in information may contribute to unnecessary return visits to the ED and/or increased parental anxiety. The use of web-based health care information portals and the widespread availability of information personalization methods provide an opportunity to offer readily accessible and tailored discharge educational interventions. Studies have shown that tailored informational materials are more likely to be read and retained, perceived as relevant, and more likely to gain the attention of the person for whom they are tailored. A paradigm shift towards self-care and disease management warrants the ubiquitous availability of validated educational content. **Methods:** We propose a web-based interactive learning system to assist with information gaps in the current provision of discharge instructions for minor head injuries. Our methodology is based upon two theoretical models: The Consumer Information Processing Model and Haddon's Matrix. These models will guide the design and development of our web-based interactive learning system. After completion of the system, we will conduct an evaluation study of parents to measure the user-friendliness and usefulness of this system. Study participants will be recruited from the IWK ED. **Results:** pending. **Conclusions:** pending. **Key words:** informatics

113

A method to improve the efficiency of ED consultations.

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Introduction: The time for waiting consultation is absolutely related to both the patient flow and length of stay in ED.Most hospitals measure the consultation time as one of the quality assurance indicators. However,consultation delay is a concerned issue worldwide, especially in Taiwan. The purpose of this study is to evaluate the method to decrease the consultation time, so as to improve the quality of care for the ED patients. **Methods:** A retrospective observational before and after compared study was conducted at the ED of Tzu-Chi medical center from January 2003 to April 2004. We divided the study period into two phases with cutting point in September 2003. Since this time, a special strategy that all the doctors with consultation delay must response to the reason for delay on the next day was practiced. The consultation delay monthly report was collected during study period. The percentage of consultation delay was compared between two phases, using the statistic method of one-way ANOVA test, and P value less than 0.05 was considered statistically significant. **Results:** Totally 9038 ED consultations were enrolled during the study period. The percentage of consultation delays per month in average were 17.83±2.29% in phase 1 versus 2.05±0.83% in phase 2, which is statistically significant comparing the difference between two phases($P<0.001$). The trend of consultation delay during the study period demonstrates that immediate dramatic amelioration began since the first month of practicing the strategy (20.38% in August Vs. 2.61% in September, $P<0.01$). **Conclusions:** The efficiency of ED consultations can surely be improved by some method with monitor and response regulation on daily basis. **Key words:** informatics, emergency department, quality of care

114*

The demographic bias of email as a survey method in a pediatric emergency population.

Taylor, BW. Departments of Pediatrics and Emergency Medicine, Faculty of Medicine, Dalhousie University, Halifax, NS, *Canada*

Introduction: Ensuring feedback from parents to physicians in a pediatric emergency department is problematic. Consequently, evaluating many aspects of patient care is made more difficult. Email has been considered as a communication medium between patients and

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clinicians in other contexts. We developed a paper based survey to explore access, willingness to participate and the demographic bias of email within our parent population. **Methods:** To 1733 possible subjects, 1200 surveys were distributed with a return of 1018, a survey response rate of 85%, and a population response rate of 59%. **Results:** Subjects from families with incomes less than $60,000 per year had lower access rates (OR = 0.40, 95% CI [0.25,0.62]), as did those with lower education (OR = 0.37, [0.17, 0.81]). Employment outside of the home was associated with increased email access rates (OR = 1.79, 95% CI [1.19, 2.70]). Visible minority status was associated with an increased willingness to participate (OR = 1.84, 95% CI [1.10, 3.06]) as was low education (OR = 2.12, 95% CI [1.04, 4.32]). **Conclusions:** We have demonstrated a degree of demographic bias in email access rates, negatively affecting those individuals with lower income, less employment, and lower education. Because of an opposing bias with regard to willingness to participate in those with visible minority status and lower education, the degree to which this would have affected a hypothetical email based survey in our population was small. Email based surveys directed at parents in pediatric emergency departments should include questions on income, employment and education in order to correct for these variables, otherwise the intrinsic biases of an email survey may render the data obtained less useful. More research is needed to confirm these findings using email surveys, rather than paper based tools. **Key words:** medical informatics, emergency medicine, pediatrics

115*

The electronic discharge summary: a novel and efficient way to capture ED discharge information informatics.

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Introduction: Capture and transmission of ED discharge information is usually limited to a faxed copy of an illegible ED physician chart. We developed an electronic discharge summary (EDS) that physicians use at the end of the ED visit to record diagnosis, procedures, follow-up and prescriptions. This information is collated with other visit data, forming an electronic ED summary that is automatically faxed to the primary care physician and retained as part of the patient record. Our objective was to compare the capture of ED discharge diagnosis and procedures performed before and after EDS implementation. **Methods:** At an urban academic centre, using the previously validated ED administrative database, we retrospectively reviewed the capture rate for discharge diagnosis and procedures performed between 2001–2005, when a data entry technician (DET) entered these from the ED chart post hoc, to the capture rate after EDS implementation. **Results:** All physicians, ½ FTE or greater (27/27), utilized the EDS. During the first 5 months after EDS implementation, discharge diagnosis capture rate was 94.6% (22576/23858) as measured 1 week after the end of the 5 month period and 3080 procedures were documented. Timely capture (within 24 hours of patient visit) rose from 68% after implementation to 80% in month 5. Overall discharge diagnosis capture using a data entry technician was 98% (240,864/245,688), but data accrual was slower with less than 90% capture at the end of any 5 month period but reaching 98% at 9–12 months after the ED visit. Fewer procedures were captured by the DET (mean = 2325 for a comparable time period in other years). All physicians used the electronic prescription writing functionality creating a total of 5028 electronic prescriptions in the 5 month period. **Conclusion:** The electronic discharge summary is a novel and timely way to capture ED discharge information rapidly and efficiently without the aid of a data entry technician. Ongoing process improvements will improve discharge diagnosis capture. **Key words:** medical informatics, emergency department, discharge

116

Quantifying the evidence gap in emergency medicine.

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Introduction: Evidence based medicine is the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients.The recent growth of evidence-based medicine has caused a plethora of literature dedicated to review of the best evidence available both in general and areas specific to different areas of medical practice.The Cochrane Library, Bestbets,British Medical Journal Clinical Evidence and Evidence-Based Medicine online (EBMonline) are few of the sites which act as repositories of evidence in the field of emergency medicine. However, a look at the topics and clinical bottomline would state the obvious about the difficulty of conducting well-designed trials in emergency medicine, partly, due to ethical reasons and partly due to the fact that our specialty is quite nascent yet. Most of the evidence is lacking, the trials are poorly conducted and ultimately it leaves us with the evidence that more systematized and well-organised trials need to be conducted in the field of emergency medicine.We aim to identify gaps in evidence in the area of emergency medicine by analysing the clinical bottomlines of reviews assimilated in evidence-based emergency medicine repositories. **Methods:** The Cochrane Library, BestBets, EBMOnline and other sites which possess reviews relevant to emergency medicine will be searched by two reviewers. The clinical bottomlines will be appraised and the evidence/lack of it will be quantified. The size of benefit/harm and degree of certainty will be summarised in a structured manner. Topics will be identified which lack reliable evidence. The inter-rater reliability will be assessed by a kappa score. **Results:** The work is on-going and results should be available for ICEM 2006. **Conclusions:** This comprehensive search and assessment will highlight the gaps in current emergency medicine evidence-base and will hope to provide directions for future primary and secondary research opportunities. **Key words:** informatics, emergency department, systematic review

117

Testing the success of blinding in randomised controlled trials in emergency medicine literature.

Sen A. Department of Intensive Care Medicine, Fairfield Hospital, Bury, Manchester, *UK*

Introduction: Blinding participants in randomised controlled trials (RCTs) is regarded as an important procedure for minimising bias. Double blind trials tend to report smaller clinical effects than similar trials that are not double blind. Also, blinded outcome evaluators assess outcomes less optimistically than unblinded evaluators. In most RCTs success of blinding procedures is assumed but not tested. Earlier reports on the success of blinding have been mainly based on placebo controlled trials published in selected journals. The number of identified trials has been low and several did not report the full details of the test of the success of blinding. Fergusson et al (BMJ Jan 2004) looked at 191 trials in medical and psychiatric journals and found only 15 which had tested success of blinding. Altman (BMJ May 2004) mentioned that assessment of blinding success would be more reliable in trials when they are carried out before the clinical outcome has been determined. We aim to assess how often the success of blinding is tested in RCTs published in emergency medicine journals over the past 5 years and test frequency of trials with successful blinding. **Methods:** 6 emergency medicine journals will be searched for all randomised controlled trials over the last 5 years since the publication of the CONSORT guidelines. They include Academic Emergency Medicine, *Annals of Emergency Medicine*, *American Journal of Emergency Medicine*, *Emergency Medi-*

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cine Journal, *Canadian Journal of Emergency Medicine*, *Journal of Emergency Medicine*. All randomised controlled trials will be assessed for report of blinding with test for success of blinding. Two people will independently abstract data for each study. Data will be analysed using Microsoft Excel. **Results:** The work is currently ongoing and results should be available for ICEM 2006 **Conclusions:** It is important that efficacy of blinding is tested in randomised controlled trials. As per the CONSORT statement, findings of an assessment of blinding should be reported in all trials. **Key words:** emergency medicine, randomised controlled trial, systematic review

118*

Knowledge sharing behaviors among rural and urban emergency practitioners using a discussion forum: a social network perspective.

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Introduction: Research supports that health care practitioners rely on their network of relationships to find information and solve problems. The existence of social relationships among emergency department (ED) practitioners creates opportunities for sharing expert knowledge. However, the nature of the ED setting and geographic dispersion pose a challenge for sustained and meaningful real-time shared initiatives. Factors that impact success in information sharing include access, habit, time, and relevance. Collaborative technologies such as electronic discussion boards may address some of these issues and increase opportunities for the development of a knowledge-sharing network. Social network analysis (SNA) provides a means for mapping and analyzing relationships among people, teams and/or organizations. In this paper a SNA approach will be used to describe the knowledge sharing patterns among rural and urban ED practitioners participating in an online discussion forum. **Methods:** 1. A discussion forum, facilitated by content experts, was established for practitioners in rural and urban EDs. Discussion topics were generated by content experts and participants. 2. Interaction data from the discussion board was analyzed using UCINET, a Social Network tool. **Results:** The online discussion forum was available to 207 practitioners from 9 rural and 2 urban EDs in Nova Scotia. Forty three percent (n = 89) of participants accessed the discussion board at least once and 69% of those (n = 62) posted at least one message. All eleven EDs were represented in the discussion postings. A variety of information seeking and information sharing behaviors were exhibited. Geography, gender and professional affiliation were found to impact network ties and network positions. **Conclusions:** Electronic discussion forums present an opportunity to engage in a range of information seeking and sharing behaviors. Supporting more effective knowledge-sharing practices will positively impact the quality of care delivered in EDs in Nova Scotia. **Key words:** informatics, emergency medicine, knowledge translation

119

The Information and Communication Technology Capabilities of Australian Emergency Departments.

Reckmann SM, Chu M, Dinh D, Dinh M. Emergency Medicine, Royal Prince Alfred Hospital, *Australia*

Introduction: The application of information technology has emerged as an important tool for quality control and process redesign in modern emergency departments. Applications pioneered by Australian Emergency departments include departmental activity and patient tracking systems (Emergency department information systems) and clinical information access projects to improve availability of online databases and medical literature. Many factors limit the widespread implementation of information technology. The uptake of new technologies in emergency departments and the perceptions of those responsible for its implementation have not been previously studied in Australia. **Objective:** To conduct a survey of the information and communication technology capabilities of emergency departments throughout Australia and identify variables associated with higher levels of uptake. To examine the perceptions of emergency directors regarding the efficacy and limitations of these systems. **Methods:** Directors from all Australian Emergency departments registered with the Australasian College for Emergency Medicine were invited by email to participate in this study. The survey consisted of a questionnare that examines computer hardware, internet capabilities, clinical applications, communications, and electronic teaching capabilities, as well as perceptions of the directors to the technology available. Descriptive statistics were used to compare proportions. Logistic regression analysis was used to determine variables associated with higher rates of information technology uptake. **Results:** The findings will be discussed at the conclusion of the study. **Conclusion:** pending. **Key words:** informatics

INJURY TRAUMA TRACK

120*

Mayhem on ice: Are team officials being injured as a result of their players being injured?

Arbeau RP, Gordon KE, McCurdie G. Faculty Of Medicine, Dalhousie University, Halifax, NS, *Canada*

Introduction: Team officials of rink sports may be required to cross the ice surface to access the player benches or to attend to an injured player. The following case study/review comments on 2 cases of team officials suffering injuries while crossing the ice, along with injury reports from a Hockey Canada administrative database. Cases: The cases include one report of a head laceration and concussion and another with a cerebral hemorrhage and resulting death. **Methods:** The Hockey Canada insurance database was analyzed to include injuries that resulted from falls on ice during game time from mid 2001 through mid 2005. **Results:** There were reports of 988 injuries of team officials including 94 concussions, 5 internal organ injuries, 226 fractures and 86 separation/dislocations. **Conclusions:** Team officials may be required to walk on the ice during games, but this is not something that they would expect might result in injury, concussion or even death. There are two ways to deal with injuries occurring from falls on ice: preventing the fall and/or preventing the injury. Falls and subsequent injury by team staff can be prevented by rink design and policy. As many injuries appear to occur while attending to injured players, the most prudent preventative strategy would appear to be the wearing of gait-stabilizing devices. Wearing helmets may offer supplemental protection against the rare catastrophic neurosurgical trauma. **Key words:** injury, hockey

121

Did French urban riots have an impact in the number of visits for injuries?

Hadef H, Arzouq H, Bilbault P, Berna C, Jaeger A. Division Of Emergency Medicine, University Louis Pasteur of Strasbourg, Strasbourg, *France*

Introduction: Since the end of october and during 15 days, many cities and especially Strasbourg, were victims of burned cars, violence against police task, and police task retort. By the fact we decided to see if such urban disorders and urban rioting can change the motive of visiting the ER **Methods:** The study is a retrospective study beginning the 30th of October 2005 and ending the 15th of November. The end

was the day when French government declared urban riots ended. We collect all the medical cases relating injuries during this period, separating them in 8 groups. Burned, wounded (contused, gunshoted, lacerated, cutaneous and subcutaneous wound), scald, and lacrimation due to gazes. We decided to compare the the 8 groups to the average consulting for wounds in the same period during 5 years. **Results:** We considerate the period as the time run between the first November to the 15th of November. There is no significant difference in the pathology type compared to the other years except for burns and wounds due to lacrimation. We face an increase of superficial cutaneous burns, and an significant increase of gaz lacrimation over than 100%(55 victims vs 1.3), the same for contused victims(an increase of 75% 144 victims vs 35). Beside that the number of consultations did not change significantly. We face this year for the period 897 persons vs 817. **Conclusions:** Pathology did not change by their numbers but during that period police tasks were deeply stressed and also the same for physicians and nurses. Lot of health workers felt an increase of oral violence. We were surprised to see that the number of consulting did not increase. Can we by the fact say that urban violence had no impact on the ER? **Key words:** injury, emergency department

122

Violence in the French ER, one year review, who is the victim, the agressor?

Hadef H, Arzouq H, Bilbault P, Berna C, Jaeger A. Division Of Emergency Medicine, University Louis Pasteur of Strasbourg, Strasbourg, *France*

Introduction: The violence in emergency rooms is an established fact. We tried to have one year review of this violence in our ER as well as its repercussions on our staff, because determining the quality of covering this patients. Not as comparable as the American ER, by its complication or its number of wounded victims, we try to give here a view of the violence that we faced over 2004. **Methods:** we listed over 2004 all the medical and nurses staffs victims of aggression, by redrawing their profile of age in the ER, the age of the victim, characterized the nature of the aggression, the aggressor, and the follow-up of the assaulted. **Results:** the men are mainly victims of violence (60 %). The women are protected from the wounds. The nurses seems to be much more victims of oral injuries maybe directly linked to their proximity with patients. The women seem to need a psychological support. Over than 70% need to discuss with a psychologist. This matter of fact is maybe linked to the huge impact for them of the violence. Men seems not to need the psychological support. For those we can maybe submit the fact that they think the work in the ER is closely link to violence? The psychological support in our ER is given only if the victim asked it for. Maybe this is the explanation for men are not requiring psychological help. We can also observe that it frequently the young and maybe the inexperienced in the ER who is facing violence. More than 70% of the victims are in the ER less than 3 year and under 25 years old. **Conclusions:** Although strictly linked to the work in the ER, the violence is at the origin of a permanent stress which can handicap the relationship between nurses and physicians, and generate a lack of coverage of these patients, and seems to require an indispensable psychological follow-up, because of the young person age implied. Followed that we have decided to establish in our ER a systematic dialog with the director of our hospital and to create a medical psychological cell. **Key words:** injury, emergency department

123

A case-control study of unintentional childhood injury: demographic and socioeconomic factors.

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Introduction: Unintentional injuries are the leading cause of death for in developed nations. The risk of injury is related to a series of demographic and socioeconomic factors. **Methods:** We conducted a hospital-based case-control study to detect the relationship between childhood unintentional injury and demographic and socioeconomic factors in the Singapore context. 16663 cases of injured patients seen in a children's hospital's emergency department (ED) from Feb 2002 to Jan 2004 were the cases enrolled in the study. 500 non-injury patients managed in the same ED from Feb-May 2004 were recruited as controls. **Results:** The risk of injury rises with age (Odds Ratio (OR)=1.13, 95% Confidence Interval (CI): 1.10-1.17). Children from non-intact families (OR=3.83, 95% CI: 1.40-10.43) and those with 2 or more elder siblings (OR=1.87, 95% CI: 1.37-2.53) were at higher risk. Children under the care of grandparents were at decreased risk (OR=0.64, 95% CI: 0.51-0.82) while those looked after by babysitters were at increased risk (OR=3.47, 95% CI: 1.27-9.45) of injury compared with those taken care of by mothers. Mother's low education level was related to lower risk of injury (compared with tertiary education, vocational education OR= 0.46, 95% CI 0.29-0.72, primary/no formal education OR= 0.53, 95% CI 0.37-0.76). A previous injury was strongly associated with a higher repeat injury risk (OR= 4.89, 95% CI 2.51-9.53). There is a strong negative relationship between very low birth weight premature babies and injury risk (OR=0.09, 95% CI 0.04-0.17), intellectually disabled children (OR=0.24, 95% CI 0.06-0.98) children with pre-existing chronic disease (OR=0.47, 95% CI 0.26-0.85). **Conclusions:** Local unintentional injury prevention strategies should be targeted at children and caregivers from the following target groups: non-intact families, large families with more than 2 children, baby sitters, mothers with higher educational levels and the child care arrangements which they choose, and children with a history of previous injury. **Key words:** injury, pediatrics, emergency department,

124*

Minimally angulated pediatric wrist fractures: Is casting without manipulation enough?

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Introduction: There is practice variation of the management of minimally angulated wrist fractures in children, and 25% of ED physicians would manipulate these fractures to obtain anatomic alignment under anesthesia prior to immobilization. However, due to the unique capacity of children's fractures to heal with remodeling, manipulation may not be necessary. Objectives: In skeletally immature children with bicortical minimally angulated (<15 degrees of angulation on lateral xray, <0.5cm displacement) metaphyseal radius±ulna fractures managed initially only with plaster immobilization, to determine the proportion of fractures that required surgical intervention (i.e., requiring closed or open manipulation and/or fixation of the fracture) in the 6 week follow up period. A secondary objective included documenting changes in angulation over time. **Methods:** A retrospective cohort study that reviewed consecutive records of all children with wrist fractures at a large, tertiary care pediatric hospital. Sample size of 124 was calculated using the proportion and 95% confidence interval estimate equation, assuming 3% of fractures would subsequently require surgical intervention. **Results:** 124 patients were included in the final analysis. Mean age was 8.7 (± 3.2) years. None of these patients required surgical intervention in the follow-up period. All but 8 (6.5%) patients had a final angulation < 20 degrees. Six patients (4.8%) with initial angulation 11– 15 degrees progressed to 20– 25 degrees, and two (1.6%) patients initially at 15 degrees progressed to 30– 35 degrees (radiographic remodeling in the latter cases is pending further follow up). No patients had a clinically apparent physical deformity and all had normal function in

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follow up, thus the lack of surgical intervention. **Conclusions:** Minimally angulated wrist fractures with the aforementioned criteria are safely and adequately managed in the ED and in follow up by plaster immobilization only, and are at very low risk for requiring future surgical intervention. **Key words:** pediatrics, injury, fracture

125*

Concern of compartment syndrome following traumatic hip or femoral shaft fracture not a reason to withhold regional anesthesia in the emergency department.

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Introduction: The 3-in-1 femoral nerve block (FNB) is a safe and effective option for perioperative pain management in selected lower limb surgeries. The application of FNB for pain management in the Emergency Department (ED) is well documented. A concern with the use of FNB in patients with traumatic hip and femoral shaft fracture is that the limb anesthesia associated with FNB might mask a compartment syndrome (CS) of the proximal lower extremity. However, there is little data to support this concern since the incidence of CS in this patient population is not well established. The objective of this study is to identify the incidence of CS in patients presenting with traumatic hip or femoral shaft fractures at our tertiary care institution. **Methods:** Institutional research ethics board approval was obtained for this study. A retrospective chart review of the prospectively gathered orthopedic trauma database of the Department of Orthopedics at Vancouver General Hospital was conducted from January 1987 to May 2005. Records for closed femoral neck and femoral shaft fractures were identified. This cohort was further analysed for associated diagnoses and procedures during admission, identifying patients who were subsequently diagnosed with CS or underwent fasciotomy while in hospital. **Results:** A total of 5392 femoral neck or shaft fractures were identified. The number of femoral neck fractures was 2194 (40.7%), intertrochanteric fractures 1849 (34.3%), subtrochanteric fractures 510 (9.5%), and femoral shaft fractures 839 (15.6%). There were no identified cases of CS or fasciotomy. **Conclusions:** The incidence of CS or fasciotomy following traumatic fracture of the hip or femoral shaft was 0% in our series. In light of this, we believe that 3-in-1 FNB can be safely used as a pain management modality for patients with femur fractures in the ED without fear of masking a CS. **Key words:** compartment syndrome, emergency department, anaesthesia

126

Procedural sedation in the emergency department: a 12-month review.

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Introduction: Procedural sedation is commonly performed in the Emergency Department (ED). There is little epidemiological data describing the type of patients requiring PS and how this procedure is performed. The aims of this study were to describe the characteristics of all patients requiring procedural sedation in the ED and to define the procedural processes and agents used. **Methods:** A descriptive study of all patients requiring procedural sedation within an adult Emergency Department (85,000 annual attendances) in one year. Data collected included demographics, times, agents used and recorded complications. Data was analysed using multiple statistical techniques. **Results:** 566 patients were identified (M:F = 1:1). Procedures were more common in young men (Age <30; n=129) and older females (Age >60; n=172). Common manipulations included glenohumeral dislocations (n=201) and ankle fractures/dislocations (n=135). Common agents included midazolam (n=424, 75%) morphine (n=398, 70%) and fentayl (n=79, 14%). Opiates and midazolam were commonly used together (n=354, 59%). Patient age was compared with administered doses of morphine (r=0.049) and midazolam (r=0.011), and copared when administered in combination (r=0.367). The median time spent in the ED between procedure completion, and before discharge or hospital admission, was 1hr 45min (IQR = 1hr 42min). 271 (48%) patients were subsequently admitted with the remainder receiving outpatient follow-up. Complications were recorded in 9 cases (2%). These included prolonged sedation, vomiting and loss of respiratory effort. **Conclusions:** This is the first UK adult ED study describing the characteristics of all patients requiring procedural sedation and how this technique is performed including drug regimes and recorded complication rates. Morphine and midazolam doses are altered to reflect the age of the patient, but there is no correlation between the doses of morphine and midazolam when given in combination. Drug regimes are not altered to suit different manipulations. **Key words:** emergency department, procedural sedation

127

Clinical significance of prolonged QTc dispersion in spontaneous intracranial hemorrhage.

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Introduction: QTc dispersion is a quantitative measure of myocardial repolarization. It is a new important prognostic factor for many disease. We have analyzed the admission EKGs of 53 patients with spontaneous intracranial hemorrhage(ICH) for their QTc dispersion. This study is performed to investigate the prognostic characteristics of QTc dispersion in patients with ICH **Methods:** On presentation, we measured the QTc dispersion of the ECG and Glasgow coma scale(GCS) of patients. The QTc dispersion is the difference in the QT duration of the longest minus the shortest rate-corrected QT interval. A computer tomography of the brain was performed in order to determine the site of the ICH, presence of intraventricular hemorrhage(IVH) and the amount of ICH. We attempted to determine the relationship between initial factors, including QTc dispersion and findings of computer tomography, as well as the Glasgow outcome scale(GOS) at discharge as the final prognosis. **Results:** Patients exhibited a poor prognosis, if they had lower GCS score on admission, larger volume of hemorrhage and accompanying IVH at computer tomography of brain, and increased QTc dispersion on univariate analyses. Although the mean QTc dispersion in the group that showed a favorable outcome was 70.6±29.6 ms; 63.8±24.2 ms in the group of GOS 1 and 76.8±26.4 ms in the group of GOS 2, the mean QTc dispersion in the group that had an unfavorable outcome was 117.6±36.1 ms; 108.8±29.6 ms in group of GOS 3, 120.7±1.3 ms in group of GOS 4 and 141.8±53.4ms in group of GOS 5. The difference in the QTc dispersion according to patient outcome was statistically significant. **Conclusions:** The QTc dispersion in the initial EKG might be a significant factor that could be useful for prediction of outcome in spontaneous ICH patients along with the GOS at discharge. Therefore, our results suggest that the QTc dispersion should be included for prognosis and treatment of patients with ICH. **Key words:** electrocardiogram, injury, intraventricular hemorrhage

128

Traumatic elbow effusion in children: an indicator of significant injury?

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Introduction: Isolated elbow effusion seen on radiographs of chil-

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dren following acute trauma has become synonymous with occult fracture. The management of these injuries involves referral to fracture clinic for follow up. We have previously shown in a pilot study looking at 47 patients with elbow effusion but no obvious fracture, that approximately 80% are discharged after a maximum of 2 weeks orthopaedic follow up. We reviewed the management of a series of 201 patients with a traumatic elbow effusion but no fracture demonstrable on X-ray. We believe this is the largest series of its kind. **Methods:** All patients who had an elbow X-ray in the ED, and subsequently attended fracture clinic between February 2000 and August 2005 were identified from the hospital Patient Administration System, (n=1361). The X-ray reports of these patients were reviewed and those which showed an effusion but no obvious fracture were isolated (n=201). The hospital records of this group were then examined to determine the further management of these patients in fracture clinic. **Results:** Of the 201 patients: Ninety six (48.8%) attended fracture clinic once only, including twenty seven patients who did not attend (DNA) subsequent clinics and were discharged from follow up. One hundred and five patients (52.2%) were seen more than once in fracture clinic. We are currently collecting data on the patients who were seen more than once in fracture clinic to determine length of follow up, any complications that arose as a consequence of their injury, and any operative intervention needed. **Conclusions:** 48% of these patients are discharged from orthopaedic follow up after one clinic review (including subsequent DNA patients). Pending further data review, we propose that these patients can safely be managed in the ED, with no need to involve orthopaedic services. **Key words:** injury, pediatrics, emergency department

129

The comparison of base deficit, lactate, and strong ion gap as early predictor of mortality and tissue perfusion in trauma patients.

Lee KH, Park KH, Kim SH, Won HK, Oh SB, Moon JB, Kim H, Hwang SO. Department of Emergency Medicine, Wonju College of Medicine, Yonsei University, Wonju, *South Korea*

Introduction: Currently, there is a variety variables for impairment of tissue perfusion and predicting prognosis of trauma patients such as trauma score, ISS (Injury severity score), and acid-base variables. But it is not clear that the initial acid-base variables at the emergency department are predictors of prognosis in trauma patients. The objective of this study is to compare the base deficit, lactate and strong ion gap as an early predictor of mortality in trauma patients. **Methods:** Our trauma registry and laboratory data were reviewed from June 2004 to February 2005; 136 patients needed to admit in intensive care unit via emergency department. The data was included with age, injury mechanism, ISS, RTS, MODS, APACHE III, GCS, laboratory profiles, calculated anion gap and strong ion gap. Patients were divided into survivors and non-survivors, shock group and non-shock group with comparison by t-test; significance was assumed for $p<0.05$. Correlation between acid-base variables and MABP (mean arterial blood pressure) was evaluated. **Results:** There was a significant difference between the RTS (p=0.00), APACHE III (p=0.00), MODS (p=0.00), GCS (p=0.00) of survivors and non-survivors. There was no significant difference between the ISS (p=0.082), lactate (p=0.541), base excess (p=0.468) and SIG (p=0.894) of survivors and non-survivors including head trauma patients. There were significant differences between the RTS (p=0.023), APACHE III (p=0.002), lactate (p=0.000), base excess (p=0.000) and SIG (p=0.000) of shock and non-shock group. The base excess was the most correlated to MABP (r2=0.150) than lactate and SIG. **Conclusions:** Initial base deficit, serum lactate and SIG are not predictors of mortality in moderate to severe trauma patients including the head trauma patients. Initial base deficit is the most correlate with MABP than serum lactate and SIG in trauma patients in emergency department. **Key words:** injury, injury severity score, metabolic

130

South West Evaluation of The Elbow Extension Test (SWEET) in Children.

Reuben A, Appelboam A, Benger J, Lloyd G, Royal Devon & Exeter Hospital, *UK*

Introduction: There are no established guidelines as to which children with elbow injuries require an x-ray. One previous small study, which included an unspecified number of children, suggests that full elbow extension may rule out significant bony injury. Elbow extension has been proposed as a simple test to assess the need for an x-ray. This study aimed to evaluate this further. **Methods:** We conducted a multicentre, prospective observational study of the elbow extension test in children. Children between the ages of 3 and 15years with elbow injuries, who met the inclusion criteria were consecutively recruited in four centres over a 14-month period. All patients who could not fully extend their elbow were x-rayed. Those children who could fully extend their elbow were x-rayed at the treating clinicians discretion. All those not x-rayed were contacted by telephone at 7-10 days. Patients who had continued pain, any loss of function or any other concern were reviewed and x-rayed. **Results:** 416 patients were recruited. 73 were excluded (age<3, injury>72hrs, no history of trauma). The remaining 343 patients underwent the elbow extension test and of 117 patients who could fully extend their elbow, 3 patients had a fracture (1 lat epicondyle, 2 supracondylar) and 4 had an isolated effusion. Of the 226 non-extenders, 154 had no fracture, 14 had isolated effusions, and 72 patients had a fracture. In this population therefore the elbow extension test had a sensitivity of 96.0% (95% CI, 87.9-98.9), specificity of 42.5% (95% CI, 36.5-48.7) and negative predictive value of 97.4% (95% CI, 92.1-99.3). **Conclusion:** In this study, the ability to fully extend the elbow following acute elbow injury was not sufficiently sensitive to reliably rule out significant bony injury. **Key words:** pediatric injury, radiology, emergency department

131*

The terrible truth of toppling televisions.

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Introduction: Although data is limited, accidents due to television tipovers have been identified as a significant risk of childhood injury. Compounding this problem is the trend toward increasing television size. A retrospective analysis of television related injuries was undertaken. In addition to this the facility with which a child could tip televisions in a pediatric hospital was examined. **Methods:** A retrospective analysis of the CHIRPP database was conducted to determine the number of television related injuries within the local healthregion between 1990–2002. In coordination with this, a static model of a child with appropriate proportions and weight was attached to each accessible television console within the hospital to determine whether televisions in the hospital were safe from tipping. **Results:** Between 1990–2002 104 childhood injuries were related to televisions with the majority occurring in the 2–4 age range. Of all reported injuries 61% occurred in males. Of the 104 reported injuries the most common area to be injured was the head and neck. Within the hospital 90% of televisions were tippable by children 4yrs. of age or younger. The median television size was 21 inches with the mean height above ground being 92cm with a standard deviation of 16cm. Only 34% of televisions were anchored to their consoles. **Conclusions:** Television sets are not safely maintained within the

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hospital, one can only speculate about television safety in the general population. Parents need to be aware of the potential for televisions tipping resulting in serious injury to children. **Key words:** injury, pediatrics, television

132

Research on the radiological diagnosis methods applied on the patients with pelvic trauma at the emergency services.

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Introduction: To compare the results of the radiological diagnosis methods applied on the patients with pelvic fracture. **Methods:** Fifty patients in total with pelvic trauma were included in the study. The radiological findings (AP pelvic radiography, Intravenous pyelography, abdomino-pelvic ultrasonography, abdomino-pelvic Tomography) were all recorded. Findings were compared with each other. **Results:** In the AP pelvic graphy, it was seen that 21 patients had ischion pubis arm fracture, 10 patients had pubis arm disconnection, 9 patients had Acetabulum fracture, 6 had sacroiliac disconnection and 4 had the combined fractures. Out of the 12 patients whose IVP was performed, 9 patients had urethra perforation. In 4 patients was found out a bladder rupture and hematoma. In the USG, it was found out that one patient had a perirenal hematoma, one patient had kidney injury, one had liver contusion, one had spleen laceration, and that three patients had intraperitoneal free fluid. In the abdomino-pelvic USG of 5 patients could not be performed as optimal because of obesity and abdominal distension. In the abdomino-pelvic CT, it was found out that 1 patient had hematoma in the liver and one in the spleen, three patients had psoas hematoma, two had kidney contusion and hematoma, and that one had free perforation. In the abdomino-pelvic CT of the 5 patients whose abdomino-pelvic USG examination was could not be performed as optimal but the clinical findings were available (rebound/defans), 3 of them were found to have serious findings (i.e. one had perforation, one had subcapsular hematoma in liver, and one had retroperitoneal hematoma). **Conclusions:** The USG on the patients with pelvic fracture is a radiological diagnosis method which might bring out changeable result due to the experience of the radiologist and the patient factor. On the patients whose clinical findings still continue and are uncertain, abdomino-pelvic CT should be done in order to see the organ injuries (especially hollow organs and retroperitoneal organs). **Key words:** trauma, radiology, ultrasound

133

The factors affecting the mortality in blunt head traumas.

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Introduction: To examine the body heat, tension arterial (TA), biochemical parameters, the blood count values and the clotting parameters of the patients with blunt head trauma taken to the emergency departments, and also to examine the relationship between the Glascow Coma Score (GCS) and mortality. **Methods:** Sixty seven patients who were at the emergency department due to the blunt head trauma were included in the study. The GCS of the patients were determined; and the vital findings (TA, pulse, body heat) of the patients were recorded. From each patient were taken the venous blood samples to see the blood count values (Hb, Htc, lokosit), the blood glucose level, AST, ALT, urea, and the levels of creatin, sodium and potassium. Also, samples of blood were taken from each patient to evaluate the clotting parameters (trombosite, Prothrombine Time, Partial Thromboplastin Time, fibrinogen, Fibrin Destruction Products and D-dimer). The results were compared with mortality and GCS. **Results:** There was no significant relation between GCS and mortality with TA. Likewise, there was no relation between the body heat with the GCS and mortality. However, out of the 24 patients whose GCS was 8 and below, the body heat of the 15 patients was 37 and over; and 9 of them were registered dead. A relation between the Hb, Htc, leukocyte numbers, ALT, AST, urea, creatin with GCS and mortality could not be found. Between the blood glocose level and GCS was found a opposite significant relation, and between the glucose level and mortality was found a positive significant relation ($p<0.05$). There was also a positive relation between GCS and mortality with PT, PTT, fibrin, FYU and D-dimer ($p<0.05$). A positive relation was not determined between the Thrombosit with the GCS and mortality. **Conclusions:** In blunt head traumas high body heat, high blood glucose level, and disorders of clotting parameters it might be indicators of poor prognosis. **Key words:** trauma, mortality, laboratory

134

Paediatric trauma and preventable causes of death in Hong Kong.

Lam JMY, Yeung JHH, Cheung NK, Graham CA, Rainer TH. Chinese University of Hong Kong, *China*

Introduction: Trauma is a leading cause of death in the paediatric population. This study aims to describe the demographics, mechanisms, severity of injury, and outcome of paediatric trauma patients and to investigate the mortality of paediatric patients admitted to the Emergency Department (ED) of a university teaching hospital and trauma centre in Hong Kong. **Methods:** Retrospective analysis of prospectively collected trauma registry data which included all consecutive trauma cases admitted through the ED trauma rooms between January 2001and February 2005. **Results:** 0f 2032 patients in the registry, 223 (11%) were paediatric trauma patients (age 0-16 years; 154(66%) male, mean age 9.3 years), a mean of 4.7 paediatric patients per month.. 114 (49%) patients were from road traffic crashes (RTC), 68 (29%) sustained falls, and 20 (9%) had burns. 51 (22%) had ISS>15. 77 (33%) patients underwent emergency operation and 35 (15%) were admitted to the intensive care unit. The total mortality was 2.6% (n=6); mortality was 11.8% in the group of patients with major trauma (ISS>15). Of those who died, all were GCS<8 on ED arrival and had severe head injury (5 patients were AIS 5 for head injury and 1 was AIS 4). Four (67%) were RTC victims (2 pedestrians, 2 cyclists). Median length of hospital stay for survivors was 11.8 days. **Conclusions:** Head injury accounts for most paediatric trauma deaths in this study. Road traffic crashes cause significant morbidity and mortality in paediatric trauma patients. Education on road safety for pedestrians and use of cycle helmets is important. **Key words:** pediatric, injury, mortality

135

Are child victims of trauma different from adults?

Lam JMY, Yeung JHH, Cheung NK, Graham CA, Rainer TH. Chinese University of Hong Kong, *China*

Introduction: This study aims to compare the epidemiology of serious trauma between paediatric (age 0-16 years) and adult trauma patients. **Methods:** Retrospective analysis of prospectively collected data included all consecutive trauma cases admitted through the ED trauma rooms from January 2001 to February 2005. **Results:** Of 2032 patients (233 children (C) and 1799 adults (A)), there was no difference in the proportion of males (C66% v A71%; P=NS), percentage with major trauma (C22% v A28%; P=NS), or leading causes of injury (MVC C49% v A49%, P=NS; falls C29% v A28%, P=NS). There was no difference in prehospital scene times, trauma

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call activation, emergency operation rate, or need for ICU (P=NS), and no significant difference in mean hospital LOS (11.4 v 10.1 days) or mean ICU LOS (5.49 v 7.05 days). Children did not sustain a higher rate or severity of head, abdominal or extremity injury. Children were more likely to be involved in bicycle accidents (14% v 5%, P<0.0001), and to sustain burns (36% v 1%, P=0.01), or pedestrian-related injury (26% v 11%; P<0.0001). Children were less likely to sustain chest injury (6.4% v 17.2%; P<0.01), or to have pre-trauma comorbidity (4.7% vs 21.3%, P<0.01). Children were less likely to have Ps<0.5 (2% v 3.5%; P<0.01), were less likely to have prolonged complications (13% v 21%, P<0.01), had fewer patients with poor Glasgow Outcome Scores (4% v 13%, P<0.0001), and had lower mortality rates (2.1% vs. 6.7%, P<0.01). Using multivariate logistic regression, trauma call activation, injury severity score and comorbidity significantly predict mortality (OR 2.1, 1.1, and 4.6) but paediatric status is insignificant. **Conclusions:** Major injury patterns and processes of care between paediatric and adult trauma victims are similar. Paediatric patients are less likely to have pre-trauma illness and are therefore not more vulnerable to trauma death. **Key words:** trauma, pediatric, mortality

136

Differences in injury pattern and mortality between Hong Kong elderly and younger patients.

Cheng CH, Cheung NK, Yeung JHH, Graham CA, Man CY, Rainer TH, Chinese University of Hong Kong, *China*

Introduction: In Hong Kong, 16.5% of emergency department (ED) trauma attendances are aged 65 years. We aimed to compare the causes, patterns and severity of injury between elderly (65 years) and younger adult patients (15 to 64 years). **Methods:** This trauma registry-based study included patients who were triaged critical or urgent, required Intensive Care Unit (ICU) admission or who died during a 5 year period (December 2000–November 2005). **Results:** 2172 patients (605 [27.9%] ISS>15; 331 [15.2%] elderly and 1841 [84.8%] younger) were included. Compared with younger patients, the elderly had a lower proportion of male trauma (163 [49.2%] vs. 1393 (75.7%); P<0.01), but when adjusted for population gender distribution there was no difference in the proportion of male trauma in the elderly (163/368000 v 1393/2925600). Compared with younger patients, the elderly group had a higher comorbidity rate (58.6% v. 14.1%; P<0.01), higher mortality rate (21.1% v. 3.6%, P<0.01), a higher proportion with ISS>15 (140 [42.3%] v. 465 [25.3%]; P<0.01), less trauma call activation (38.6% v. 53.3%; P<0.01) and a higher mortality rate (42.9% v. 13.8%; P<0.01) in major trauma. Compared with younger patients, the elderly group were more likely to be involved as pedestrians (19% v. 9.5%; P<0.01) than as drivers (0.6% vs. 15.6%; P<0.01), and have a higher MVC-related mortality rate (23.8% v. 7.9%; P<0.01); and to have more falls<2metres (54.4% v. 10.3%; P<0.01), which resulted in major trauma in 37.2% v. 16%, (P<0.01), and an associated fall-mortality rate of 22.2% v. 3.7% (P<0.01). High falls (>2metres) were less common in elderly group (5.1% v. 11%) but carried a higher mortality rate (29.4% v 7.4%). AIS evaluation revealed more frequent head/neck (53.2% v. 47.5%; P<0.01) and abdominal injuries (13.4% v 5.1%, P<0.01) in elderly patients. **Conclusions:** Trauma in the elderly affects more women, causes higher proportions of head and abdominal injury, results in less trauma team activation, has a higher mortality rate. **Key words:** trauma, mortality, emergency department

137

Major trauma in elderly patients in Hong Kong.

Graham CA, Yeung JHH, Chang ALM, Ho W, So FL, Cheng B, Cheung NK, HO HF, Yuen WK, Kam CW, Rainer TH. Chinese University of Hong Kong, *China*

Introduction: Trauma is a significant cause of morbidity and mortality in elderly patients aged above 55 years. The aim of this study was to describe the characteristics of major trauma in elderly patients from four trauma centres' trauma registry data **Methods:** This is a retrospective analysis from the 2002-2004 trauma registries of four Hospital Authority designated trauma centres with emergency departments which received a combined total of 708 058 patient attendances per year. Of these, 125 340 (18%) were trauma patients and 25 416 of these were aged 55 years. **Results:** 809 injured patients aged >55 years (58% male; 785 (97%) blunt injuries). Falls accounted for 404 (50%) cases (82% <2 metres) whilst pedestrians injured in motor vehicle crashes accounted for 230 (28%) cases. Head injury occurred in 543 (68%) patients. 434 (54%) patients suffered from severe injuries (ISS>15). Among major trauma (ISS>15) patients, 295 (68%) had severe head injuries (AIS 4), 303 (37%) had extremity injury, 130 (16%) had facial injury, and 102 (13%) had abdominal injury. 483 (60%) had trauma call activation, and 311 (38%) patients required operative treatment. Average length of stay (LOS) was 14 days (range 0.1-306 days). 354 (44%) patients required intensive care unit (ICU) care, with an average LOS in ICU of 5.8 days. The overall mortality was 23%. In major trauma (ISS>15), the mortality rate of patients aged 65-74 was 32% and it increased to 57% if patients were 75 years old. 270 (33%) patients required rehabilitation in non-acute hospitals after discharge from the trauma centre. **Conclusions:** Falls and pedestrian injury are the two leading causes of trauma in elderly patients. If mortality from elderly trauma is to be reduced, then attention needs to be paid to strategies to protect against head injury. **Key words:** trauma, mortality, morbidity

138

The correlation of penetrating trauma and social deprivation.

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Introduction: Penetrating trauma, particularly stabbings, are a common cause of morbidity and mortality in the West of Scotland. It is assumed that penetrating trauma would be more common in people from more socio-economically deprived areas. There are no recent United Kingdom studies examining whether this is the case. **Methods:** A retrospective observational study of 109 patients with penetrating trauma seen at an urban emergency department over a four-year period. Patient data was identified from the Scottish Trauma Audit Group Register. The Carstairs Index of Deprivation was used to calculate the socio-economic deprivation according to postcode. Complete data was available for seventy-one patients. **Results:** Of the seventy-one patients, the median age of patients was 27 years (IQR 20 – 37). There was a higher incidence of penetrating trauma in individuals living in less affluent areas (Odds Ratio = 1.88). Deprivation Affluent Deprived Total P Value (Carstairs Index) (1-4) (5-7) Frequency 22 49 71 0.013 Total Population within Postcode Area 53790 63969 117759 Male patients 18 (28.6%) 45 (71.4%) 63 0.18 Incidence/100,000/Year 13.63 25.53 20.1 0.013 The Carstairs Index had no association with age, sex, disturbed admission physiology or three month mortality in the sample group. There were no significant differences between the more affluent and more deprived groups in the overall length of hospital stay, time spent in high dependency or intensive care units, or in the injury severity score (all p values between 0.1 and 0.95). Demographics were similar to previous studies in sex ratio, median age and mortality. **Conclusions:** Patients from deprived areas are more likely to be injured from penetrating trauma but there was no difference in morbidity or mortality between the two groups. **Key words:** trauma, socio-economic, mortality

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139

Epidemiology of pelvic fractures in a Hong Kong emergency department trauma centre.

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Introduction: To describe the epidemiology of pelvic fracture in this university teaching hospital, which is one of five trauma centers in Hong Kong. **Methods:** Retrospective analysis of prospectively collected trauma registry data. All consecutive trauma cases admitted through the ED trauma rooms between September 2001 and June 2005 were included. Age, sex, cause of injury, injury severity score (ISS), treatment, length of stay and clinical outcome were determined. Data were analyzed using non-parametric techniques. Patients with major trauma (injury severity score [ISS] >15) were analyzed further to identify any factors influencing mortality. **Results:** 125 patients with pelvic fractures were identified for the study. 44 (35%) were female and 81 (65%) were male; mean age was 42 years (range 13 to 99 years). Falls from a height accounted for 35 (28%) patients, motor vehicle crashes for 48 (38%) patients, 37 pedestrians (30%) and other mechanisms were responsible for 5 (4%) patients. 103 (82%) of patients were local, 22 (18%) were transferred from other hospitals including 6 patients who were transferred from China and Taiwan. 76 (61%) cases were ISS 16, and the mortality rate for these patients was 37% (46/125); 13 of these patients were dead on arrival. Trauma calls were activated in 62 (50%) cases. The mortality for patients with a trauma call was 23% and the mortality for those without a trauma call was 24%, p=0.87. Multisystem injuries (head, chest and abdomen) were common. 62% (8/13) patients who arrived in the ED with a systolic BP ≤90mmHg died. 72 (58%) patients had surgery and 34 (27%) were admitted to ICU with a mean ICU LOS of 3 days. Mean inpatient LOS was 19 days. Multiple logistic regression shows that ED GCS (p=0.001) and ED systolic BP (p=0.018) are best predictors of mortality. **Conclusion:** Patients with pelvic fractures often have multisystem injury and have a high mortality. The Glasgow coma scale and systolic blood pressure are ED predictors of survival in these patients. **Key words:** trauma, emergency department, epidemiology

140

The value of the initial base deficit in the severe pediatric trauma population.

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Introduction: There are difficulties in assessing shock in pediatric trauma patients. The initial base deficit (iBD) is an important indicator of shock in adult trauma patients but its value in pediatric trauma patients is unclear. The purpose of this study was to assess the ability of the iBD to predict the blood transfusion requirement in the first 24 hours (TF < 24h) and mortality in severe pediatric trauma patients. **Methods:** This study was a retrospective review of severe pediatric trauma patients admitted to the emergency department in whom an iBD was available, from January 1998 to June 2005. Patients with severe brain injury (head AIS > 3 and other parts AIS ≤1) were excluded. The iBD subjects were divided into three groups: normal (-2 ≤ BD ≤ 2mEq/L), mild-moderate (-8 ≤ BD≤ -2mEq/L), and severe (BD ≤ -8mEq/L). The iBD was assessed as an independent predictor of TF < 24h and mortality by multiple logistic regression analysis, with the development of hypotension (age adjusted), and high injury severity score (ISS 16) as covariates. **Results:** The study group consisted of 102 patients. The percentage of patients who required TF < 24h was 35.3% and the overall mortality was 12.7%. After 2 patients were excluded because they died before blood transfusion was started, the iBD was an independent predictor of the TF < 24h (p=0.04). The severe (OR, 8.4; 95% CI, 1.3-53.8; p=0.02) and mild-moderate (OR, 6.5; 95% CI, 1.4-30.5; p=0.02) BD groups had a higher risk of TF < 24h than the normal BD group. The severe BD group was an independent predictor of mortality (OR, 14.3; 95% CI, 1.3-157.6; p=0.02). **Conclusions:** The iBD was a strong independent predictor of TF < 24h and mortality in pediatric trauma patients. Blood transfusion should be considered in cases of iBD decrease in severe pediatric trauma patients. **Key words:** injury, mortality, pediatrics

141

Family violence and maxillo-facial trauma.

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Family violence, a social phenomenon, is rarely considered as a public health problem. It is about a prospective study, during a period of 6 months, going from December 31st, 2004 till June 31st, 2005 in emergency the service of the University hospital “Farhat Hached “ Sousse (Tunisia). Our population of study consists of: 86 women (89,25 %) and 10 men (10,75 %). The average age is of 36 years, it varies between 20 years and 72 years. The place of residence of the assaulted belongs to Sousse in 80,6 %. The duration of the marriage was 1-year-old subordinate in 7,4 %. The assaulted women were encircled in 5,2 % of the cases. The economic problems were the cause of aggression in a third of the cases, the drunkenness in 21,9 % of the cases and free in 19,8 % of the cases. Antecedents of conjugal violence were found at 88,5 % of the victims. The majority of the assaulted (86,4 %) wanted to carry judicial complaint and ask for divorce, 2/3 asked a psychological support. In 91,7 % of cases it was bare hand aggression . 44,6 % of the assaulted were unemployed and 18, % of them were daily workers. The socioeconomic level of the couples was relatively average in 71,26 % of the cases.The aggressor was under the influence of alcoholic drinks in 28,13 %. The fractures of nose bone were noted in 40,6 % of cases. The deviation of the nasal septum was present at 7,3 % of the victims. The multiple wounds of the face were noted at 7,3 % of the patients A mandibular fracture was found only once. Average ITT is of 9 days. This prospective descriptive study of the conjugal attacks establishes a means to estimate better this social problem, recognize the causes and the profile of the couple with the aim of an improvement of the coverage.

142*

Effectiveness of bicycle helmet legislation to increase helmet use: a systematic review.

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Introduction: Head injuries related to bicycle use are common and can be serious. They can be prevented or reduced in severity with helmet use; however, education has resulted in modest helmet use in most developed countries. Helmet legislation has been proposed as a method to increase helmet wearing; while this social intervention is thought to be effective, no systematic review has been performed. This review evaluates the scientific evidence for helmet use following legislation to identify the effectiveness of legislative interventions to increase bicycle helmet use among all age groups. **Methods:** Comprehensive searches of the databases, the grey literature, reference lists and communication with authors was performed to identify eligible studies. Eligible studies for this review were community-based investigations including cohort studies, controlled before–after studies, interrupted time series studies, non-equivalent control group studies. Two reviewers extracted the data. Individual

and pooled odds ratios (OR) were calculated along with 95% confidence intervals (CI). **Results:** Out of 86 pre-screened articles, 25 were potentially relevant to the topic and 12 were finally included in the review. Of 12 studies, eight articles, two reports, one unpublished manuscript and one Governmental report. While the baseline rate of helmet use among these surveys varied between 4% and 59%, after legislation this range changed to 37% and 91%. While the effectiveness of bicycle helmet legislation varied (n = 12 studies; OR range: 1.2–22), all studies demonstrated higher proportions of helmet use following legislation, particularly when the law was targeted to a specific age group. **Conclusions:** Legislation increased helmet use among cyclists, particularly younger age groups and those with low pre-intervention helmet wearing proportions. These results support legislative interventions in populations without helmet legislation. **Key words:** injury, systematic review, prevention

143*

Epidemiology of bicycle injuries in 13 health divisions, Islamic Republic of Iran 2003.

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Introduction: To describe the nature and extent of bicycle injuries sustained and circumstances of patients presenting to emergency departments after bicycle collisions in thirteen health divisions in Iran. **Methods:** This study was performed using available data from a survey that was carried out in 2003. The survey was performed for periods of 3 to 6 months among 64 cities/towns in Iran. Instruments were completed by trained health workers in hospitals through: 1) interviewing patients, relatives and hospital personnel 2) extracting data from hospital records and death records from the coroner's office. The abbreviated injury scale (AIS) and injury severity score (ISS) were used to categorize severity of injury. **Results:** Altogether, 8817 persons were hospitalized and/or died due to traffic-related injuries. Bicycle casualties comprised 440 (5%) of cases; of whom 420 (95.5%) were non-fatally injured and 20 (4.5%) died. The majority of fatally and non-fatally injured cyclists were male: 19 (95%) and 417 (94.8%) respectively. Most (75%) of injured cyclists were 18 years old (median 14). The 5–19 age group had the highest incidence of cycling injuries, 67.6 person-years (p-ys). The incidence of injury among males, (84.8 p-ys), was 18 times greater than females (4.6 p-ys). Head injuries occurred in 14% of all cases and 90% of fatal cases. In a multivariate analysis, striking a moving vehicle was found to increase the risk of death by 32 times (OR: 32.3; 95% CI 3.5 to 291.0) and risk of severe injury by nearly 2 times (OR: 1.9; 95% CI 1.2 to 3.2), compared to a fall, striking a stationary object or being hit by a vehicle. **Conclusions:** Bicyclists in Iran are vulnerable to severe injury and death especially through head trauma and when striking a moving vehicle on a highway. Mortality and morbidity resulted from cycling can be prevented by some simple measures such as helmet use and specific routes and also some regulations like helmet law for bicyclists. **Key words:** injury, bicycle, epidemiology

144*

Head injuries in the rural setting: What is the role of the Canadian CT Head Guidelines?

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Introduction: The Canadian CT head rule is a valuable tool in the clinical assessment of head injuries. It risk stratifies head injured patients, identifying the ones that will require neurological intervention and the ones having clinically important brain injuries (sensitivities 100% and 98.6%, respectively). This standardized approach to head injuries may challenge the rural practitioner without access to CT scan. The Whistler Health Care Center (WHCC) is a Diagnostic and Treatment Centre that sees approximately 23,000 patients annually, many of them trauma patients with a high acuity level and no CT scanner on site. This provides a unique setting to study head injuries: we see a large number of head-injured patients with limited diagnostic tools, much like many other rural facilities in Canada. **Methods:** Retrospective chart review of all patients triaged with head injury, or trauma, to the WCHH in 2004. Canadian CT head guidelines were applied to all charts, and were risk stratified according to the guidelines. **Results:** 515 charts were reviewed, 305 of which were excluded (5 GCS < 13, 1 pregnant, 5 seizures prior to assessment, 56 no amnesia, LOC or disorientation, 38 follow-ups, 174 age < 16 yrs, 22 not seen by MD, 1 acute neurological deficit, 1 unstable vitals, 1 depressed skull fracture, 1 anticoagulant use), and 210 were included. Of the 210 included charts, 51 had CT indicated, and only 11 of these were transferred to a health care facility with CT scan available. **Conclusions:** In 2004, the WHCC saw a high number of head injuries. Of these, 9.9% would have required a CT scan if the Canadian CT head guidelines were applied. When the CT head guidelines are applied to the rural setting without diagnostic CT, all patients with high risk criteria should all be transferred. A prospective study in a similar setting is recommended to determine the management of moderate risk patients. **Key words:** injury, emergency department, decision rule

145

Protein S-100B as an emergency room blood test for head injury.

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Introduction: Protein S-100B has shown potential as an early biomarker of brain damage after head trauma. This study was performed to investigate whether determination of protein S100B in serum could 1.) predict CT scan findings after mild head injury (MHI), and 2.) predict neurological disability at 6 months. **Methods:** We included 226 patients with MHI (GCS 13-15) in this prospective study. It was conducted in centres in the UK, Norway and Switzerland. Eighty-eight patients had neurological disability assessed at 6 months in two centres (UK and Norway), using the extended Glasgow Outcome Score. The diagnostic properties of S100B measurements for prediction of intracranial injury and neurological disability were tested by receiver operated curve (ROC) analysis and with cross table analysis at different cut-off levels. We also included analysis of S100B levels normalised with regard to time between injury and sampling. **Results:** S100B levels were significantly ($p<0.001$) elevated in patients with intracranial injury (mean 0.36, 95 % C.I. 0.21–0.50 mg/L) compared to patients with normal CT scans (mean 0.18, 95 % C.I. 0.16–0.20 mg/L). S100B analysis with a cut-off level of 0.10 microgram/L detected 20 of 21 (sensitivity 0.95 95% C.I. 0.76-1.0) patients with intracranial injury, but 141 of 205 (specificity 0.31 95% C.I. 0.25-0.38) patients with no such injury also had a S100B level above this limit. ROC analysis showed a significant ($p = 0.001$) area under the curve (0.73, 95 % C.I. 0.62–0.84). S-100B level did not relate to disability (10/88 patients [11%]) GOSE <7 at six months, area under curve 0.58, 95% CI 0.32-0.83). Exclusion of cases with blood samples collected more than three hours after injury or normalisation of S100B did not improve diagnostic properties. **Conclusions:** S100B serum measurements have a potential to replace CT scanning in a minority of patients with MHI. This might be of benefit where scanning is impractical. S-100B levels did not relate to neurological outcome at 6 months in those we followed up. **Key words:** injury, biomarker, emergency department

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146*

Air bag associated pneumonitis.

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Introduction: Air bags have been used to reduce the mortality associated with motor vehicle accidents since the mid-1970s. However, these safety devices can also cause injury. Fractures, chemical burns, cardiovascular and ophthalmologic trauma, soft tissue injuries and death have been widely reported. Inhalation injuries related to the release of toxic compounds have rarely been reported. This case report focuses on the pulmonary injury sustained by an 18-year-old male involved in a high-speed motor vehicle rollover with air bag deployment. Pulmonary injury presented as significant bilateral upper-lobe densities on chest radiography and computerized tomography with clinical signs limited to modest compromise of respiratory function. Subsequent clinical and radiological evaluation supported a diagnosis of bilateral upper-lobe pneumonitis related to a toxic inhalation injury. **Methods:** Clinical case report supported by a review of the literature (Medline 1970 to current) for injuries related to air bag deployment. **Results:** The clinical scenario, patient management, results of plain radiography and computerized tomography imaging at presentation in the emergency department and the patient's follow-up pulmonary function testing are reported. Literature review supports the potential role of sodium azide, a highly toxic compound and the main constituent in air bag gas generants, as the toxin causing injury in this case. **Conclusions:** Use of air bags will continue to increase as these safety devices are more widely installed in automobiles. The potential for air bag associated injuries must be considered in any patient presenting to the emergency department following a motor vehicle accident. Inhalational injury, including chemical pneumonitis from sodium azide exposure, should be included in the differential diagnosis of patients presenting with pulmonary densities on chest radiography following deployment of an air bag. **Key words:** injury, pneumonitis, air bags

147*

Glasgow Outcome Score as a predictor of the functional independence measure in the OPALS major trauma study.

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Introduction: The Glasgow Outcome Score (GOS) measures functional outcome in major trauma patients but there are few data regarding its validity. We studied the accuracy of the GOS for predicting the more rigorous Functional Independence Measure (FIM). **Methods:** This prospective cohort substudy of the Ontario Prehospital Advanced Life Support (OPALS) Study was conducted in 17 cities and enrolled adult major trauma (ISS>12) patients. Included were survivors with both GOS and FIM assessed on hospital discharge. The GOS is a simple measure of function that ranges from 5 (good recovery) to 1 (death) and can be taken from the hospital chart. FIM evaluates functional outcome from 18 (dependent) to 126 (independent) and requires a detailed interview. Data were also collected from ambulance dispatch, EMS, and the Regional Trauma Registry. Data were compared via chi-square, Spearman's and Kappa statistics, as well as measures of validity (sensitivity and specificity) and clinical yield (positive and negative predictive value). **Results:** Of 733 eligible patients: mean age 44.2 (range 16–94), male 75.3%, blunt injury 98.5%; initial GCS < 9 28.6%; mean ISS 24.2 (SD 9.1); median FIM 102.0 (IQR 73.5–116.0); GOS scores: 1 (dead) 0%, 2 (vegetative) 3.3%, 3 (severe disability) 27.4%, 4 (moderate disability) 15.1%, 5 (good recovery) 54.2%. Median FIM scores were: GOS 2–18.0; GOS 3–57.0; GOS 4–98.0; GOS 5–114.0. High GOS was a good predictor of a higher FIM (³100): Spearman's 0.55, $p < 0.001$; Kappa 0.55, $p < 0.001$; Sensitivity 80.0%, Specificity 75.2%, PPV 78.6%, NPV 75.2%. Lower GOS was a good predictor of lower FIM (<100): Spearman's –0.56, $p < 0.001$; Kappa –0.50, $p < 0.001$; Sensitivity 58.3%, Specificity 91.4%; PPV 88.9%, NPV 91.4%. **Conclusions:** This is the first study to compare the use of GOS and FIM scoring systems among major trauma patients. The GOS appears to be a simple and accurate predictor of functional outcome at discharge and may be used as both a clinical and a research tool for major trauma patients. **Key words:** injury, advanced life support, clinical scores

148*

Spine injuries in mountain bikers: the Vancouver experience.

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Introduction: Mountain biking (MB) is a popular sport with a high risk of traumatic injury. We reviewed MB related spinal injuries in three trauma centres over a 10 year period. **Methods:** Three Vancouver area trauma centers serve a MB 'Mecca' which caters to 56,000 riders/yr. Trauma and Spine Registries for these hospitals were reviewed from 01/01/1994 till 31/12/2004. Patients qualified for the registries if (1) they presented within 7 days of injury, and (2) were admitted for 3 or more days and/or had an injury severity score (ISS) >12 and/or expired in hospital. We electronically searched these registries to identify MBs with spinal injuries and then reviewed their medical records. **Results:** During the study period 1037 injured cyclists were captured in the Trauma or Spine registries. Of these we identified 399 (38.4%; 95% CI = 35.5%–41.5%) MBs, of whom 52 (13.0%; 95% CI = 9.9%–16.7%) sustained spinal injuries. The MBs with spinal injuries were male (48/52 = 92.3%; 95% C I= 81.4%–97.9%) with an av age of 33 yrs (range 14–51, median 30, stnd dev 11.9). Most (36/52 = 69.2%; 95% CI=54.9%–81.3%) used a helmet, but 5/52 (9.6%; 95% CI = 3.2%–21.0%) did not. Helmet use was not reported on in 11 (21.7%). The most common mechanism was a fall over the handlebars in 29/52 (55.8%; 95% CI = 41.3%–69.5%). Severe spinal injuries were common: 37/52 (71.2%; 95% CI = 56.9%–82.9%) required operative treatment and 28/52 (53.8%; 95% CI = 39.5%–67.8%) had a neurological deficit on discharge. The av LOS was 17 days. Discharge dispositions were: home 32/52 (61.5%; 95% CI = 47.0%–74.7%), rehab 15/52 (28.9%; 95% CI = 17.1%–43.1%), acute care facility 4/52 (7.7%; 95% CI = 2.1%–18.5%) and against advice 1/52 (1.9%; 95% CI = 0.1%–1.0%) **Conclusions:** Mountain biking is a growing cause of serious spinal injuries often resulting in permanent disability. Young males are principally at risk. The universal use of protective equipment and appropriate training should be mandatory. In response to our research, MB injury prevention programs including a public service announcement were initiated. **Key words:** injury, biking, emergency department

149*

Impact of a Canadian regional trauma program on patient outcomes: a ten-year retrospective.

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Introduction: Regionalization of trauma centres has been shown to improve patient outcomes. Over the past ten years, the Hamilton Health Sciences General Hospital site has developed and maturated a regional trauma program. The objective of this paper is to deter-

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mine the effect of the trauma program on patient outcomes over the ten-year period. **Methods:** We conducted a retrospective cohort study comparing the first two years of complete data (1995/1996 n = 831) with the most recent two years of complete data (2003/2004 n = 975) using the Hamilton General Hospital trauma database for all admitted adult trauma patients with an ISS greater than 13. Both demographic and outcome variables were analysed. Outcome variables included in-hospital mortality, number of vented patients, and hospital length of stay. Continuous variables were compared using Student's t-test and categorical data using chi-square. **Results:** Initial analysis demonstrates that in-hospital mortality was similar between 1995/96 (15.9% 95% CI 10.5–21.3) and 2003/2004 (15.3% 95% CI 10.0–21.6). However, there were significant differences between the two time periods with respect to patient age, injury severity scores, and hospital length of stay. In 95/96, the mean age was 45.5 (95% CI 44.0–47.0) compared with 50.0 (95% CI 48.7–51.4) in 03/04. Mean ISS scores decreased from 24.4 (95% CI 23.8–25.1) to 22.7 (95% CI 22.1–23.29) respectively. Mean length of stay was significantly shorter in patients discharged alive in 03/04 (18.1 days 95% CI 16.4–19.9) compared to those in 95/96 (23.6 days 95% CI 21.7–25.5). **Conclusions:** Since the introduction of the regional Hamilton trauma program, there has been a trend towards increasing number of patients, increasing age of patients, and decreasing acuity. There has been no interval change in mortality. Further evaluative research is needed to determine patient, program, and regional factors that are implicated in this trend. **Key words:** trauma, patient outcomes, mortality

150*

A comparison of survival probabilities according to the transfer status of trauma victims.

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Introduction: Little is known about the injury profiles of patients transferred from a lower to a higher level of care hospital compared to patients that are not transferred. We've compared injury profiles and survival probabilities of transferred and non transferred adult trauma victims in a regionalized system including four levels of care. **Methods:** The Quebec Trauma Registry contains data observations from all 58 designated trauma centres of four levels of care in the province. Between 1998 and 2005, 36,118 adults (i.e. age > 16) trauma patients were transported to these centres. Of these 9,281 (25.7%) were transferred to a higher level of care. Deaths on arrival and those occurring less than two hours after arrival at the initial hospital were excluded as they were considered unfit to transfer. Multiple logistic regression was used to compare the mortality according to transfer status and level of trauma care, while adjusting for cofounding factors. **Results:** Comparison of adjusted mortality of patients transported directly to a trauma centre and not transferred revealed increasing mortality for decreasing expertise, as expected (Odds Ratios (OR) of 1.00, 1.08, 1.23 and 1.41 for levels I to IV, respectively). However, adjusted mortality of patients transferred to a level I centre was lower than that of patients sent directly to a level 1 trauma center: OR = 0.74, 0.84, 0.907, 0.48 if transferred from a non-designated, level IV, level III and level II centre compared to 1.0 for direct transport to level I centre, respectively. Adding a transfer factor to the regression analysis model also revealed a protective effect of being transferred compared to direct transport (OR = 0.86, 95% Confidence Interval = 0.76–0.97). **Conclusions:** Lower mortality for patients transferred to a level I centre over patients arriving directly may indicates the presence of selection bias. Our results suggest that the results of studies evaluating the benefits of transferring trauma patients to higher levels of care could be misleading. **Key words:** trauma, regionalization, mortality

151*

Evaluation of etomidate's effect on adrenal gland secretion of cortisol in intubated traumatic brain injury victims (EVAST): a prospective cohort study.

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Introduction: Etomidate is one of the most used induction agents for intubating head trauma patients. Therefore, it is important to evaluate the consequences of any adrenal suppression that could result from the use of this agent. The primary objective of this study is to determine the effect of etomidate on adrenal cortisol production and the length of adrenal suppression (AS) after its use in intubated head trauma patients. **Methods:** This study is a prospective cohort study. The eligible patients were all intubated moderate to severe head trauma patients admitted to a neurosurgical reference centre (Enfant-Jesus Hospital, Quebec City, Canada) between 2003 and 2004. Three ACTH stimulation tests (250 mcg) were performed 24, 48 and 168 hours after intubation. Patients having received etomidate and those not having received it were compared on the basis of their responses to these three ACTH stimulation tests. Adrenal suppression was assessed by comparing cortisol levels at baseline, 30 and 60 minutes after the ACTH stimulation test. Linear and logistic regression models were applied to adjust for confounding variables. **Results:** This study included 40 patients. Fifteen patients received etomidate and 25 received other induction agents. At 24 hours after intubation, the patients having received etomidate presented a blunted response to the ACTH stimulation test. Etomidate decreased the response to ACTH significantly by 145,8 nmol/l (95 CI: 83,4–208,2) (p = 0,02). After adjustment for confounding variables (age and Injury Severity Score) this decrease in response persisted to be significant: 134,3 nmol/l (95 CI: 70,1–198,5) (p = 0,04). At 48 and 168 hours, there was no statistically significant difference in responses to the ACTH tests in both groups. **Conclusions:** Etomidate decreases the response to ACTH stimulation tests up to 24 hours after a single dose used in the Emergency department for intubating traumatic brain injury victims. **Key words:** cortisol, trauma, intubation

152

New Method for review patients in easy and fast way named "Mmexico"

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Actually in emergency room everybody review the patient accord with his medical knowledge and depend if the patient are traumatic or not, however "Time is life" one method is the soap, but is very subjective. We propose the pneumonic name "Mmexico" because is easy and fast for evaluate patient in emergency room, the signs and symptoms contribute to make the diagnosis and suggest what image and laboratory test could be helpful to do the diagnosis, and suggest the treatment decision-making and guides therapy according to the acute pathology, injury severity and predicted outcome. The development of this system helps to correctly identify the appropriate levels of care for patients with an medical emergency or trauma requires more attention. An effective patient index selection which is easy to use and quickly identifies at risk of death and those with severe injuries has a high values. A correct categorization of patients using resources in the emergency room results in the early recognition of injuries, determination of what is an adequate treatment, and a decrease morbidity and mortality, if we make the correct use of the resources.

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153

A proposed conceptual model of cervical collar combined with shoulder and cheek fixation and its implications on cervical immobilization.

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Introduction: We hypothesize that the increased fixation of the region of immobilization by the cervical collar would restrict motion of the cervical spine better than traditional design. A conceptual cervical collar model which extends the fixation to cheek and shoulder was developed and the effect of cervical immobilization was evaluated. **Methods:** The traditional cervical collar was transformed into a model with cheek and shoulder fixations using tenacious foam and Velcro. Study participants were 20 volunteers, ten female and ten male, aged 20 to 28 years. Cervical range of motion (ROM) was tested in 6 directions (maximum amount of flexion, extension, right and left lateral bending, right and left axial rotation) using a cervical range of motion instrument (CROM). After measuring participants' unrestricted ROM, a 1-piece rigid cervical collar and a conceptual device prototype were placed for measurements. Each movement was repeated 3 times and the average of the 3 measurements calculated. Data were analyzed with paired t-tests and presented as mean ± SD. **Results:** Measured ROM (in degree) restricted (no collar - after collar placement) between traditional and new devices were: flexion 41.40±8.71 vs. 45.32±9.89, $p<0.05$; extension 54.26±8.57 vs. 61.86±9.79, $p<0.05$; right-lateral bending 30.16±5.76 vs. 37.06±6.31, $p<0.05$; left-lateral bending 32.93±5.85 vs. 40.04±6.58, $p<0.05$; right-rotation 53.62±0.38 vs. 61.33±9.60, $p<0.05$; and left-rotation 52.67±7.77 vs. 59.26±8.52, $p<0.05$. **Conclusions:** Our data suggests the effectiveness of this conceptual cervical collar model, which extends the fixation to cheek and shoulder, restricted cervical spine movement significantly more than the traditional collar as measured by. **Key words:** trauma, cervical collar

PEDIATRIC TRACK

154

"Fever phobia" in the emergency department.

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Introduction: Fever is one of the most common reasons for parents to bring their children to an emergency department. Several investigators have described caregiver unrealistic fears of fever in office and clinic setting. We wished to investigate caregivers' attitudes towards fever in an emergency department setting. **Methods:** A 25-item questionnaire was formulated, based on similar previous published surveys, for administration to a convenience sample of caregivers. It was administered by a medical translator after triage and prior to assessment by a physician. Most items were multiple choice questions, a few open-ended. **Results:** Three hundred questionnaires were administered to caregivers and 264 were analyzed. A high proportion (82%) of caregivers perceived to be "very worried" about fever. Temperatures which were felt to require treatment were relatively low (one third treating <37.9 ºC), but many respondents measure axillary body temperature. Similar to previously published studies, the main concerns were with possible CNS damage (24%), seizures (19%), and death (5%), although worries about discomfort and signs of serious illness were also expressed by respondents (11%). Similar to older surveys, home treatment of fever was worrisome with frequent administration of acetaminophen. **Conclusions:** We found high levels of anxiety among caregivers presenting to a hospital emergency department with a complaint of fever in a child. Many caregivers appear to confuse effects of fever with the harmful effects of hyperthermia. Aggressive and potentially dangerous home therapy and monitoring of fever is common among caregivers surveyed. **Key words:** children, fever, parents

155*

Performing procedures in emergency departments, a national survey of Canadian paediatric emergency.

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Introduction: An important part of Paediatic Emergency Medicine training is becoming comfortable and expert with common procedures performed in the Paediatric Emergency Department. There is little documentation on how frequently this occurs and to what extent trainees become comfortable with these procedures during fellowship. **Methods:** A survey was developed by the authors and pretested among 5 paediatric emergency staff at Children's Hospital of Western Ontario. The survey was then modified and mailed out to all Canadian fellows in Paediatric Emergency Medicine using a modified Dillman technique. Data was analyzed using the Mann–Whitney test for continuous variables, and the chi-squared test or Fisher's exact test for proportions. Analysis included comparison between first and second year fellows. **Results:** 32 questionnaires were returned giving a response rate of 70%. Among the 23 procedures assessed, the ones most commonly mastered were endotracheal intubation, removal of airway foreign bodies, intravenous access, orthopaedic procedures, and complex laceration repair. Procedures taught but not commonly performed included pericardiocentesis and surgical airway skills. There were significant differences between first and second year fellows in regard to comfort with using adjuvant airway devices ($p = 0.01$). **Conclusions:** At the end of their second year of training it is highly likely that fellows in Paediatric Emergency Medicine will have mastered basic airway skills, vascular access techniques, orthopaedic and simple plastic surgery procedures. Other procedures which are not commonly performed in emergency are demonstrated and evaluated during the fellowship. **Key words:** children, sedation, survey

156

"Virtual" streaming and emergency nurse practitioners in a paediatric emergency department.

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Introduction: Streaming of patients into separate flows based on their treatment needs, is thought to improve patient throughput in emergency departments. The processes involved have not been studied in paediatric emergency medicine. We sought to determine whether streaming, supported by an emergency nurse practitioner service, and is viable in a paediatric emergency department. **Methods:** Patients attending an inner city paediatric emergency department were prospectively allocated a streaming category, in addition to normal triage. This was compared with a retrospective definitive category. A random sample of notes was examined to assess what proportion of minors patients could be assessed and managed by emergency nurse practitioners. **Results:** There was no seasonal variation in case mix as defined by streaming category. Assigning a streaming category at triage was more useful for streaming than using triage categories, because triage categories 2 and 3 were inaccurate at predicting streams. ENPs judged themselves able to assess and manage an average of 76% of 'minor patients' during the summer, and 70% during the winter, representing 50% and 44% of all

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patients respectively. **Conclusions:** Streaming is viable in a paediatric emergency department. Triage using the Manchester Triage Scale is not suitable for streaming, and a new tool is required. We describe a potentially useful tool. The majority of patients presenting to paediatric emergency departments could be streamed to a minor injury and illness area, where there would be a role for dedicated minor illness and injury ENPs in delivering patient care. **Key words:** nurse practitioners, pediatric, emergency department

157*

Does this child have acute meningitis? A systematic review.

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Introduction: Early recognition of meningitis is imperative for expedient initiation of appropriate therapy and investigations. Our objective was to systematically review the literature to assess the accuracy of common physical exam signs and symptoms in children with suspected meningitis. **Methods:** A search of the literature was conducted using MEDLINE, EMBASE, CINAHL, Web of Science, Pubmed, the Cochrane Library, Google Scholar, selected review articles, textbooks and primary authors. Prospective and retrospective case–control cohort studies were included if they described signs and symptoms in objectively confirmed bacterial, viral or other form of meningitis in children. The diagnostic gold standard for meningitis was laboratory analysis of cerebrospinal fluid. Two authors independently assessed study inclusion, quality rating and data extraction. Data analysis consisted of calculation of likelihood ratios (LRs), sensitivities and specificities for each individual sign or symptom. **Results:** The search yielded 12,685 references which were screened for relevance by title and abstract. Of these, 906 articles were obtained for close review. Twelve articles (9 prospective), published between 1986 and 2001 and containing 5,433 study subjects (3,910 Africans, 549 Europeans, 642 Papua New Guineans and 332 Americans), met inclusion criteria. Ages ranged from 1 day 17 years. Most children presented to pediatric emergency departments with signs or symptoms attributable to meningitis. Data for 39 signs and 21 symptoms were found. Three items had LRs above 20: appears sick (LR 295; 95% CI, 132–661), cyanosis (LR 50; 95% CI, 3–850) and high tone (LR 21.5; 95% CI, 15–30). Thirteen items had LRs between 5 and 20 while only 4 signs had LRs less than 1: simple seizures, chest indrawing, fever and enlarged node. **Conclusions:** Many useful examination signs and symptoms exist to aid in the diagnosis of acute meningitis in children. Varying descriptions of the same phenomena across studies make combination of data for useful interpretation challenging. **Key words:** children, meningitis, systematic-review

158*

Childhood fractures appear to be heritable: a genetic epidemiology study.

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Introduction: Childhood fractures are common, a significant cause of morbidity and are costly to society. The importance of genetic factors in childhood fractures have not yet been evaluated. The objective of this study was to determine if a familial tendency to fracture exists and to assess the relative role of environmental factors in determination of fracture risk. **Methods:** Healthy children presenting to the pediatric emergency department with fracture as well as fracture-free controls were consecutively enrolled in this case control study. Participants and both parents were asked to complete a questionnaire about their medical and fracture history including information relevant to risk factors for fracture. **Results:** Data was obtained from 79 cases (mean age 8.5 years) and 71 controls (mean age 9.1 years). Boys made up 63% of the fracture group and 52% of the control group. Of the cases, 74/158 (46.8%) parents (30 mothers and 43 fathers) had sustained fractures as compared to 44/142 (31.0%) parents (16 mothers and 28 fathers) in the control group; $p = 0.007$. Thus children with fractures were much more likely to have parental history of fracture. If a childs mother had fractured the OR (Odds Ratio) for fracture for that child was 2.1 (95% CI 1.026, 4.318); $p = 0.0356$. If a childs father had fractured the OR for fracture for that child was 1.8 (95% CI 0.958, 3.514); $p = 0.459$. If both parents had sustained a fracture the OR for fracture for that child was 3.0 (95% CI 1.1, 8.023); p= 0.0203. T-test and regression analysis revealed that cases and controls did not differ with respect to potential environmental influences on fracture risk such as dietary factors and levels of activity. **Conclusions:** Childhood fractures appear to be heritable, a feature which is independent of the environmental risk factors for fracture. This study provides important evidence supporting the need to further investigate the genetic basis of common childhood fractures. **Key words:** children, injury, epidemiology

159*

Use of single-dose activated charcoal among emergency physicians in the pediatric emergency department.

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Introduction: Gastric decontamination with single-dose activated charcoal (SDAC) is a mainstay in emergency department (ED) treatment of ingestions. Guidelines published in 2005 encourage practitioners to use SDAC only in toxic ingestions presenting within one hour. Despite these guidelines, adult studies demonstrate a significant lack of consensus. This study examined the proposed use of SDAC for gastric decontamination in common pediatric ingestion scenarios by emergency physicians working in Canadian pediatric EDs. **Methods:** A standardized survey consisting of 5 clinical scenarios was mailed to all physicians with a primary clinical appointment to the ED at 9 Canadian children's hospitals. **Results:** One hundred and thirty-one physicians were surveyed and 95 (72%) responded. The majority of respondents were pediatricians (68.1%) with a mean of 15.0 years of experience (SD 6.8 years). Of those surveyed, 91 (97.8%) would use SDAC for a toxic ingestion presenting in less than 1 hour, 35 (36.8%) would use SDAC for a toxic ingestion presenting after 3 hours, 61 (64.9%) would use SDAC for a non-toxic exploratory ingestion presenting in less than 1 hour and 29 (30.5%) would use SDAC for a non-toxic mixed ingestion presenting at an unknown time. Eleven (11.7%) would use SDAC for an ingestion of a substance that does not adsorb to SDAC. **Conclusions:** There is variation in the use of SDAC among emergency physicians working in Canadian pediatric emergency departments. This variation suggests that optimal management is not clear and that continued education and research are required. **Key words:** children, activated charcoal, survey

160*

Rapid IV rehydration using dextrose in children with gastroenteritis who have failed oral rehydration.

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Introduction: Gastroenteritis is a common pediatric problem presenting to the Emergency Department. Oral rehydration therapy (ORT) is sometimes unsuccessful in patients who have persistent vomiting or are unable to meet minimum ORT. These non-respond-

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ing patients may benefit from the addition of IV dextrose to a rapid intravenous rehydration (RIR) protocol. **Methods:** Eligible children, aged 1 to 6 years with acute viral gastroenteritis who were mild to moderately dehydrated and had failed standard ORT, were randomized to 3 hrs of RIR with 5% dextrose/0.45% normal saline (D5W.45NS), RIR with 0.9% normal saline (NS), or ORT. Study personnel and parents were blinded to the treatment. IV fluids were given to all patients, with RIR groups receiving 10 mL/kg/hr and the ORT group receiving 10 mL/hr (minimum to keep vein open). Primary outcome was positive fluid balance and improved clinical signs of dehydration. Other outcomes included change in serum chemistry, length of stay, admission rates, duration of illness, return for medical attention and time to return of normal fluid intake and activity level. Telephone follow-up occurred at 24 and 72 hours. **Results:** 84 patients were enrolled: 32 received D5W.45NS, 24 NS and 28 ORT. Study groups were similar at baseline. There was no difference between groups for the primary outcome with all patients having improved fluid balance and/or clinical signs of dehydration. Length of stay was shorter in the D5W.45NS group, although not statistically significant. There were no significant differences in admission rates, serum chemistry, return for medical attention, duration of illness, and time to return of normal fluid intake. No patient became hyponatremic. Time to return of normal activity was slightly better in the D5W.45NS group, although not statistically significant. **Conclusions:** In this pilot study, RIR using a dextrose solution appeared to be as safe, although not more efficacious, than standard RIR and ORT in treating mild to moderate dehydration in children with gastroenteritis. **Key words:** children, gastroenteritis, rehydration

161*

Do trainees prolong the length of stay in the pediatric emergency department?

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Introduction: Trainees are part of any academic emergency department (ED). Reviewing a patient might prolong the patient length of stay (LOS) resulting in increased cost and dissatisfaction. The aim of this study was to determine if children seen first by a trainee compared to children seen immediately by a Faculty member have a longer LOS and more lab tests, imaging studies, consultations and admissions. **Methods:** A retrospective chart review in a large pediatric academic center, with 24/7 coverage by PEM-trained Faculty in Toronto, Canada. We randomly chose 14 days during two months of the academic year 2004–5. We collected information on age, acuity, time of arrival, MD-time, and disposition, lab tests (blood work, urinalysis), imaging (x-ray, CT scan, ultrasound), consultations with sub-specialists and disposition. We excluded children seen directly by a sub-specialty service and those left without being seen (LWBS). We conducted a univariate analysis and a logistic regression analysis to compare patients seen first by a trainee to those seen only by a Faculty member. **Results:** During the study period, 785 (43%) and 1023 (57%) were seen first by a faculty and by a trainee, respectively. Trainees examined younger children ($p = 0.016$) with a higher acuity ($p < 0.0005$). The LOS of children seen first by trainees was 51 minutes longer than those seen first by faculty ($p < 0.0005$). The probability of ordering blood tests, urine tests and a consultation, as well as admission to the hospital was significantly larger if a patient was seen first by a trainee ($p < .0000$ to $p = 0.0475$). There was no significant difference in ordering imaging tests. **Conclusions:** patients seen first by a trainee have a significantly longer LOS and the probability of ordering blood and urine tests, requesting a consult from a sub-specialist and admitting a patient is greater. **Key words:** children, trainees, length of stay

162*

Outpatient management of non-facial cellulitis in children in a pediatric emergency department.

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Introduction: To evaluate antibiotic choice, route of administration, time spent in the emergency department and outcomes of children treated as outpatients with non-facial cellulitis at a tertiary care center. **Methods:** Medical records of all children presenting with cellulitis over a three year period (January 01, 2000 – December 31, 2002) were reviewed. The practice of using twice daily cefazolin with probenecid was introduced over this time period. Charts selected for review were those with patients who were otherwise healthy, age 1–16 years old, and who had a discharge diagnosis of non-facial cellulitis by the emergency physician. **Results:** 269 charts met the inclusion criteria and were selected for review. The oral antibiotic most often prescribed was cephalexin (105). The intravenous antibiotic most often prescribed was cefazolin (124). In the intravenous group, 39 received cefazolin alone and 85 received cefazolin and probenecid. Table 1 summarizes the pertinent data. The cefazolin only group had a treatment failure and admission rate of 30.8%, where the cefazolin and probenecid group had a rate of only 8.2%. **Conclusions:** Non-facial cellulitis is most commonly treated using first generation cephalosporins. Patients treated with oral antibiotics had the least number of visits, time spent in the emergency department, treatment failures and admissions to hospital. Twice daily cefazolin and probenecid was associated with less treatment failures and admissions than cefazolin alone, and may be an equal or better alternative intravenous therapy plan for children with non-facial cellulitis. **Key words:** children, cellulitis, antibiotics

Table 1, Abstract 162. Summary of pertinent data

Route of administration, no. of patients	No. of ED visits	Time in ED (min)	Treatment failures (%)	Admissions to hospital (%)
IV, 152	3.4 (2.78)	521.1 (287.05)	21 (13.8)	20 (13.2)
PO, 112	1.4 (0.98)	164.2 (138.8)	10 (8.9)	3 (2.7)

163

Sonography of the hip-joint by the emergency physician (SHEP): It's role in the evaluation of children presenting with acute limp.

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Introduction: Our objective was to describe a new imaging bedside test called SHEP (Sonography of the Hip-joint by the Emergency Physician), and to examine its use as a triage tool for the presence of fluid in the hip-joint and guide the Emergency Physician to the right diagnosis. **Methods:** Case series of five children presented to the ED with an acute onset of limp. In addition to a careful clinical history and physical examination each child had a Sonography testing of the Hip-joint by the Emergency Physician (SHEP). **Results:** Follow-up confirmed that the presumptive diagnosis made in the ED was correct. SHEP test was found helpful in di-

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agnosing Transient Synovitis (three cases), Septic arthritis (one case) and Osteomyelitis of the femur (one case). **Conclusions:** SHEP tests provided additional information that narrowed the differential diagnosis, and minimized unnecessary blood tests and diagnostic imaging studies. **Key words:** children, ultrasonography, arthritis

164*

Tasty treats: a palatability study of dexamethasone liquid verses prednisolone liquid in children with asthma in the pediatric emergency department.

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Introduction: Palatability is a critical factor in medication compliance particularly in children where the acceptability of a liquid medication and hence its ease of administration will be greatly affected by its taste. Studies assessing the palatability of steroids in children are limited. The purpose of this study was to determine which, if any of two steroid preparations, oral dexamethasone (DEX) and oral-prednisolone (PRED), was most palatable to children requiring steroid treatment for asthma. **Methods:** A single-blind taste test of 2 different steroid suspensions, liquid prednisolone (1mg/ml) verses liquid dexamethasone (1mg/ml) was conducted in children presenting to the Pediatric Emergency Department with an exacerbation of asthma. After obtaining informed consent children received 2.5mls of either PRED or DEX, then were asked to score their impression of taste on a 10 cm Visual Analogue Scale (VAS). After cleansing of the palate they were given the other steroid and scored its taste on a VAS. **Results:** Forty children (58% male) were enrolled in the study. The mean age was 7 years with a range of 5 to 12 yrs. The mean VAS measurement for DEX was 6.7 cm (SD = 3.8 cm) whilst the mean VAS measurement for PRED was 5.3 cm (SD = 3.7 cm). This difference was not statistically significant ($p = 0.09$, paired samples t-test). The order in which the steroids were tasted did not have a significant impact on the scores. Males were much more likely to prefer the taste of DEX than females (mean score 8.0 cm vs 5.2 cm),(independent samples t test, $p = 0.03$). There was no gender preference for PRED. **Conclusions:** There was no statistically significant difference between the taste of DEX and PRED although there was a strong trend towards Dexamethasone as the preferred steroid among all pediatric patients with asthma. There was a significant difference between genders with males much more likely to prefer the taste of DEX when compared to females however there was no difference between gender with regards to the taste of PRED. **Key words:** children, steroids, asthma

165*

Prospective validation of the Pediatric Appendicitis Score (PAS).

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Introduction: Appendicitis can be a difficult diagnosis in children. Clinical scores attempt to improve diagnostic accuracy but most are not unique to pediatrics and have not been consistently validated. The PAS performed well in the derivation study, but was administered by surgeons in a referred population. We aim to validate the PAS in a non-referred population by non-surgeons. **Methods:** A convenience sample of children, 4–18 yrs old, presenting to a pediatric ER with <72 hrs of abdominal pain and in whom a diagnosis of appendicitis was considered was prospectively evaluated. PAS components were collected by the treating physician who was blind to the scoring system. Interobserver assessment was completed when possible. Appendicitis was defined as appendectomy with positive histology. At 1 month, discharged patients were contacted to verify final outcome. Sensitivity, specificity and NPV of the score were calculated. Overall performance was assessed by the receiver operating characteristic (ROC) curve. **Results:** 246 children were enrolled from Nov 2003–Jul 2005. 84(34%) had pathology proven appendicitis. Mean PAS in children with and without appendicitis was 7.3 (SD 1.2) and 3.3 (SD 1.5) respectively ($p < 0.0001$). There was no difference in mean age, duration of symptoms or sex between groups. If a PAS of <5 was used to discharge patients without further investigation, 2 (2.4%) patients with appendicitis would have been discharged. At this cut point, the sensitivity was 97.6%, specificity 52.1% and NPV 97.7%. If a PAS of >7 determined need for appendectomy, 8 (4.9%) children would have undergone a negative appendectomy. At this point, the sensitivity was 54% and specificity 95%. The area under the ROC curve was 0.90. PAS interobserver scores were completed in 14.6% of patients. 94% of scores correlated within 2 points. **Conclusions:** The PAS is a useful tool in the evaluation of appendicitis. Scores <5 help rule out appendicitis while scores >7 help predict appendicitis. Patients with PAS 5–7 may need further radiological evaluation. **Key words:** children, appendicitis, score

166*

Abdominal CT scan in pediatric blunt abdominal trauma: the Hospital for Sick Children experience.

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Introduction: This study was performed to investigate the utility of abdominal CT imaging in pediatric trauma patients at Canada's largest tertiary care pediatric hospital. **Methods:** Retrospective review of The Hospital for Sick Children's internal trauma registry for all consecutive trauma team activations during which patients underwent an abdominal CT scan between April 1, 1998 and March 31, 2001. **Results:** A total of 560 trauma team activations occurred during this 3 year period. Three hundred and twelve children (55.7%) underwent evaluation with abdominal CT and had a mean ISS of 14. The CT scan was reported as normal in 167 (54%) of patients. On the 145 abnormal CT scans performed, intra-abdominal free fluid was the most common finding present on 115 (79.3%). Only 82/145 (57.6%) patients had a definite intra-abdominal injury documented on CT scan. Abdominal surgery was performed on 17/312 (5.4%) of all patients that underwent abdominal imaging. **Conclusions:** Over half of the abdominal CT scans performed on pediatric trauma patients at our institution were normal and another 23% of the CT scans did not contribute to the patient's final diagnosis. A better method of selecting patients for abdominal CT scan could decrease patient's radiation exposure as well as the overall costs to the health care system. **Key words:** Abdominal trauma, computerized tomography, children

167*

Pediatric blunt abdominal trauma: What are the injuries and who needs an operation?

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Introduction: The purpose of this study was to quantify the intra-abdominal injuries suffered by children with blunt trauma and to identify the types of injuries that require surgical intervention. **Methods:** Retrospective review of The Hospital for Sick Children's internal trauma registry for all consecutive trauma team activations during which patients underwent an abdominal CT scan between April 1, 1998 and March 31, 2001. **Results:** A total of 560 trauma

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team activations occurred during this 3 year period. Three hundred and twelve children (55.7%) underwent evaluation with abdominal CT. An intra-abdominal injury was documented in 82/312 (26.3%) patients. The incidence of damage to specific organs was as follows: 32 spleen, 31 liver, 14 bowel or mesentery, 16 renal or adrenal, 5 pancreas and 3 bladder injuries. A total of 17/312 (5.4%) of all patients that underwent abdominal CT scan required surgical intervention for their injuries. All 17 patients requiring surgery had an abnormal abdominal examination as well as suspicious radiologic findings on CT scan. Ten of the patients had operations on their bowel. The liver was operated on twice, the spleen once and the bladder twice. Three of the exploratory laparotomies performed were normal. **Conclusions:** The incidence of abdominal surgery for pediatric blunt abdominal trauma at our institution is 5.4% of all abdominal CT scans performed. Most of the procedures performed (59%) involved the bowel. Injuries to the liver and spleen were the most prevalent but rarely required surgical intervention. **Key words:** Abdominal trauma, surgery, children

168*

External validation and modification of a pediatric trauma triage tool.

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Introduction: Simon et al developed a simple secondary triage tool (mPTS) based on physiologic parameters and physical findings to identify pediatric trauma patients who had a low likelihood of serious injury. Such patients could be treated in the Emergency Room without full trauma activation. Our purpose was to apply the mPTS to the trauma population at Sick Kids. **Methods:** A retrospective cohort study of all trauma team activations at Sick Kids (1999–2002), excluding penetrating trauma and burns. Patients were stratified into high (ISS 12) and low-risk (ISS < 12) groups. The mPTS evaluates airway integrity, open wounds, neurological status, hemodynamics and skeletal integrity and applies a score of 1 point to each criterion. A score of 5 implies a low risk injury. **Results:** There were 628 trauma patients (382 males, mean age of 8 ± 3.8). The mPTS had a sensitivity of 92% and PPV of 47% when applied to our population. The mPTS missed 21 patients with significant injuries, many were intraabdominal. We modified the mPTS to include contusions to head &/or torso and a history of loss of consciousness and a 7 point score was developed. After modification the sensitivity was 0.99, specificity 0.21 and PPV of 0.46 with a 20% reduction in unnecessary trauma team activations. **Conclusions:** The original mPTS by Simon et al was not sensitive enough to be used as a reliable triage-screening tool for our population. The Sick Kids modification to the score improved the sensitivity to 99%. The PPV of 46% indicates that a safe level of over triage is maintained. The Sick Kids mPTS appears to reliably identify a subset of trauma patients at low-risk for serious injury, where full trauma team activation could be deferred. The Sick Kids mPTS remains easy to apply at the time of triage and would have reduced trauma team activation by 20%. **Key words:** trauma, triage, children

169*

Barriers to metered-dose inhaler/spacer (MDI+S) use in Canadian pediatric emergency departments (PEDs).

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Introduction: MDI+S are at least as effective as nebulizers (NEBS) for delivering beta-2-agonists to children with mild to moderate asthma exacerbations in the ED. They result in a shorter ED stay, fewer side effects and are preferred by parents. However the uptake of MDI+S in Canadian EDs appears to be slow. We aim:1) to describe current practice and beliefs with respect to MDI+S use in Canadian PEDs, and 2) to identify barriers to MDI+S use as perceived by pediatric emergency physicians (EP) and nurses (EN). **Methods:** We conducted a cross-sectional, mail survey of all pediatric EPs and a random sample of ENs at 10 Canadian PEDs. A modified version of Dillman s Survey Method was used. A descriptive analysis was performed. **Results:** 262 of 315 (84%) responded including 126 of 144 (88%) EPs and 136 of 171 (80%) ENs. Currently 21% of EPs use MDI+S to treat asthma in the ED. Most respondents believe MDI+S are at least as effective as NEBS (EPs 86%; ENs 60%), and that there is enough research evidence to justify switching to MDI+S (EPs 87%; ENs 60%). They also believe they have the knowledge and skills to use MDI+S in the ED (EPs 93% ENs 92%) and that compared with NEBS parents will find MDI+S both easier to deliver (EP 81%: EN 83%), and resulting in equal or better patient outcomes (EP 92%; EN 74%). The most important barriers to MDI+S use are: 1) For EPs: safety and feasibility of reusing spacers (78%), cost to ED (70%) and lack of an MD champion to affect change (54%); 2) For ENs: safety and feasibility of reusing spacers (81%), MDs who do not believe MDI+S are effective (78%) and parental expectations to be treated with NEBS (73%). Overall, 57% of EPs and 70% of ENs feel it is difficult to change practice in their ED. **Conclusions:** MDI+S are infrequently used to treat acute asthma in Canadian PEDs despite the fact that both EPs and ENs believe they are effective. Important barriers to using MDI+S are different for EPs and ENs, and should inform any future implementation strategy. **Key words:** asthma, metered-dose-inhaler, children

170*

Interobserver agreement in the assessment of children with minor head injury.

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Introduction: We aimed to determine the interobserver agreement in the MD assessment of clinical findings in children with minor head injury. This methodological sub-study was an important component in the derivation of a clinical decision rule for the Canadian Assessment of Tomography for Childhood Head Injury (CATCH) Study. **Methods:** This prospective cohort study was conducted in 9 Canadian pediatric teaching hospital EDs and involved children (0–16 years) with documented loss of consciousness, amnesia, disorientation, persistent vomiting (2 times) or irritability (children < 2) and a GCS score of 13–15. MDs evaluated patients for 28 standardized clinical findings before imaging and performed blinded inter-observer assessments when feasible. Analyses included the simple or weighted kappa coefficient with 95% CIs. **Results:** 640 assessments were conducted on 320 patients who were similar to the study population in mean age, sex, mechanism of injury, admission rate and brain injury on CT. Table 1 shows kappa values for clinical findings. **Conclusions:** "Pallor" had poor agreement. Findings with moderate agreement were "possible depressed skull fracture", "lethargy", "headache" and "disorientation". Substantial agreement was found for most elements of the CATCH Rule, suggesting that physicians should be able to consistently interpret the overall rule. This reliability will be explicitly and prospectively evaluated in ongoing studies. **Key words:** trauma, head-injury, children

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Table 1, Abstract 170. Kappa values for clinical findings

Clinical finding	Kappa	95% CI
Loss of consciousness	0.65	0.56, 0.73
Disorientation	0.58	0.50, 0.66
Any amnesia	0.83	0.73, 0.94
Irritability	0.69	0.57, 0.81
Headache	0.53	0.44, 0.63
Repeated vomiting	0.92	0.87, 0.96
Pallor	0.26	0.14, 0.38
Lethargy	0.46	0.35, 0.58
Hematoma	0.60	0.51, 0.70
Possible depressed #	0.46	0.21, 0.71
Signs basal skull #	0.77	0.58, 0.97
GCS-initial score	0.60	0.45, 0.74

171

Pediatric emergency department procedural sedation and analgesia: two centers experience over a period of one month.

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Introduction: To characterize the practice of Procedural Sedation and Analgesia (PSA) in two Israeli Pediatric Emergency facilities. The authors sought to assess the indications and the frequency of side effects within these settings. **Methods:** A prospective, descriptive series of a consecutive sample of Pediatric ED patients treating with PSA over a period of one month at two study sites. Patients were monitored for PSA-related events. Data collection was performed during PSA with a standardized data collection sheet unique to each site. **Results:** During December 2005, 88 patients were treated with PSA in one study site and 34 in the other. Medications were administered in the oral route (29.5%), intranasal (18.85%), intravenous(43.45%), and inhalational (8.2%). Indications for sedation included laceration repair, bladder catheterization, difficult IV access, fracture reduction, abscess incision and drainage, computed tomography imaging, thoracentesis, ear paracenthesis, arthrocentesis, and insertion of NG tube. The rate of PSA-related hypoxia events was 2.45% (resolved quickly with oxygen supplementation). No patient had apnea or aspiration, and no patient required endotracheal intubation or admission for PSA-related complications. **Conclusions:** It appears from this one month experience that PSA was commonly and safely practiced in both Pediatric ED facilities. **Key words:** procedural sedation and analgesia, pediatric emergency department. **Key words:** children, sedation, analgesia

172

Trampoline related injury in children

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Introduction: To quantify and describe trampoline related injuries in children attending an urban Paediatric Emergency Department. **Methods:** Retrospective cohort study of consecutive patients attending a children's Emergency Department with trampoline related injuries over a three month period (May – July 2005). **Results:** One hundred and sixty-eight children were treated for trampoline related injuries during the time period reviewed. 63% were female. Their age ranged between 4 months and 16 years (mean 10.4 years [SD - 3 yr 10 mo]). Lower limb injuries (51%) were more common overall. The most common injuries were to the ankle (31 %), followed by foot, (9.2 %) and neck (8.4%). Sprain or soft tissue injuries (68 %) were the most common type of injury, followed by fracture (12.2%). The most common mechanism of injury was inversion of the ankle on a trampoline (18.4%). **Conclusions:** Trampoline related injuries represented 2.5% of morbidity from accidental trauma in children presenting to emergency department in our study. The rate and severity of injury has become a significant public health concern. Despite the efforts of public education, inclusion of safety materials in the trampoline packaging and media attention, injuries from the use of trampolines continue to occur at an increased rate. It appears that current preventative strategies are inadequate in making children's carers aware of the potential risks of trampoline use, particularly when used recreationally. **Key words:** trauma, trampoline, children

RESUSCITATION TRACK

173*

Severe sepsis in the ED: a review of patient characteristics and initial management.

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Introduction: Sophisticated goal directed therapy in the ED for severe sepsis has shown promise in recent studies. Prior to implementing such a resource intensive strategy, we undertook a review of patient and physician patterns as an initial step to optimizing fundamentals of ED diagnosis and management of the critically ill patient with sepsis. **Methods:** Retrospective chart review of all patients in a large urban centre admitted to the ICU from the ED with primary diagnosis of sepsis over 2000–2004. All values are reported as mean values. **Results:** We identified 188 patients and 154 charts were available for review. Patients' age was 61.8 years and 55.1% were male. Respiratory complaints (49%) were the most common presentation. CTAS score was 2.03. On arrival, vital signs were HR 108, SBP 114, temperature 37.6C, and RR 28. There was no temperature on arrival recorded for 41% of patients. Time to be seen by an MD was 17 minutes. Time to fluid resuscitation was 45 minutes. The amount of fluid given was 2.93L. Only 62% of patients received antibiotics in the ED, with an average door to needle time of 97 minutes. Procedures in the ED included intubation, central venous catheterization, and vasopressors, in 57, 42, and 51% of patients respectively. Only 2% received blood products. There were no CVP measurements or central venous gases drawn in the ED. APACHE II score was 22.1. No temperature was recorded during the entire ED stay in 32% of patients. Lactate level was 6.3, measured in only 25% of patients. WBC count was 15.5. An infectious ED discharge diagnosis was given in 76% of cases. Length of stay in the ED was 3h:41min, and in hospital was 17.1 days. Hospital mortality was 30.5%. **Conclusions:** These observational data suggest that improved diagnostic yield and treatment of severe sepsis in the ED may be achieved with routine temperature screening, consistent antibiotic administration and use of physiologic markers of shock. The heterogeneous management of this critical illness supports the use of a goal directed protocol. **Key words:** sepsis, emergency department, management

174

Research for cardiopulmonary resuscitation in an emergency department of tertiary hospital.

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Introduction: The purpose of this research is to analyze the result of CPR performed in Emergency Department of a University hospital

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situated at Northwest area of Kangwon Do and to make a comparative study with other researches. Furthermore, we expected to use of this result as research data of CPR in this area. **Methods:** From August, 1999 to August 2005, we studied prospectively 238 consecutive patients with in emergency room and out-of hospital cardiac arrest who visited Emergency department of Chuncheon Sacred Hospital and were performed CPR management. The subject includes both traumatic cardiac arrest and non-traumatic cardiac arrest, regardless of the cause of cardiac arrest. **Results:** According to the cause of cardiac arrest, 167 patients (70.2%) had medical cause, 71patients (29.8%) had traumatic cause. Among patients with medical cause, 77patients (32.4%) had cardiogenic cause and 90patients (37.8%) had non-cardiogenic cause. Among 238 patients, 90patients (37.8%) returned to spontaneous circulation after resuscitation. 33patients were restored to spontaneous circulation over 24hours. Of 77 patients with cardiogenic cardiac arrest, 24 patients (31.2%) restored to spontaneous circulation and 4 patients (5.2%) has discharged alive. Among 25 patients who had pulseless ventricular tachycardia or ventricular fibrillation in initial electrocardiogram (ECG), 15 patients (60.0%) restored to spontaneous circulation and 3patients (12.0%) of them discharged alive. Among total 238 patients, 9patients discharged alive and 8 of 9 patients was male. According to cause of cardiac arrest in discharged patients alive, 4 patients had cardiogenic cause, 3patients had non-cardiogenic, and 2 patients had traumatic cause. **Conclusions:** In Emergency department of a university hospital in northwest Kangwon do, cardiac arrest due to cardiogenic cause was 77cases (32.4%), non-cardiogenic arrest occurred in 90 cases (27,8%), and traumatic arrest occurred in 71 cases (29.8%). **Key words:** cardiac arrest, emergency department, advanced life support

175

Effect of the pulsatile cardiopulmonary bypass system (Twin Pulsatile Life Support, T-PLS) on the septic shock in the dog model.

Gil Joon Suh, Sang Do Shin, Woon Yong Kwon, Young Ho Kwak, Sung Koo Jung, Young Joon, Kang, Ju Ok Park, Kyoung Jun Song, Kyu Seock Kim, Yeo Kyu Youn, Byung Goo Min, Kyoung Soo. Department of Emergency Medicine, Seoul National University College of Medicine, Seoul, *Korea*

Introduction: We have developed the pulsatile cardiopulmonary bypass system which is called as Twin-Pulsatile Life Support(T-PLS) for the resuscitation and tried to evaluate the effect on the septic shock. **Methods:** We made animal experiment with 11 dogs with the body weight (30kg~35kg). 6 were experimental group with T-PLS and others were control group with conservative management. All animal were induced with anesthesia and were applied with ventilator. After infusion of the pre-loading normal saline of 20ml/kg, we injected the endotoxin of 50mg for induction for septic shock. After 30min, the control group was resuscitated with dopamine and norepinephrine but experimental group was treated with only T-PLS. We compared the hemodynamic and laboratory parameters using the repeated measures ANOVA method, at baseline, 30 minute after infusion of endotoxin, 30, 60, 120, 180, and 240 minute after application of T-PLS. **Results:** Mean blood pressures were not significantly different between two groups (p=0.544) and other hemodynamic parameters showed similar findings. Arterial pH were significantly much lower in control group (7.227, 7.125, 7.130, 7.123, 7.145. 7.092, and 7.038, respectively) than in the experimental group (7.257, 7.181, 7.303, 7.309, 7.309, 7.286, and 7.288, respectively) (p=0.025). There were similar results in comparison of two group which serum bicarbonates were much higher in control group (p=0.012,) and serum potassium levels were much higher in control group (p=0.026). But serum lactate showed the controversial results that the each levels in control group (3.1, 4.4, 4.2, 4.1, 3.6, 3.1, and 4.2 mg/dl) has lower tendency compared to those in experimental group (3.5, 3.9, 4.3, 4.8, 6.0, 6.1, and 6.4mg/dl) without significancy (p=091). **Conclusions:** The pulsatile cardiopulmonary bypass system showed a significant effect on the prevention of metabolic acidosis and the elevation of potassium in the septic shock in the dog. **Key words:** septic shock, cardiopulmonary bypass, resuscitation

176

The change of cortisol level and relative adrenal insufficiency in postresuscitation disease.

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Introduction: The integrity of the hypothalamic-pituitary-adrenal(HPA) axis is a major determinant of the host response to stress. In severe stress, the integrity of the HPA axis can be impaired by multiple mechanism. The purpose of this study was to evaluate the cortisol response and determine the relative adrenal insufficiency after return of spontaneous circulation (ROSC). **Methods:**30 patients admitted to the intensive care unit after successfully resuscitated after out-of-hospital cardiac arrest were prospectively and evaluated. Serum cortisol level was measured and a corticotropin stimulation test was performed 3times(initial, 1st morning after ROSC, 2nd morning after ROSC). Patients with an incremental response less than 9./. were considered to have relative adrenal insufficiency. **Results:**13 patients (43%) had relative adrenal insufficiency at initial, 13 patients (43%) at 1st and 10 patients (33%) at 2nd morning. Basal serum cortisol level was higher in patients with relative adrenal insufficiency at first and second morning (p=0.003, p=001) than without relative adrenal insufficiency. Basal serum cortisol level was high at initial then significantly decrease at first morning in patient without relative adrenal insufficiency (p=0.07). A time interval arrest to start cardiopulmonary resuscitation (CPR), SOFA (sequential organ failure assessment) score and initial arterial lactate level were associated with mortality. In patients with relative adrenal insufficiency had a tendency to die early (p=0.008) and had a poor outcome (shock-related mortality) thirteen times more than without relative adrenal insufficiency (p=0.03, odds ratio 13.82). **Conclusions:** Basal serum cortisol level and corticotropin stimulation test at first morning after ROSC are helpful to guess a prognosis of post-resuscitation disease. Although a basal serum cortisol level was normal or even high, if the patients have relative adrenal insufficiency, low dose corticosteroid therapy should be considered and more studies are needed. **Key words:** adrenal insufficiency, cortisol, resuscitation

177

Arterial-End tidal CO2 difference as a early prognostic factor in shock.

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Introduction: In shock states, the pulmonary perfusion is one of the most important prognostic factors, end-tidal carbon dioxide (ETCO2) reflects pulmonary perfusion. Although ETCO2 and PaCO2 can be reduced by incresing ventilation to compensate lactic acidosis, the differences between these values (Pa-etCO2) are influenced to a much lesser degree by minute ventilation. We hypothesized that P(a-et)CO2 reflect pulmonary perfusion in the shock and can be used as a prognostic indicator of survival of shock patients. **Methods:** In emergency department of university hospital, 57 shock patients having low systolic blood pressure (<90mmHg) were enrolled from March to November 2005. Patients with chronic pulmonary disease were excluded. ETCO2, arterial blood gases, central venous pressure and

oxygen saturation, and serum lactate were obtained at admission and after resuscitation (about 4 hours later). ETCO2 were measured using side stream capnography. The receiver-operator characteristic (ROC) curves of serum lactate, dead space ventilation ratio (VdA/Vt) and P(a-et)CO2 were performed to identify threshold values for predicting mortality. Survival analysis were performed according to the threshold values of lactate level , VdA/Vt, and P(a-et)CO2. **Results:** Twenty-two people died in hospital. At admission, the dead had high lactate level, high P(a-et)CO2, and high VdA/Vt. After resuscitation, the survival had high systolic BP, high pH, high base excess, low lactate, low P(a-et)CO2, and low VdA/Vt comparing with the values of the dead. Post-resuscitation values of P(a-et)CO2 and VdA/Vt were significant to predicting mortality comparing with lactate level that is traditionally prognostic marker of shock. Lactate > 4.5, P(a-et)CO2 > 5.85 and VdA/Vt. > 0.235 after resuscitation were associated with high mortality rate. **Conclusions:** P(a-et)CO2 and its derived value help to predict mortality and may be useful as a guideline of resuscitation of shock patients in emergency department. **Key words:** shock, blood gasses, resuscitation

178

The impact of hyperchloraemic metabolic acidosis following resuscitation of major trauma patients.

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Introduction: Hyperchloraemic metabolic acidosis (HCMA) is known to occur in trauma patients resuscitated with chloride rich solutions such as 0.9% sodium chloride. It is not known whether HCMA is associated with increased morbidity or mortality in trauma patients. **Methods:** A retrospective observational study carried out on major trauma patients (Injury Severity Score (ISS) >15) at an urban general hospital over a two-year period. Hospital records were reviewed along with venous and arterial blood parameters for the first forty-eight hours after admission. The total chloride load was calculated and patients with biochemical HCMA identified. Patients with and without HCMA were compared on a number of measures including morbidity and mortality. **Results:** 119 patients were identified of which eighty-one had complete data suitable for analysis. HCMA positive HCMA negative 95% CI of median P Value (mean) Numbers 18 63 N/A Male 15 51 0.82 Mortality 1 13 0.17 ITU Stay Median 0.0 0.0 -3.1 – 3.1 1 (Mean) (1.6) (2.6) (-4.2 – 2.1) (0.52) HDU Stay Median 0.0 0.0 -6.5 – 6.5 1 (Mean) (6.8) (4.2) (-3.9 – 9.1) (0.43) Inpatient Stay Median 9.0 14.0 -22.0 – 12.0 0.56 (Mean) (29.4) (28.2) (-15.9 – 18.2) (0.89) Median GCS 12.5 14 -3.3 – 1.2 0.34 Median ISS 19.5 25.00 -10.0 – 2.0 0.19 Median Chloride Load 1162.5 910 -127.8 – 684.7 0.17 **Conclusions:** The development of HCMA does not appear to affect the morbidity or mortality in major trauma patients. **Key words:** major trauma, metabolic acidosis, resuscitation

179

Vasopressin level: prognostic factor in septic shock?

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Introduction: In recent years, vasopressin is emerging as a rational therapy for the hemodynamic support of late-phase septic shock because relative vasopressin deficiency has been implicated as one mechanism of vasodilatory shock. However, little is known about the value of vasopressin level as a prognostic marker in septic shock. We investigated the prognostic value of vasopressin level in septic shock. **Methods:** This was a prospective observational study in one emergency department based intensive care unit (EICU). Eighteen patients with septic shock were prospectively enrolled between May and October 2005. Baseline clinical values, hemodynamic data, and APACHE II score were recorded during the study period. Plasma vasopressin level was measured at study entry. Patients were followed until day 28 or death. Continuous variables were compared between survivor group and non-survivor group with Mann-Whitney U test. **Results:** As the origin of sepsis, pneumonia was 22.2%, pyelonephritis was 11.1%, and intra-abdominal infection was 33.3%. 28-day mortality was 22.2% (4/18). Comparison of non-survivors and survivors did not reveal any significant difference in terms of age, hemodynamic parameters, and brain natriuretic peptide. Plasma vasopressin concentrations were significantly lower in the non-survivors than in the survivors (1.2 ± 0.9 pg/ml vs 10.5 ± 22.8 pg/ml, p=0.046). Acute Physiology and Chronic Health Evaluation II score were significantly higher in the non-survivors than in the survivors (24.5 ± 5.7 vs 17.6 ± 7.2 p=0.046). Lactate levels were also significantly higher in the non-survivors than in the survivors (8.2 ± 3.7 mmol/l vs 3.3 ± 2.8 mmol/l). **Conclusions:** These data indicate that vasopressin may be a valuable early prognostic marker in patients with septic shock. **Key words:** septic shock, vasopressin, resuscitation

180*

Emergency physicians are ready to implement EGDT for sepsis in an academic tertiary care emergency department setting.

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Introduction: Recent attention has been placed on early goal-directed therapy (EGDT) for sepsis in the emergency department (ED). A mortality benefit and cost-savings has been demonstrated in the use of this therapy. The feasibility of implementing EGDT has not been established in a Canadian ED setting. **Methods:** Using a web-based survey, we employed a modified Dillman's Total Design Method to survey a group of full-time emergency physicians (EPs) working in a tertiary academic ED (n = 53) regarding the treatment of sepsis. **Results:** We achieved a response rate of 75% (40/53). EPs felt that a combined strategy of measurement of venous lactate and monitoring for abnormal vital signs was the best strategy for identifying potentially septic adult patients. In pediatrics, 72% agreed that monitoring for abnormal vital signs was sufficient. Most EPs in this group were "comfortable" with necessary skills to provide EGDT in the ED or were open to training. Although all agreed that septic patients with respiratory compromise should be intubated, 87% of EPs would intubate patients in septic shock without respiratory compromise and 48% would intubate in clinically severe sepsis. Fewer EPs were comfortable with invasive pediatric procedures or the use of vasopressors in children, although 81% were comfortable managing the initial fluid resuscitation. The majority agree that the creation of an intensivist-lead sepsis team on-call would be the most appropriate method to manage these patients, but a small percentage believed that the EP should lead this team. Additional members of the team viewed as essential were the ICU nurse (88%), and respiratory therapist (91%). **Conclusions:** EPs in this institution are generally prepared to institute EGDT in this institution or are receptive to training. The vast majority believe a "sepsis-team on call" would be the best way to manage these patients. Further work is needed to determine feasibility of this therapy in terms of support staff and equipment availability. **Key words:** septis, goal directed therapy, resuscitation

181

Glycoprotein IIb/IIIa Inhibitor(Tirofiban®) therapy in post-arrest patients with cardiac origin.

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Introduction: Acute coronary syndrome had been reported with a

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large portion of the cause of sudden cardiac arrest. Glycoprotein IIb/IIIa Inhibitor(Tirofiban®) is known as the treatment of the unstable angina and non-ST elevation myocardial infarction (NSTEMI). **Methods:** We enrolled 12 patients who were admitted and resuscitated with cardiac arrest in ED. They also were presented with ST-depression of precordial leads in 12-lead ECG and elevated serum CK-MB or Troponin-T. On admission, Cardiopulmonary Resuscitation(CPR) was performed as the Advanced Cardiac Life Support(ACLS) guideline and the post-resuscitation therapy were began. Post-resuscitation therapy was consisted of hypothermia (BT≤34) for brain resuscitation and anticoagulation with Tirofiban®. The evaluations of post-resusciation therapy were neurologic exam, brain MRI, TTE, cardiac enzymes and 12-lead ECG. **Results:** The cause of arrest were all cardiac origin. All patients had no vascular related diseases with renal disease, previous vascular disease(cerebral, myocardial, peripheral), acute infection, malignancy. The mean arrest time was 14 minutes and the mean CPR time was 11 minutes. 8 were witnessed and chest compression in out of hospital. 7 had complained a unspecific chest dyscomfort before arrest. Analyzing ECG, 4 were anterior, 5 were anterolateral and 3 were lateral ST depression. In Troponin-T and CK-MB, 6 were positive at both, 5 at CK-MB, and 1 at Troponin-T. On TTE after ROSC, At 3 day after anticoagulation with Tirofiban®, all showed no RWMA on TTE and 7 were normal cardiac enzymes but 5 was slowly decreased. 2 were good neurologic outcome, 6 were vegetable state, 3 died and 1 was not found the final result because he was transferred to other hospital and not connected anymore. **Conclusions:** Glycoprotein IIb/IIIa inhibitor (Tirofiban®) was effective with the resuscitated who was showed on ST-depression of precordial leads in 12-lead ECG and elevated serum CK-MB or Troponin-T after arrest. But, there was no relationship in survival rate. **Key words:** cardiac arrest, IIb/IIIa inhibitor, resuscitation

182

Survey of attitudes and beliefs to family witnessed resuscitation amongst doctors, nurses and paramedics in emergency departments: a UK perspective.

Sen A, Saab M, Contractor N. Department of Intensive Care Medicine, Fairfield Hospital, Bury, Manchester, *UK*

Introduction: The tragedy of a sudden or unexplained death in the Emergency Department (ED) can leave many unanswered questions for the loved ones left behind. Poor communication during this process may lead to unnecessary anger and a delay in the grieving process. The option of Family presence however is frequently met with resistance by health care workers who may view the family's presence as increasing their risk of making a mistake or worse, being sued. A belief that further complications could arise if family members lose control, leaving staff to deal with two patients rather than one or that the experience may be too visually upsetting for families to see all have been expressed in the literature. We aim to provide a snapshot of the attitude and beliefs of UK ED staff to family witnessed resuscitation **Methods:** A survey would be conducted amongst all doctors and nurses and allied health staff who work in two UK emergency departments. Paramedics who attend the ED would also be assessed. A questionnaire would be provided which would investigate beliefs and attitudes regarding family presence during cardiopulmonary and trauma resuscitation of both adult and paediatric population. It would be piloted to ensure ease of comprehension, internal validity, reliability and reproducibility. Age, gender, experience, years in practice and concerns regarding medicolegal implications would be sought for. Variables would be analyzed by analysis of variance and chi2 analysis, respectively. Responses to questions by using a Likert Scale for degree of agreement will be analyzed by using the Kruskal-Wallis test. Non-responders would be followed up. **Results:** The work is on-going and the results should be available for ICEM 2006. **Conclusions:** As health care professionals caring for families in the ED, we need to recognize the need for compassionate family-centered care.A well trained and motivated team equipped with effective, well thought out guidelines would be extremely helpful in these difficult situations. **Key words:** emergency department, grieving, resuscitation

183

New techniques in intraosseous infusion.

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Vascular access and fluid therapy in the critically ill patient is often a vital part of the initial resuscitation phase. Intraosseous access is a way to establish vascular access for the rapid infusion of fluids, drugs and blood products in the prehospital field as well as ED. The Intraosseous infusion (I/O) has the advantage to allow a fast and safe access in any situation of emergency. The poster will address new techniques in the deployment of these devices.

TOXICOLOGY TRACK

184

Pneumonia complicating organophosphate insecticide poisoning: is it really aspiration pneumonia?

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Introduction: Pneumonia is a common complication of organophosphate poisoning and it is well known that pneumonia complicating organophosphate poisoning increases the incidence of respiratory failure and the duration of mechanical ventilator support. We performed the present study by investigating the clinical characteristics of pneumonia complicating organophosphate poisoning. **Methods:** A retrospective study was performed on patients with organophosphate insecticide poisoning, who were treated at a university based, 1,000-bed hospital with medical records and chest radiographs of patients. During 4 year period, eighty five patients were included in this study. **Results:** 71% of the patients developing pneumonia developed pneumonia later than 48 hours from admission and 55.6% of the patients developing pneumonia developed pneumonia later than 48 hours after mechanical ventilatory support. Most common pathogen of these pneumonias was Methicillin resistant Staphylococcus aureus. 46.7% of pneumonias showed resistance to initial empirical antibiotics. Patients complicated by pneumonia required larger doses of atropine and 2-pralidoxime, as well as longer mechanical ventilatory support, duration of ICU admission, and total hospital admission. **Conclusions:** Despite general assumption that most pneumonias complicating organophosphate poisoning might be from aspiration related to decreased mentality, vomiting, and gastric lavage during acute phase of poisoning, most pneumonia in organophosphate poisoning patients was nosocomial pneumonia and ventilator-associated pneumonia. Thus, to reduce the incidence of pneumonia complicating organophosphate poisoned patients, physicians must take preventive measures for nosocomial infection from emergency department. In selecting empirical antibiotics for pneumonia complicating organophosphate poisoning patients, physicians must consider pneumonia caused by organism resistant to commonly used empirical antibiotics. **Key words:** toxicology, organophosphate, pneumonia

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185*

A case of prolonged withdrawal from use of 1,4-butanediol complicated by seizure and rhabdomyolysis.

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Introduction: 1,4-butanediol (1,4-BD) is an industrial solvent that is metabolized to gamma-hydroxybutyrate (GHB), a gamma-aminobutyric acid (GABA) agonist with depressant effects on the central nervous system. Although it was classified as a schedule I drug by the Drug Enforcement Agency in 2000 1,4-BD remains a popular drug of abuse. Withdrawal from 1,4-BD is characterized by autonomic instability and altered mental status. Previous reports have documented withdrawal symptoms lasting no more than five days and no reports have described the occurrence of seizure or rhabdomyolysis in association with withdrawal from 1,4-BD. **Methods:** Case report. **Results:** We report a case of withdrawal from 1,4-BD in a twenty-nine year old male who had abused 1,4-BD for the past several years. His last use of 1,4-BD occurred three days before presenting to hospital with a new onset of a generalized tonic–clonic seizure. Computerized tomography (CT) of his head was normal. His withdrawal course lasted six days and was further complicated by the occurrence of rhabdomyolysis, as demonstrated by elevation of his creatine kinase (CK) to 24,068 IU/L. Additional symptoms included tachycardia, hypertension, combative behavior, altered mental status and auditory hallucinations. GHB was detected by gas chromatography-mass spectrometry (GC-MS). The patient was treated with a total of 44mg of lorazepam, 27mg haloperidol and a bicarbonate infusion and recovered uneventfully. **Conclusions:** This case represents the longest documented case of withdrawal from 1,4-BD and represents the first occurrence of seizure and rhabdomyolysis in the setting of 1,4-BD withdrawal. With the emergence of 1,4-BD as a drug of abuse, emergency physicians must consider withdrawal from GHB and its analogues when patients present with clinical features suggestive of a sedative-hypnotic withdrawal syndrome. **Key words:** toxicology, rhabdomyolysis, 1,4-butanediol

186

Mass cyanide poisoning from laced drinks.

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Introduction: Cyanide is a deadly poison and lead to an acute, dramatic, severe, but classic presentation while significant exposure. Due to its hazardous property, cyanide has been noted to be a chemical weapon or used in homicide. Here, we reported .an event of mass cyanide poisoning due to beverages laced with cyanide. **Case report:** On the night of May 17, three persons (55 y/o male, 38 y/o female and 28 y/o male) drank one mouthful of an energy beverages bought from different stores at different time. Collapse, shock and conscious change developed in a few minutes after taking poisonous beverages. Severe metabolic acidosis was the additional general finding. Under the impression of cyanide intoxication, these patients received hydroxocobalamine injection individually in 1, 2 and 5 hours after poisoning. The two patients treated early became irritable 2-3 minutes after antidote administration and made a quick recovery without complications. The aged one developed cardiac arrest one hour after intoxication and was resuscitated successfully. The antidote was used late and proved to be failure. Potassium cyanide was noted to be the toxin laced in the drinks. **Conclusion:** Classic presentation of quick collapse, coma and severe metabolic acidosis to be diagnosed as cyanide intoxication and prompt antidote storages help the two dying patients to survive. Hydroxocobalamine was effective and safe in cases of severe cyanide intoxication. **Key words:** toxicology, cyanide, antidote

187

Methanol intoxication in ingestion of pesticides.

Wen-Yu Yu, Dong-Zong Hung. Department of Emergency Medicine, China Medical University Hospital, *Taiwan*

Introduction: Methanol is commonly used as a solvent, also used in pesticides. Pesticides remains the commonest means of self poisoning in many rural areas, however, methanol poisoning in ingestion of pesticide has not been previously described. **Methods:** We reviewed 9 patients with the diagnosis of pesticide poisoning admitted to the hospital between August 2002 and July 2004. Patients with pesticide poisoning and elevated methanol level in serum were included. The following data including age, sex, the reason of ingestion, the ingested pesticide, the amount of ingestion, co-ingested agents, clinical menifestations, laboratory results, treatment, and outcome were all retrospectively analyzed. **Results:** Among these 9 patients, eight patients had attempted suicide and one was exposed in unknown reason. Three were male and six were female., with age ranging from 25 to 75, with an average 49.5 years. Six patients ingested organophosphate, two ingested carbamate and one took hexaconazole. Five patients were found elevated blood methanol level with high anion gap metabolic acidosis. Among these five patients, two were undergoing hemodialysis but no one survived. **Conclusions:** Awareness of the rare but lethal complication from methanol intoxication in ingestion of pesticide should be stressed. All patients with high anion gap metabolic acidosis and history of pesticide ingestion should have a serum methanol examination to identify potential methanol poisoning. Once methanol intoxication is recognized, intensive treatment with acidosis correction, folic acid to catalyze formic acid, alcohol dehydrogenase inhibitors to block toxic metabolites and adequate hemodialysis are the hallmarks of treatment. **Key words:** toxicology, methanol, acidosis

188

Strychnine toxicity from adulterated cocaine.

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Introduction: Strychnine toxicity should be suspected as a potential cause of seizure like activity with normal mental status in the context of recent illicit drug use. **Case report:** A 34 year old female with no seizure history presented to the Emergency Department (ED) 2 to 3 days after a brief witnessed "seizure". The patient admitted to crack cocaine abuse and most recently used just prior to the "seizure" event.. The patient was quite animated and extremely restless with normal mentation. Initial vitals: BP 168/108, HR 87, RR 16, Temp 98.4 (oral), pulse ox 98% on RA. The physical exam was remarkable for constant rhythmic movements of her arms and legs without tremor and an otherwise normal neurological exam. Head CT was negative. A urine drug screen was positive for cocaine and the CPK was elevated at 192U/L. All other labs and studies were otherwise unremarkable. Treatment consistent of IV fluids (IVF), Benadryl 25mg IV, Toradol 15mg IV and KCL 40 meq by mouth (PO) without resolution. She was admitted for new onset seizures, movement disorder and cocaine abuse. The regional poison control center was consulted and an adulterant was considered. The patient was then given escalating doses of benzodiazepines, to which she responded well. The serum strychnine level was reported as 0.59ng/ml (normal < 0.5ng/ml). The patient had an uneventful hospital course and was discharged two days later. **Conclusion:** The presentation of seizure like activity with normal mental status in the setting of illicit drug use should alert one to the possibility of concurrent strychnine poisoning. When suspected, the mainstay of therapy is supportive care, IVF and aggressive benzodiazepine therapy. **Key words:** toxicology, strychnine, case report

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189

Relationship between the methemoglobin level and oxygen saturation on pulse oximetry in methemoglobinemia.

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Introduction: The severity of and treatment for Methemoglobinemia (methemoglobin> 2%) is determined by the level of methemoglobin that inhibits the supply of oxygen to an organ. Through animal experiments, it is known that pulse oximetry and arterial blood gas measurements provide false oxygen saturation values in methemoglbinemia. Therefore, the aim of this study was to determine the relationship between the blood methemoglobin level and oxygen saturation on a pulse oximeter and as well as the relationship between the blood methemoglobin level and the level of arterial oxygen saturation in humans breathing room air. In addition, an attempt was made to indirectly measure the methemoglobin level by using these relationships. **Methods:** The medical records of patients admitted to the Chonnam University Hospital Emergency Medical Center due to acute methemoglobinemia between January 1, 2001 and June 30, 2005, were reviewed prospectively. The exclusion criteria were hypotension at presentation, a history of pulmonary disease that effects the level of oxygenation, severe anemia at presentation and the oxygen supply at the prehospital stage. **Results:** Out of a total of 39 cases, there were 25 males and 14 females. The most common cause of methemoglobinemia was the intentional ingestion of an aniline-type pesticide. The blood methemoglobin levels at presentation were negative correlated with the pulse oximetry saturation level (R2=0.820, P<0.001). Pulse oximetry showed that the level of oxygenation began to decrease to below 90% at a methemoglobin level of about 40% and did not decrease to less than 80%. However, a numerical formula showing the relationship between the levels of oxygenation and the methemoglobin level could not be obtained. Arterial gas analysis was not associated with the blood methemoglobin level. **Conclusions:** Pulse oximetry in humans with methemoglobinemia is associated with the methemoglobin level and may be able to be used as determinant factor for treatment instead of the methemoglobin level. **Key words:** toxicology, methemoglobin, oximetry

190

The dosage efficacy and safety profile of equine bivalent f(ab).

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Introduction: Crotaline snakebite is commonly encountered in Emergency Department (ED) in northern Taiwan. In Taipei Veterans General Hospital, patients with such injuries are either admitted to Toxicological Division (Medical Ward) or Trauma Team (Surgical Ward) for further treatment after initial management in ED. The purpose of this study is to elucidate the differences between patients treated in Medical Ward and Surgical Ward in specific antivenom (SAV) dosage, clinical complications, and outcomes following Taiwan habu and green habu envenoming and SAV therapy. **Methods:** The study design was retrospective chart review. Using a structured questionnaire, pertinent information was abstracted from medical charts. Independent samples t-test and Fisher's exact test were used to compare variables of demographic characteristics, SAV dosages, adverse effect of SAV, clinical complications, hospital stay, and long-term disability between the two groups. **Results:** One hundred and ninety eight patients were eligible for the study between 1991 and 2005. Ninety eight were treated in Medical Ward and 100 in Surgical Ward. The average dosage of SAV was significantly higher in patients in Surgical Ward (5.5 vs. 2.6 vials, p<0.001). There were no significant differences in terms of demographic variables, adverse reaction of SAV (4.1% vs. 3.0%, p=0.72), hospital stay (5.8 vs. 7.8 days, p=0.06), systemic complications (18.4% vs. 12.0%, p=0.24), surgical complications (25.5% vs. 21.0%, p=0.5), and long-term disability (1.0% vs.1.0 %, p=1.00) between the two groups. **Conclusions:** Lower dosage of equine F(ab')2 SAV used in Medical Ward was as effective and safe as higher dosage in Surgical Ward for the treatment of crotaline snake envenoming in northern Taiwan. Taiwan habu envenoming caused more systemic and surgical complications compared to green habu. Other crucial factors such as the bite sites, changes of severity of envenomation over time, and timing of SAV administration should be incorporated into future studies. **Key words:** toxicology, equine bivalent f(ab), Crotaline snakebite

191

The early prognostic factors of glyphosate-surfactant intoxication.

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Introduction: The purpose of this study was to establish an early prognostic model of Glyphosate-surfactant (GlySH) herbicide intoxication patients. **Methods:** This was a case control study. GlySH intoxicated patients were collected from 2 hospitals. Patients were admitted to emergency department of Chang Gung Memorial Hospital from April 1996 to March 2003 and emergency department of Taichung Veterans General Hospital from April 2000 to October 2003. Collected variables such as age, gender, estimated amount of ingestion, symptoms/signs including first vital signs, Chest X-ray, biochemical studies were analyzed for their role in the prognostic model of GlySH intoxication mortality. Univariate analysis, Odds ratio analysis were then performed. Prognostic model was then established by using logistic regression analysis and further stratified analysis. **Results:** There were 58 patients (19 male and 39 female, p=0.38) enrolled in our study. The age was 48.84±15.76 years old. 41 patients survived from GlySH intoxication and 17 died. After univariate analysis, five variables such as respiratory distress need intubation, metabolic acidosis, tachycardia, elevated Cr, and hyperkalemia were found to be highly associated with poor outcome and mortality. Then a multiple logistic regression model was established as: Log p/q= -6.13+ 3.43(abnormal CXR) + 2.53(metabolic acidosis) + 2.55(Cr) + 2.4(Tachycardia) + e. **Conclusions:** GlySH poisoning is multi-organ toxicity. Pulmonary toxicity and renal toxicity seems to be responsible for its mortality. Metabolic acidosis, abnormal CXR, tachycardia, and elevated creatinine are useful prognostic factors for predicting GlySH mortality. **Key words:** toxicology, glyphosate-surfactant, mortality

192

Suicidal oral deltamethrin ingestion: a rare case report.

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Introduction: Deltamethrin ingestion is an uncommon cause of poisoning worldwide. Although the pyretroid insecticides are considered to be of relatively low toxicity compared to other insecticides such as organophosphorus-containing compounds, acute deltamethrin poisoning in way of suicidal oral intake is extremely rare. **Case:** A 32 years old female was brought to emergency room with atypical symtomps. It was learnt that the patient whom had no property in her history ingestion deltamethrin. After stabilizing in Emergency Department, the patient were hospitalized in intensive care unit with symptoms suggestive of deltamethrin poisoning and

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given supportive and symptomatic treatment. The patient was discharged from the hospital at the end of 72nd hour after 24 hours intensive care unit treatment. **Conclusions:** As a result, those patients applying to the emergency room with non-specific symptoms like paresthesias, hyperexcitability, tremors, and incoordination, deltamethrin poisoning should be considered in differential diagnosis. It should not be forgotten that in acute period (first 24 hours) of these patients, supportive and symptomatic treatment is life saving; and symptoms become worsen and follow up become harder with increasing dose. **Key words:** toxicology, deltamethrin, mortality

193*

Adequacy of antidote stocking in British Columbia hospitals: the 2005 antidote stocking study.

Wiens M, Zed PJ, Lepik KJ, Abu-Laban RB, Brubacher JR, Gorman SK, Kent DA, Purssell RA. CSU Pharmaceutical Sciences and Department of Emergency Medicine, Vancouver, BC, *Canada*

Introduction: Timely antidote administration is often required following a poisoning. Inadequate stocking of essential antidotes by hospitals is well described and has been documented in the British Columbia (BC) antidote stocking study completed in 2000 which found that no BC hospital adequately stocked all 14 antidotes evaluated. The mean number of antidotes stocked was found to be 4.2 ± 2.9 per hospital. In response to this issue the BC Poison Control Centre (BCPCC) developed provincial antidote stocking guidelines in 2003. We sought to determine the current availability of 21 essential antidotes in acute care hospitals in BC. **Methods:** A two-part survey, consisting of hospital demographics and antidote stocking information, was distributed in 2005 to all acute care hospital pharmacy directors in BC. The antidotes examined and the definitions of adequacy were based on BCPCC guidelines. Standard descriptive statistics were generated. Availability was reported as number of antidotes stocked per hospital and proportion of hospitals stocking each antidote. **Results:** Surveys were completed for all 79 (100%) hospitals. A mean of 15.3 ± 4.8 antidotes were adequately stocked per hospital. Over 90% of hospitals had adequate stocks of N-acetylcysteine, activated charcoal, naloxone, flumazanil, calcium salts and vitamin K; >70–90% had adequate cyanide antidotes, ethanol/fomepizole, PEG solution, dextrose 50% and protamine sulfate; >50–70% had adequate atropine, deferoxamine, glucagon, leucovorin, methylene blue and pyridoxine; and <50% had adequate digoxin immune Fab, isoproterenol and pralidoxime. Only 5 (6.3%) hospitals sufficiently stocked all antidotes. **Conclusions:** Marked improvements have been achieved in antidote stocking in BC hospitals since the 2000 study, however over 90% of hospitals continue to stock insufficient quantities of at least some essential antidotes. Further improvements in BC hospitals antidote stocking are necessary to ensure optimal management of poisoned patients. **Key words:** toxicology, antidote, administration

194

Intra muscular administration of an organophosphorus compound: a rare route for a common poison.-probably an index case.

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Background: Organophosphorus (OPC) poisoning has been well described in literature in various forms. However, We have not come across reports of intramuscular (IM) administration. Case report: 39 year old pharmacist, diabetic and hypertensive on irregular treatment presented to peripheral Hospital, with loose stools, chest discomfort and breathlessness. Examination showed high BP (240/140mmHg) with decline in GCS score and ECG changes suggestive of ischemia. He was given diuretics and sent intubated to our centre, diagnosing as pulmonary edema secondary to Acute Coronary Syndrome Patient was in shock with minimal lung signs and pupils 2mm not reacting to light. ECG revealed ST-T changes in leads I, II, V5 and V6.Cardiac biomarkers were positive (transient). ECHO suggested mild LV dysfunction without diastolic dysfunction. Relatives denied any history of poisoning. With persistent pupillary findings associated with normal systems (including CNS imaging), on suspicion of poisoning, forensic analysis was done. This analysis revealed OPC compound in blood and urine sample, but negative for gastric aspirate. Glycopyrrolate and Pralidoxime administered. Wide Blood pressure fluctuations were considered neurally mediated. He remained ventilator dependent due to development of intermediate syndrome, his mental status gradually improved. He developed multiple eschars (corresponding to the site of injections) on his thighs which needed escharotomy and skin grafting. Later the patient admitted to self injecting a non-carbamate pesticide. Psychiatric help rendered. He recovered remarkably **Conclusion:** This was an unusual scenario coupled with no documented history of poisoning. This may be an index case as there is no literature review for IM OPC poisoning The cardiac presentation was thought to be due to toxic myocarditis, which is a rare presentation of OPC poisoning. Early onset of intermediate syndrome in this case probably points to rapid inception of the same with an Intramuscular route compared to conventional administration. **Key words:** toxicology, organophosphate, administration

195

Intoxication by rat poisons as experienced by a Tunisian emergency department.

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Through this work, we report a retrospective epidemiological contribution concerning 338 cases of voluntary intoxication by rat poison brought In the emergency department of universital and peripheral hospital of Sousse Tunisia, during a period of four and a half years: from January, 2001 til June 30th, 2005. We try to re-release the epidemiological, clinical and analytical characteristics of the attempts of suicide in the rat and to estimate the attitude of the coverage. It gets free of the present study that: The voluntary intoxication's by rat poisons represents 8,1% of the total toxicological activities. The average age of suicides is 23,6 years. 58,6 % are women. Single women represent 57,6%. The psychiatric antecedents are indicated at 6,6 % of suicidants. A factor starting the passage to the act is mentioned in 45,8 %, that is 156 cases. The evolution according to the seasons and in the course of the months and the years turns out relatively constant. The distribution according to the gravity reveals that the third (third party) of the poisoned (32,3%), benefited an hospitalization in Intensive care unit. The clinical picture is dominated by the consciousness troubles (45%), the tremors (29%) and the bronchial congestion (20%). The mortality is considered very weak, lower than 2%. The rat poison was identified in 100% of the cases in urines and at the level of the gastric wash. Only 28% of suicidants benefited a Psychiatric coverage. In the light of these data and according to our experience, we are confronted and made sensitive in this problem of voluntary suicides which surprises by an important incidence, it seemed to us that the rate poisons "chloralosis" are the most reliable to illustrate this phenomenon, seen the frequency and the gravity. This approach allowed among others to rise the typical portrait of the poisoned and to clarify the characteristics of this plague to target better the prevention. **Key words:** toxicology, suicide , administration

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196

A descriptive survey on acute poisoned patients in capital toxicology center.

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Introduction: Emergency medicine is a new specialty here in Iran and toxicology is one of the interesting fields which emergency medicine has to manage it so first of all we needed to some epidemiologic data for our plannings. In other hands, as the first line of public education, our target groups had to be cleared. **Methods:** This study is a longitudinal observational study which was performed in the largest capital, Tehran, toxicology center by the use of questionnaires during June 10th to July 10th 2005. **Results:** 308 patients were enrolled. There were significant difference in sex, age and used agents (p=0.00). 184 patients (pts) were female vs 124 male, mean age of 27.4±1.93 years, (range 14-72 years), the most common agents were drugs and pharmaceutical agents (72.7%), chemical agents (14.3%) ,natural toxins (9.1%) and other non classified agents. Among medications mixed drug use was the most common (29.9%) and benzodiazepines (27.3%) were the second one. Toxins were available in their living or work place in 58.4% of the cases. 22% of the pts suffered from psychiatric diseases, 19.5% medical problems and 23.4% both. Average time from ingestion to ED arrival was 3 hours and 24 minutes (range 0.5 to 8 hours). **Conclusion:** Better social and psychological support, more legal bandage on drug and medication trading besides public education will decrease mortality and morbidity of poisonings, less need for critical units and more commercial benefits. Young people have to be considered high risk group and need more attention. **Key words:** toxicology, epidemiology, education

197

Clinical profile of venomous snake bites in north Indian military hospital.

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Introduction: Snakebite is an environmental hazard which one cannot foresee and which carries high mortality. We present a series of venomous snakebites in military operational area of northern India **Methods:** Out of 38, 26 patients of venomous snakebite were included in the study. The history, clinical examination and management were recorded on a detailed data sheet. Statistical analysis was done using SPSS version 10. **Results:** The mean age was 23.5 years with male preponderance. 63% were venomous bites and all were of neurotoxic nature. The mean duration of onset of symptoms was between 30 to 60 minutes. Abdominal pain (95%), headache (91%), dysphagia (91%), ptosis (77%), diplopia (73%), blurring of vision (73%), dyspnoea (68%) vomiting (60%), were the predominant clinical presentation. Lassitude (45%), perioral paresthesia (45%), (9 %) respiratory paralysis and dryness of mouth were the less frequently observed symptoms. Leucocytosis and azotemia were observed in few cases. All 38 cases were admitted and non-venomous bites were discharged after 48–72 hours of hospitalization. Polyvalent AntiSnakeVenom (ASV) was given in patients with systemic envenomation. The mean ASV given was 180 ml with a range of 90- 320 ml. ASV was repeated based on the response to therapy. One patient developed anaphylaxis and two developed anaphylactoid reaction. 13out of 22 patients received neostigmine with glycopyrrolate to counter cholinergic effects .Two patients were given ventilatory support. The average time of recovery from envenomation was 16 hours after onset of ASV. **Conclusions:** Autonomic features along with headache, ptosis, diplopia and dysphagia were the predominant presentation of neurotoxicity. Polyvalent Anti Snake Venom and neostigmine was the cornerstone of management. Dose of ASV and neostigmine were tailored based on the degree of envenomation and response to therapy. Early diagnosis and judicious management is of paramount importance in neurotoxic snake bite **Key words:** toxicology, snake bite, epidemiology

198*

High dose insulin and glucose for calcium channel blocker overdose: a systematic review.

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Introduction: We describe a systematic review of the efficacy and safety of high dose insulin and glucose (HDIG) for the treatment of acute calcium channel blocker (CCB) overdose. **Methods:** A systematic search of the literature was conducted; using electronic searches of MEDLINE, EMBASE, Cochrane, CCTR, IPA, Science Citation Index, LILAC, ClinicalTrials.gov, TOXLINE, Academic Search Premier and CINAHL databases, limited to human studies in English, literature on the use of HDIG in CCB overdose was identified. Hand searches of relevant chapters from toxicology and emergency medicine textbooks and bibliographies of pertinent journal articles were performed. Citations identified by the literature search were evaluated independently by all three authors for inclusion using title and abstract. Data collected included CCB ingested, use of conventional antidotes, HDIG regimen, and treatment duration. Efficacy outcomes included resolution of hypotension, therapies given after HDIG, and survival. Safety outcomes included clinically relevant hypoglycemia. **Results:** Nine studies with 16 cases of CCB overdose (13 adult, 3 pediatric) were identified. HDIG was most effective in treating hypotension (n = 12). Three patients also converted to sinus rhythm from atrioventricular block; for two patients, this occurred within 15–60 minutes of starting HDIG. The duration of HDIG ranged from a single bolus to a 96 hour infusion, and the time to cessation of other therapies after initiation of HDIG ranged from 30 minutes to 90 hours. One patient received a norepinephrine infusion to maintain blood pressure after HDIG was discontinued. Adverse effects of HDIG included asymptomatic hypoglycemia (n = 5), hypokalemia (n = 4), hypophosphatemia (n = 3) and hypomagnesemia (n = 3). Thirteen patients survived; however, one patient remained in a vegetative state. **Conclusion**: HDIG is a safe and effective treatment for acute CCB overdose. Further study is required to determine the most effective dose and its proper location within the CCB overdose treatment algorithm. **Key words:** insulin, antidote, toxicology

199*

Withdrawal from gamma-hydroxybutyrate, gamma-butyrolactone, and 1,4-butanediol: a systematic review.

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Introduction: 1,4-butanediol (1,4-BD) is an industrial solvent that is metabolized to gamma-hydroxybutyrate (GHB), a gamma-aminobutyric acid (GABA) agonist and central nervous system depressant. GHB and its analogues are popular drugs of abuse. Withdrawal from these agents is characterized by autonomic instability and altered mental status. We describe a systematic review of this topic following a patient in withdrawal from 1,4-BD complicated by new onset of seizure and rhabdomyolysis. **Methods:** A systematic search of the literature on withdrawal from GHB, gamma butyrolactone (GBL), and 1,4-BD was conducted using electronic searches of MEDLINE, EMBASE, Cochrane, CCTR, IPA, and CINAHL databases, limited to human and English language. Reference list searches from leading toxicology textbooks and included articles were performed by two independent reviewers. Data collected included last use prior to symptom onset, clinical features on presentation, duration of symp-

toms, and outcome. **Results:** Twenty-eight studies with 57 episodes of withdrawal were identified. Thirty-six cases (63%) involved GHB, 18 (32%) involved GBL, and 3 cases (5%) involved 1,4-BD. The last use prior to symptom onset ranged from 20 minutes to 7 days for GHB, 5 hours to 8 days for GBL, and 6 hours to 3 days for 1,4-BD. The most common symptoms experienced by patients were: tremor (67%), hallucinations (62%), tachycardia (59%), insomnia (57%), anxiety (46%), hypertension (43%) and agitation (40%). Seizures and rhabdomyolysis occurred in 7% and 5% of cases, respectively. One death occurred. The duration of withdrawal symptoms ranged from 2 hours to 18 days for GHB, 6 hours to 11 days for GBL and 4 to 6 days for 1,4-BD. **Conclusions:** Withdrawal symptoms from GHB and its analogues are complex; however, death appears rare. As in the case presented, seizures and rhabdomyolysis may occur. Emergency physicians must consider withdrawal from these agents when patients present with clinical features suggestive of a sedative-hypnotic withdrawal syndrome. **Key words:** toxicology, 1,4-butanediol, systematic review

200*

The Narcotic Overdose Registry of Alberta (NORA).

Dong KA, Blitz S, Rowe BH, Wild C. Departments of Public Health Sciences and Emergency Medicine, University of Alberta, Edmonton, Alta., *Canada*

Introduction: Death from drug overdose is a significant problem in North America. Fatal and non-fatal drug overdoses are particularly common among heroin users. Previous research is limited; however, suggests that most deaths do not occur immediately in otherwise healthy users and both formal and informal health service responses are often inadequate. This study describes the characteristics of fatal narcotic overdoses in a Canadian province. **Methods:** A retrospective study of all medical examiner cases from 2004 in the province of Alberta in which at least one narcotic medication was quantitatively identified at the time of autopsy. In this province, post-mortem toxicology screens are only obtained when drug use is suspected to have been involved in the cause of death. **Results:** A total of 352 charts were reviewed. The mean age of death was 45.2 years (SD 13.1 years), and 60% of cases were male. The vast majority of victims were Caucasian (84%) followed by Native Canadian (11%). Most deaths occurred at home (55%), in-hospital (20%) or in another private residence (18%); few (4%) occurred in a public place. Bystander CPR was performed in only 13% of all cases. The most commonly found co-ingestants were benzodiazepines, acetaminophen, alcohol and cocaine. **Conclusions:** Most deaths from drug overdose in this province occur in relatively young men in a private residence where rates of bystander CPR are low. Overdose prevention programs need to be targeted towards those individuals most likely to be present at an overdose – drug users and their acquaintances. Programs focused on general basic life support techniques as well as the use of antidotes appear to warrant further evaluation. **Key words:** toxicology, mortality, epidemiology

201*

The Narcotic Overdose Registry of Edmonton (NORE).

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Introduction: Overdoses (ODs) are common among illicit opioid users and while many overdoses are witnessed by other drug users, health care responses are often sporadic or delayed. There is a need to develop innovative health promotion strategies to address the consequences associated with frequent overdose; however, little is known about the circumstances surrounding non-fatal opioid overdoses that present to the emergency department (ED). **Methods:** A retrospective study of all narcotic overdoses (ICD 10 codes 965.00 – 965.09) presenting to one of five participating EDs in the Capital Health (CH) region of Alberta in 2004 was conducted. CH provides services for almost 1 million people in northern Alberta and includes one large inner city teaching hospital where many ODs present. **Results:** A total of 563 charts were reviewed. The mean age of presentation was 37.0 years (SD 15.0 years), and 54% of patients were female. Most overdoses occurred at home or in another private residence (54%). The most common opioids in ODs were codeine, morphine and oxycodone; heroin ODs accounted for a small proportion of cases. Coingestants were common (85%) and most frequently included acetaminophen, alcohol and/or cocaine. EMS was called in 72% of cases; and 51% of all cases received triage scores of 1 or 2, requiring urgent assessment. Hospitalization occurred in 20% of cases while discharged patients stayed on average 9.4 hours in the ED; 0.5% died in the ED or after admission. **Conclusions:** Most narcotic overdoses that present to the ED occur in a private location and frequently include multiple drugs. Most patients require urgent assessment in the ED, consume valuable resources and contribute to ED overcrowding; fortunately, death appears rare. Overdose prevention programs should stress the dangers of mixing drugs, teach early overdose recognition and encourage early EMS activation. **Key words:** toxicology, mortality, epidemiology

202*

Antidote Kit Project.

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Introduction: It has been well documented that antidotes stocked in Emergency Departments (EDs) are often inadequate in terms of antidote selection and quantity of antidotes. A survey of antidotes stocked in EDs in Capital Health (CH) and the Izaak Walton Killam Health Centre (IWK) identified the same deficiency within this district. **Method:** A collaborative team, consisting of representatives from CH, IWK and IWK Regional Poison Centre, was created to address this issue. Funding for the project was secured and the following components, integral to the project's success, were developed: district standards for required antidotes and quantities, a convenient high profile format (kit) for the storage of antidotes in EDs, a simple and efficient procedure for antidote kit replenishment, a district-wide policy and procedure for accessing additional antidotes in non-urgent and urgent situations and an educational resource (manual) containing information on the dosage and administration of antidotes. **Results:** The antidote kits were distributed to EDs over a nine-month period. As of December 2005, all EDs in CH and IWK have standardized antidotes in standardized quantities. This provides all patients access to life saving antidotes and ensures that the opportunity for treatment of poisonings/overdoses is consistent at all sites in CH and IWK. **Conclusion:** To date, nine patients have benefited from this quality improvement initiative. This project has contributed significantly to patient care at CH and IWK by providing the tools to enable healthcare professionals to save lives that may have previously been jeopardized. Evaluation Ongoing Complete Antidote Kit Project document is available upon request. **Key words:** toxicology, administration, antidote

203*

Therapeutic practices in recurrent methanol abusers in the Calgary Health Region.

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Introduction: While guidelines exist for the treatment of acute methanol toxicity, there are few recommendations for emergency

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department (ED) management of recurrent methanol abusers. The purpose of this study was to examine the relationship between serum MeOH levels and treatment interventions for 4 chronic methanol abusers in the Calgary Health Region (CHR). **Methods:** A retrospective review was conducted on all methanol-related visits to CHR facilities by 4 known recurrent abusers from 1997–2005. Data collected included treatment modalities, ED disposition, and length of stay (LOS). Outcome measures included treatment complications and clinical outcome. **Results:** 147 visits for MeOH ingestion were identified. The mean initial serum MeOH level was 11.3 mmol/l (range 2.0–50.0 mmol/L). 106 (72.1%) and 65 (44.2%) of visits were treated with intravenous ethanol (IV EtOH) and hemodialysis (HD) respectively. Considerable variation was observed in the serum MeOH levels which prompted initiation of therapy. The mean MeOH levels not resulting in IV EtOH and HD treatment were 7.5 mmol/L and 7.4 mmol/L respectively (range 2.0–18.0 mmol/L). The average LOS was 24.7 hrs (range 40 min–10 days). 109 (74.1%) of cases were treated entirely in the ED, 26 (17.7%) were admitted to the ICU, 24 (16.3%) to a general hospital bed, and 6 (4.1%) to psychiatry. Treatment complications included 3 (2%) bleeding episodes and 3 (2%) cases of hypoglycemia. There were no deaths. **Conclusions:** Treatment of recurrent methanol abusers in the CHR is highly variable. Apparent recovery after no therapy for levels as high as 18.0 mmol/L suggests that these patients may tolerate higher MeOH levels without developing toxicity. Further assessment of the costs related to these visits and the impact of using fomepizole instead of IV EtOH is required before treatment guidelines in this patient population can be developed. **Key words:** toxicology, methanol, epidemiology

TRIAGE TRACK

204*

Are patients willing to wait as long as CTAS says they can?

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Introduction: The Canadian Emergency Department Triage and Acuity Scale (CTAS) was implemented in 2002 to standardize case severity definitions and provide guidelines for timely care of patients. Little is known about patient perceptions of CTAS guidelines. Objectives: To determine if the waiting time guidelines associated with CTAS meet patients' expectations of timely access to care in the emergency department and to explore what the potential health outcomes would be if patients do not receive care from a physician within the maximum time they are willing to wait. **Methods:** Sixty patients classified as CTAS Levels III, IV or V presenting consecutively to the St. Michael's Hospital (SMH) ED, over seven predetermined afternoons between January 24 and March 7, 2005 were interviewed using a predetermined fixed short answer survey. The amount of time patients felt was reasonable to wait for care and the maximum time that patients were willing to wait were compared to the time guidelines associated with patients' CTAS score. Patients were also asked in open question format what they would do if their maximum wait time was exceeded. **Results:** The CTAS time guidelines meet patients' expectations for timely access to care. The guidelines met the expectations for reasonable wait times in 90% of Level III patients, 94% of Level IV patients and 20% of the Level V patients (however, very few participants were classified as Level V). In addition, the guidelines met the expectations for maximum wait times in 100% of Levels III and IV patients, and 40% of the Level V patients. If not seen within their maximum stated waiting time, 35% of patients reported that they would leave the ED. **Conclusions:** This study highlights that the SMH ED must strive to meet the CTAS guidelines. In satisfying the guidelines, the SMH ED will also be meeting patients' expectations and therefore, providing timely access to care, and likely helping to prevent unnecessary morbidity and mortality. **Key words:** triage, guidelines, emergency department

205*

Sepsis and CTAS level in the emergency department.

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Introduction: Successful treatment of severe sepsis in the emergency department (ED) is time-dependent. Early goal directed therapy (EGDT; Rivers et al.) initiated in the ED decreases mortality and morbidity. Given this urgency, combined with the high mortality associated with severe sepsis, potentially septic patients should be triaged with an appropriate CTAS (Canadian Emergency Department Triage and Acuity Scale) level, and seen within the recommended fractile time responses. The purpose of this study was to assess the CTAS level, time in minutes (mean) to MD and orders and admission rate in patients with an ED diagnosis of sepsis or severe sepsis, compared to all other ED patients. **Methods:** *Design:* Administrative database, historical cohort study performed in an urban, tertiary care ED (65,000 visits/year). All patients with an ED diagnosis of sepsis or severe sepsis between January 2001 and July 2005 were included (n = 972). Outcomes for septic patients were compared to all other ED patients for the same time (N=238,939). **Results:** See Table 1. All patients with an ED diagnosis of sepsis were designated a CTAS Level III, IV or V, despite an admission rate 5 times greater than all other diagnoses combined (all CTAS levels = 15.1%; septic patients = 84.5%; $p < 0.0001$). A lower CTAS level was associated with longer times to physician assessment and initiation of orders ($p < 0.0001$). **Conclusion:** Currently, CTAS does not adequately reflect the urgency of the treatment of the septic patient. **Key words:** triage, administration, emergency department

Table 1, Abstract 205.

CTAS level, type of patient	No. of patients	Admit, %	Time to MD, min	Time to orders, min
Level I				
All patients	1,577	46.9	12	12
Septic	30	93.3	8	24
Level II				
All patients	26,362	34.1	28	30
Septic	107	92.5	26	24
Level III				
All patients	76,874	23.4	37	54
Septic	519	92.7	36	55
Level IV				
All patients	91,719	7.5	35	66
Septic	275	75.5	40	63
Level V				
All patients	42,407	3.2	33	68
Septic	41	85.4	51	65

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Monday, June 5th: Poster Presentations

INFECTIOUS DISEASE TRACK

206

Violent abdominal pain: severe Legionella pneumophila lung infection with acute pancreatitis.

Hadef H, Bilbault P, Arzouq H, Berna C, Jaeger A, Division of Emergency Medicine, University of Strasbourg, *France*

Introduction: Legionnaire's disease described the first time in San Francisco during a soldier's meeting in 1976, is responsible for severe community and hospital pneumonia. Rarely described, legionella can be involved in pancreatitis with unknown incidence. In this report, we present a case of pancreatitis hospitalized for acute abdominal pain. **Case report:** A 54 year-old man with no history of chronic alcoholism was admitted because of fever, chills, diarrhea and epigastric pain. Physical examination revealed a temperature of 40 degree celsius, a Glasgow coma rate of 14, a blood pressure of 90/56, a respiratory rate of 35, he presented mottled with and left focal pulmonary crepitations. He was icteric, his abdomen was tender, with ultrasound confirmed hepatomegaly and splenomegaly. Serum analysis revealed cytolytic hepatitis. The urinary antibody titer for L.P was positive. Chest X rays showed an alveolar condensation of the left lower lobe. The abdominal CT scan revealed an oedematous caudal pancreatitis . His clinical condition rapidly worsened requiring transfer to I.C.U. A culture of sputum and alveolar lavage fluid was positive for Legionella pneumoniae. **Discussion:** The pancreas is unusual extrapulmonary site of legionella pneumophila disease. Pancreatitis seems to be directly linked with primary pneumoniae. The extrapulmonary infection is mostly likely due to bacteremic seeding is associated with immunosuppression. Hematologic dissemination to different organs may occur through phagocytic cells and impairment of cellular immunity or dysfunction of phagocytic cells may contribute to facilitate such diffusion. In our case, the patient suffered for acute lymphoblastic leucemia diagnosed in the I.C.U. The pathogenesis of pancreatitis is to that date unknown. **Key words:** Legionella, pancreatitis

207*

Prospective evaluation of the parental satisfaction with the outpatient management of moderate to severe cellulites.

Gouin S, Chevalier I, Gauthier M., Division of Emergency Medicine, University of Montreal, Montreal, Que., *Canada*

Introduction: Few studies have reported the parental satisfaction with the delivery of pediatric outpatient care. We aim to describe the parental satisfaction of pediatric patients with moderate to severe cellulitis who were managed as outpatients. **Methods:** Prospective survey of all of the patients (3 months–18 years) with a presumed diagnosis of moderate to severe cellulitis made in a university-affiliated pediatric Emergency Department (ED) from Sept 2003 to Sept 2005, who were treated as outpatients. Patients came once daily for parenteral antibiotics at the hospital. Parental satisfaction with their ambulatory care experience was assessed through anonymous self-administered questionnaire consisting of 11 standardized questions. **Results:** During the study period, 92 patients were treated as outpatients with a presumed diagnosis of cellulitis. Nineteen patients eventually required an inpatient stay. A completed questionnaire was returned by 78 families (85% response rate). Overall 95% of the families rated their global appreciation as very good to excellent. Of the 28 patients (36%) who had been hospitalized in the past, 68% thought that their ambulatory care experience was much better than their hospital experience. Eighty-nine % of the families judged that the home discharge instructions given by the ED personnel were clear. Five % expressed worry at the thought of going home with a child who was still febrile and 9% with a child who had indwelling IV access. Only 4% of families were ever concerned or worried about reaching the medical and nursing staff of the unit. Four % of the families did have to contact the ambulatory care team after closing hours. In the future 31% of the families would prefer an inpatient stay over outpatient management. **Conclusions:** Overall the outpatient management of patients with cellulitis was reported as a satisfactory experience by families. This study also identified parental expectations of ambulatory care, this information is useful in optimizing future services. **Key words:** cellulitus, treatment, emergency department

208*

Adequacy of respiratory isolation resources in Ontario emergency departments.

Chenkin JS, Spence JM. Division of Emergency Medicine, University of Toronto, Toronto, Ont., *Canada*

Introduction: The isolation of patients with febrile respiratory illnesses who present to the Emergency Department (ED) has been used successfully to contain outbreaks of infectious disease. The Canadian SARS outbreak suggests that EDs may have a shortage of respiratory isolation resources. The purpose of this study is to determine whether EDs in Ontario have adequate number of respiratory isolation rooms. **Methods:** An online survey was developed and piloted by staff at two EDs. An list of all ED directors in Ontario with a valid email address was compiled from the CAEP registry. Using modified Dillman methodology, an anonymous internet-based survey was sent to ED directors in Ontario. Data was analyzed using Microsoft Excel. **Results:** 77/143 (54%) of physicians responded to the online survey. Ontario EDs have an average of 6.4 respiratory isolation rooms (range 0–33) and 2.5 negative-pressure isolation rooms (range 0–17). Four (5.2%) EDs have no isolation rooms and 14 (18%) have no negative-pressure rooms. Most responders reported that their isolation rooms had an average occupancy of 75–95% and an occupancy of >95% during influenza season. When isolation rooms are full, high-risk patients are commonly being placed in ED waiting rooms (80%) and in common areas of the ED (85%). 47% of ED directors reported that they had an inadequate number of respiratory isolation rooms in their department. 61% of respondents reported that a lack of funding was the largest barrier to the construction of new respiratory isolation rooms. **Conclusions:** A large proportion of EDs in Ontario report having an inadequate number of respiratory isolation rooms. This is leading to patients being placed in areas of the department where they are at high risk for contaminating other patients and healthcare workers. Lack of funding was the most commonly cited reason for inadequate isolation resources. In order to prevent future outbreaks, targeted funding should be allocated to retrofit EDs that have inadequate respiratory isolation rooms. **Key words:** emergency department, infectious disease, outbreak

209*

The effect of widespread restrictions on hospital utilization to control an infectious disease outbreak: lessons from the Toronto Severe Acute Respiratory Syndrome outbreak.

Schull MJ, Stukel TA, Vermeulen MJ, Zwarenstein M, Alter D, Manuel D, Guttmann A, Laupacis A, Schwartz B. Institute for Clinical Evaluative Sciences, Toronto, Ont., *Canada*

Introduction: Efforts to control an outbreak of Severe Acute Respiratory Syndrome (SARS) in Toronto, Canada, led to the imposition of major restrictions on non-urgent use of hospital-based services;

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we sought to describe the impact of the restrictions on health care utilization. **Methods:** Population-based rates of hospital admissions, emergency department (ED) and outpatient visits, diagnostic testing and essential drug prescribing, adjusted for age and sex, in the Greater Toronto Area (GTA), and unaffected comparator regions, before, during and after the SARS outbreak (April 2001 to March 2004). **Results:** During the 4 months of restrictions in the GTA, overall and medical hospital admission rates fell by up to 12% and 11% respectively, elective surgical admissions by up to 22%; urgent surgical rates were unchanged. Elective cardiac revascularization procedure rates fell by as much as 66%; urgent procedure rates remained the same or increased, except for an initial decrease in percutaneous coronary interventions. Admission rates for some acute serious medical conditions decreased by 15% to 21%. High and lowacuity ED visits fell by 37% and 14%, respectively. Inter-hospital transfers declined by up to 44%. Visits to specialists and outpatient diagnostic testing decreased (from 17% for electrocardiograms to 42% for magnetic resonance imaging). Results were similar across age and socioeconomic groups. Overall admission rates in the comparator regions were unchanged, although small decreases in elective procedures occurred. **Conclusions:** Restrictions on hospital utilization achieved substantial reductions in elective services, and modest reductions in overall admission rates. Spillover effects to non-hospital based health services and SARS unaffected regions were minimal and short-lived. However, brief reductions did occur in admissions of some acute serious conditions, high-acuity ED visits and inter-hospital transfers, suggesting that access to care for some potentially seriously ill patients was affected. **Key words:** severe acute respiratory syndrome, outbreak, emergency department

210

Utility of B-type natriuretic peptide in the evaluation of left ventricular diastolic dysfunction in patients with sepsis.

Seong Beom Oh, Sung Oh Hwang, Sun Hyu Kim, Ho Jin Ji, Yoon Kwon Kim, Ho Kyoung Won, Jung Bum Moon, Hyun Kim, Kang Hyun Lee. Division of Emergency Medicine, Wonju College of Medicine Yonsei University, Wonju City, *Gangwon Province*

Introduction: Little data concerning correlation between plasma BNP and left ventricular (LV) diastolic dysfunction in sepsis patients have been reported. The aim of this study is to investigate whether the level of plasma BNP is associated with probability and severity of left ventricular diastolic dysfunction in septic patients with normal systolic function. **Methods:** Forty-five consecutive patients (average age: 59.2 year-old, 26 males) who admitted to emergency department for sepsis, severe sepsis or septic shock from October 2004 through september 2005 were enrolled. Level of plasma BNP was measured and LV diastolic function was assessed by LV diastolic filling profiles using Doppler echocardiography on admission. Patients with systolic dysfunction or any documented preexisting conditions known to increase plasma BNP were excluded. Patients were classified as having normal, impaired relaxation, pseudonormal, or restrictive filling patterns. **Results:** LV diastolic dysfunction was present in 33 (73.3%) of septic patients with normal systolic dysfunction. Patients with abnormal LV diastolic function had an elevated mean BNP concentration than patients with normal LV diastolic function (303±469 vs 64±58 pg/mL, p=007). Mean BNP concentrations of patients with impaired relaxation (n=13), patients with pseudonormalization pattern (n=6), and patients with restrictive filling pattern (n=14) were 144±204, 295±174, and 455±663 pg/mL, respectively (p=0.002). The area under the receiver-operating characteristic curve for BNP to detect any diastolic dysfunction was 0.77 (95% CI, 0.63 to 0.93; P=0.007). A BNP value of 67 pg/mL had a sensitivity of 70% and a specificity of 75% for detecting diastolic function in septic patients with normal systolic function. **Conclusion:** In the early phase of septic patients with normal systolic function, elevated level of plasma BNP is associated with high probability of LV diastolic dysfunction and the levels of plasma BNP were correlated with the severity of LV diastolic dysfunction. **Key words:** natriuretic peptide, sepsis, diastolic dysfunction

211

Patients' perceptions of nasopharyngeal aspiration performed in the emergency department.

Graham CA, Wai AKC, Kwok WO, Chan MS, Rainer TH.. Accident and Emergency Medicine Academic Unit, Chinese University of Hong Kong, *Hong Kong*

Introduction: Nasopharyngeal aspiration (NPA) is the preferred method for collecting specimens for viral culture in patients with respiratory tract infection. As early identification of the virus may influence admission and treatment decisions, it is increasingly important to perform the test in emergency departments. However the test may be perceived as uncomfortable and poorly tolerated. The aim of this study was to investigate patients' perceptions of NPA and the incidence of post NPA nasal bleeding. **Methods:** Prospective observational study in the emergency department of a teaching hospital in the New Territories, Hong Kong SAR. All patients with upper respiratory tract infection undergoing nasopharyngeal aspiration as part of their emergency department investigations between 9th March and 12th August 2005 were included. Data were collected by interviewing patients, including patient's history of nasal procedures; experience of NPA; perception of the procedure on a 10-point scale (0: painfree, 10: most painful), and in comparison with blood taking; and occurrence of nasal bleeding after the procedure. **Results:** Of 86 patients (mean age 47 years, standard deviation 23 years; 49 (57%) female) recruited to the study, 80 (93%) had no previous experience of NPA. 22 (26%) patients complained that NPA was very uncomfortable, 59 (69%) it was mildly uncomfortable and 5 (6%) patients experienced no discomfort. Using the 10-point scale, the median discomfort score was 4.0. 29 (34%) patients complained that NPA was more uncomfortable than blood taking, 19 (22%) felt it was similar to blood taking, and 38 (44%) felt NPA was less uncomfortable (P=NS). 5 patients (6%) developed nasal bleeding after NPA testing. **Conclusions:** NPA performed in the ED is a well-tolerated procedure for the majority of patients and is associated with little nasal bleeding. NPA should be used in EDs when results may influence patient management. **Key words:** nasopharyngeal aspiration, emergency department, pain control

212

Comparisons of adult and pediatric patients with occult bacteremia discharged from the emergency department.

Hung-Jung Lin, Cheng-Chien Lu, Chin-Te Lin, Yuan-Lung Yen. Department of Emergency Medicine, Chi-Mei Medical Center, Tainan, *Taiwan*

Introduction: Fever is a common complaint for visiting the emergency department. Although occult bacteremia in children is a well-known entity and has been extensively studied, there are only a few literatures on adults. **Methods:** To determine and compare epidemiological and clinical characteristics of adult and pediatric patients who were discharged from the emergency department (ED) and subsequently proved to have positive blood cultures for bacteria. A study utilizing a system for notifying positive blood culture results and recalling of the patients was conducted in the ED at a teaching hospital in Taiwan between September 1, 2001 and January 31, 2003. **Results:** During the study period, 172,147 patients were treated in the ED and 72% were adults. Blood cultures were done for 9.3% of the adult and 16.4% of the pediatric patients. Among them, significant

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organisms were isolated in 12.9% of the adults and 0.9% of the children. In those who had significant organisms isolated, 4.2% of the adult and 18% of the children were discharged from the ED. Urinary tract infection was the single most important diagnostic entity among the adults. Acute gastroenteritis was the most common diagnostic entity among children. The most frequently isolated organisms in adult patients were Escherichia coli and Klebsiella pneumoniae. The most frequent isolated organisms in pediatric patients were Salmonella species, Staphylococcus aureus and Sreptococcus pneumoniae. However, 47% of pediatric patients and 56% of adult patients, who were discharged and proved to be bacteremic, returned to the hospital and received proper treatment, either admitted or discharged again. There were 37% of discharged children and 26% of the discharged adults that could not be contacted. **Conclusions:** Among patients with occult bacteremia, adults and children had very different distributions of isolated organisms and initial major diagnoses. A system for recalling could enhance patient safety for patients with occult bacteremia. **Key words:** bacteremia, epidemiology, emergency department

213*

A randomized controlled double blind trial of intravenous cefazolin versus oral moxifloxacin for the treatment of cellulitis in the emergency department.

Stenstrom R, Grafstein E, Innes G, Huynh F, Brown G, Lo G, Christenson J, Saona R, Harris D, Hunte G. Department of Emergency Medicine, St. Paul's Hospital, Vancouver; Faculty of Medicine, University of British Columbia, Vancouver, BC, *Canada*

Introduction: Cellulitis is a common emergency department (ED) diagnosis treated with outpatient intravenous (IV) antibiotics, despite a lack of evidence supporting this practice. The purpose of this trial was to compare 400 mg of oral moxifloxacin and 1 gram of oral probenecid (Oral Group) once daily to 2 gms of IV cefazolin and 1 gm of oral probenecid once daily (IV group) for the treatment of cellulitis. **Methods:** A prospective, randomized, double blind, IRB-approved, controlled trial was conducted in an urban tertiary care hospital (65,000 ED visits/year). Patients with a diagnosis of cellulitis requiring outpatient IV antibiotics were randomized to receive 400 mg of oral moxifloxacin combined with 1 gm of oral probenecid and 2 gms of IV placebo once daily or 2 gms of IV cefazolin and 1 gm of oral probenecid with 400 mg oral placebo, once daily. Patients were assessed daily until the study medication was discontinued. Primary outcome: treatment failure (admission to hospital, change in IV antibiotic regimen, adverse event, inability to obtain IV access, specialist consultation, re-treatment within 14 days). Secondary outcomes: diameter of erythema, days of treatment. **Results:** Data were analyzed by intent to treat. 42 subjects were randomized to the oral group, 42 to IV. Demographic features of the groups were similar. Failure rate was 8/42 (19.1%) in the Oral group and 6/42 (14.3%) in the IV group ($p = 0.79$). Repeated measures ANOVA with diameter of affected area as the dependent variable and treatment and time (day 1, 2, 3) as the independent variables demonstrated a significant effect of time on diameter of the affected area ($F2, 164 = 57.2$; $p < 0.001$), no significant effects of treatment ($F1, 82 = 0.02$; $p = 0.89$) or treatment x time interaction ($F1, 162 = 0.18$; $p = 0.83$). Median days of treatment was 3 in both groups ($p = 0.86$). **Conclusion:** IV Treatment of cellulitis with cefazolin was not superior to oral moxifloxacin on the basis of treatment failure rate, reduction in area of erythema over time, or days of treatment required. **Key words:** cellulitus, randomised controlled trial, emergency department

214

Pandemic Influenza - practical preparation of the ED.

Hughes TC, Way R, Black JJM, Mardel S. Emergency Department, John Radcliffe Hospital, Oxford, *UK*

The overall aim should be to establish and monitor safe infection control practices among staff using clear guidelines and monitoring. Local implementation should be guided by the infection control team. For emergency departments preparation includes: 1. Institution of effective standard infection control precautions applied to all patients. This includes routine hand hygiene before every patient contact, and additionally after removal of gloves or after contact with body fluids. 2. In situations where body fluids, including respiratory secretions may splash into the face, eye protection and a surgical mask should be used. 3. Since influenza maybe difficult to diagnose in patients either presenting with co-morbidity or developing in patients already hospitalised for another condition, these standard precautions will be essential in reducing influenza transmission in any health care setting. 4. Education of staff to be alert for novel strain of influenza regardless of local status of pandemic influenza. 5. Prepare for use of respiratory hygiene/ respiratory etiquette among staff, patients and visitors within the ED including waiting room and reception areas. This requires signage, training material, consumables, and disposal arrangements. 6. Measures to reduce admission, improve communication with primary care, safe treatment at home, reduce transmission in home (proformas, advice leaflets). 7. Plan on how reception staff will be protected from contact and droplet transmission e.g. screens. 8. Plan how to safely triage all ED patients to determine infection risk of all patients in the event of pandemic flu. Triage algorithms will be decided centrally. 9. Plan Segregation measures within department, including provision of increased cleaning measures. 'Hot' / 'Dirty' and 'Cold' / 'Clean' zones. Appropriate ventilation with filtration. 10. Training and equipment preparation for increased use of droplet/ aerosol precautions. Monitor compliance with droplet precautions. Eliminate aerosols outside designated areas. **Key words:** pandemic, influenza, emergency department

215

Hints for Leptospirosis in ED.

Pei-Chun Lai, Yen-Ta Huang. Department of Pediatrics, Buddhist Tzu-Chi General Hospital, Hualien, *Taiwan*

Introduction: Emergency physicians usually overlook leptospirosis because of initially non-specific presentations. This investigation aimed to find some indicators for early alertness of leptospirosis in ED. **Methods:** We conducted a retrospective study in ED of Tzu-Chi medical center from September 2000 to February 2005. Patients with clinical diagnosis of leptospirosis were included and divided into three groups. Confirmed cases had 1 of the following criteria: a 4-fold increase in microscopic agglutination test (MAT) serum titer between acute and valescent phase; positive IgM detection assay; isolation of Leptospira species; positive dark-field microscopy; and positive PCR assay. Probable cases had positive MAT titer without 4-fold increase, and suspect cases had no laboratory support. Initial symptoms, signs, and laboratory information within two days of ED visiting recorded in charts were collected. **Results:** 25 confirmed, 19 probable, and 91 suspect cases were collected. The clinical presentations of confirmed and probable cases (n=44) were analyzed. The most common presentations were fever (86.4%), flu-like symptoms (72.7%), dyspnea (36.4%), icteric sclera (34.1%), altered mental status (29.5%), subconjunctival suffusion (27.3%), hypotension (27.3%), rales of breathing sound (22.7%), and skin/soft tissue lesions (20.5%). Abnormal laboratory data included positive DD-dimer (22/26); elevation of GGT (11/11), CRP (31/35), LDH (18/26), AST (29/44), ALT (28/44), and CPK (22/36). Percentage of abnormal CXR was 65.9%. Compared confirmed plus probable with suspect cases, the most likely indicators (likelihood ratio) with statistical significance ($P<0.05$) for early alertness were abnormal CXR (12.61), risks of exposure (10.38), rales (6.88), skin/soft tissue lesions (5.67), flu-like symptoms (5.59), elevated GGT (5.09), and

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dyspnea (4.18). **Conclusions:** Leptospirosis could be watchful in ED through some indicators. **Key words:** leptospirosis, emergency department, indicators

216

Epidemiology of Community-Acquired Pneumonia in Hong Kong: A prospective observational study.

SY Man, K Chu, CY Man, N Lee, M Ip, AP Galvani, GE Antonio, KT Wong, DPN Chan, AWH Ng, KK Shing, SSL Chau, P Mak, P Chan, AT Ahuja, DS Hui, JJY Sung, TH Rainer. Chinese University of Hong Kong, Hong Kong, *China*

Introduction: Community-acquired pneumonia (CAP) is a leading cause of hospital admission. The aim of this study was to describe the epidemiology, clinical features and outcome of CAP in Hong Kong. **Methods:** Prospective observational study of all patients admitted through the Emergency department of a university hospital in Hong Kong's New Territories in 2004 with a provisional diagnosis of CAP. Main outcome measures were confirmed CAP, admission to ICU and mortality rate. **Results:** Of 1016 patients (583 [57%] male, mean age 72 years) with CAP, a microbial organism was identified in 491 patients (48%): 310 (31%) bacterial, 146 (14%) viral and 35 (4%) with mixed infection. The commonest pathogens were chlamydia pneumoniae (6%), streptococcus pneumoniae (6%), haemophilus influenzae (5%) and influenza A (8%). 766 (75%) cases were from the community whilst 252 (25%) patients were from old age homes. 117 (12%) patients were smokers. 122 patients (12%) had traveled outside Hong Kong within 14 days before the onset of illness, mostly commonly Mainland China. Common symptoms include cough (89%); expectoration (77%); shortness of breath (70%) and fever (80%) with a mean temperature of 37.9oC. Only 28 patients (<3%) had very high fever with temperature 40oC. Other less common symptoms include pleuritic chest pain (25%) and haemoptysis (7%). Radiological evidence of pneumonia were present in the first chest radiograph of 770 (76%) patients. 99 patients (<10%) had pleural effusion. 42 patients (4%) needed ICU admission, and 25 (60%) of these needed intubation and ventilatory support. The overall mortality rate was 8.7%. **Conclusions:** CAP in Hong Kong is typical of other developed areas in the world. **Key words:** pneumonia, epidemiology, emergency department

217

Discrepancy between initial Emergency Diagnosis of CAP and final diagnosis in admitted patients in Hong Kong.

SY Man, Chu K, Man CY, N Lee, M Ip, AP Galvani, GE Antonio, KT Wong, DPN Chan, AWH Ng, KK Shing, SSL Chau, P Mak, P Chan, AT Ahuja, DS Hui, JJY Sung, TH Rainer. Chinese University of Hong Kong, Hong Kong, *China*

Introduction: To determine the discrepancy between initial diagnosis made by the emergency physicians and final diagnosis at discharge in patients admitted to hospital with a provisional diagnosis of community acquired pneumonia (CAP). **Methods:** Prospective observational study of all patients admitted through the Emergency department of a university hospital in Hong Kong's New Territories in 2004 with a provisional diagnosis of CAP. Main outcome measures were confirmed CAP. **Results:** Of 1648 patients, 1016 (62%) were confirmed as CAP at discharge. In 632 patients with other discharge diagnoses, influenza (n=115;11%), aspiration pneumonitis (n=95; 9%), exacerbation of chronic obstructive airway disease (n=77; 8%), urinary tract infection (n=41; 4%) and fever secondary to neoplasm (n=31; 3%), were most common. 770 (76%) patients had confirmed radiological evidence of pneumonia on chest radiograph at admission while the remaining 246 (24%) patients were normal. 457 patients (45%) had more than one pulmonary lobe affected. **Conclusions:** An early accurate diagnosis of CAP may not be easy but emergency physicians should be alert to the possibility of aspiration, UTI and neoplasm especially in the elderly. 25% of the CAP patients did not have any radiological evidence of pneumonia at admission. **Key words:** pneumonia, diagnosis, emergency department

218*

The risk of methicillin-resistant *staphylococcus aureus* (MRSA) infection based on previous MRSA colonization in emergency department (ED) patients.

Stenstrom R, Grafstein E, Romney M, Innes G, Harris D, Hunte G. Department of Emergency Medicine, St. Paul's Hospital, Vancouver; University of British Columbia, Vancouver, BC, *Canada*

Introduction: MRSA infections are increasingly common in the ED. Institutional identification and alert generation of MRSA status from any source usually means the maintenance of that alert in perpetuity. This has created an increase use in empiric vancomycin therapy for patients with new infections and a previous MRSA alert. Our objective was to determine the infectious etiology of wound cultures in patients with MRSA alerts presenting to the ED. **Methods:** This was a historical cohort study using an ED administrative database. All patients with patients presenting to an urban Canadian tertiary care emergency department (60,000 visits/year) between Jan 2003–Jan 2005 with a discharge diagnosis of skin and soft tissue infection (SSTI) (ICD-9 682.9) were included. Linkage with the hospital microbiology database allowed identification of a) all patients with a previous MRSA alert and b) culture results for those patients who had wound cultures while in the ED. **Results:** 144 patients with a pre-existing MRSA alert had subsequent wound cultures in the ED. Of patients who were MRSA positive > 1 year, 34% were MRSA positive on repeat culture versus 62.6% of those patients MRSA positive for < 1 year (OR = 3.2; 95% CI = 1.4–5.7). In 76 patients with an existing MRSA alert who were diagnosed with cellulitis or abscess 58% were MRSA positive and 42% were MRSA negative. **Conclusion:** MRSA Alerts do not predict the likelihood of having MRSA positive ED wound culture. The further the length of time from the generation of an MRSA alert, the greater the likelihood that the infection is not from MRSA. **Key words:** methicillin resistant, *staphylococcus aureus*, emergency department

PAIN TRACK

219

Should emergency physicians use xylocaine spray to ease nasogastric tube insertion and prevent complication? A prospective, double blinded, randomized control trial in a regional hospital in Hong Kong.

Dr.Chan Chi Pang. Emergency Department, Queen Elizabeth Hospital , Hong Kong, Hong Kong, *China*

Introduction: This study was conducted to examine the efficacy and safety of xylocaine spray as an analgesic agent for nasogastric tube insertion in adult in the Emergency Department. **Methods:** All patients presented with conditions requiring nasogastric tube insertion and fulfilling the inclusion criteria were enrolled. Primary outcome measures were procedure time, patient discomfort perception using visual analogue scale (VAS), Likert scale score of insertion difficulty, number of insertions, adverse events and final success or fail. **Results:** From 30 May 2005 to 20 October 2005,

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altogether 206 patients were recruited. Their mean age was 59 years. 103 patients (50%) received placebo (normal saline spray) and 103 patients (50%) received xylocaine spray. The average VAS was 86.8 mm for the placebo group and 20.2 mm for the xylocaine group. The majority of Likert scale score was "severe" for the placebo group and "slight" for the xylocaine group. The average procedure time was 4.8 minutes for the placebo group and 1.8 minutes for the xylocaine group. Patients who received placebo experienced more frequent complications of chest pain (11.7% vs 0%), epigastric pain (11.7% vs 0%), vomiting (65.1% vs 3.9%), shortness of breath (40.8% vs 1%), epistasix (11.7% vs 1.9%) and facial petechiae (5.8% vs 0%) than those in the xylocaine group. No inadvertent tracheal placement was noted in both groups. Average number of insertion attempt in xylocaine group was one in contrast to average two in placebo group. Nine patients of placebo group (8.8%) eventually failed insertion of nasogastric tube but only one patient of xylocaine group (1%) was failed. **Conclusions:** The use of xylocaine spray, compared to placebo application, was associated with significantly shorter procedure time, much less patient discomfort, more easy insertion and reduced adverse events or failed insertion rate. Xylocaine spray is an effective and safe analgesia in adult patients requiring nasogastric tube insertion in the Emergency Department. **Key words:** pain, nasogastric tube, randomised controlled trial

220*

Sucrose and/or pacifier as analgesia for infants receiving venipuncture in a pediatric emergency department.

Curtis SJ, Jou H, Ali S, Vandermeer B, Klassen TP. Division of Pediatric Emergency Medicine, Stollery Children, Edmonton, Alta., *Canada*

Introduction: Previous studies have demonstrated the effectiveness of sucrose as analgesia, in the NICU population, mainly for the procedure of heel lance. To date, the effect of sucrose +/- pacifier for the procedural pain of venipuncture on infants in the pediatric emergency department had not been studied. **Methods:** Double blinded (sucrose) randomized control trial, factorial design. Eighty-four patients were randomly assigned to one of four groups as follows: a) sucrose b) sucrose & pacifier c) control d) control & pacifier. Each child received 2 ml of either 44% sucrose (case) or sterile water (control), PO, 2 minutes prior to venipuncture. A research nurse recorded pain scores and heart rate before and after the procedure, as well as crying time after venipuncture. Primary outcome: Faces, Legs, Activity, Cry and Consolability (FLACC) pain scale score. Secondary outcome: 1. Crying time 2. Heart Rate. **Results:** Age-adjusted regression analysis revealed that use of both sucrose (mean reduction 50 sec, $p < 0.0145$) and pacifier (mean reduction 64 sec, $p < 0.0018$) independently decreased crying time after venipuncture in infants 0–6 months in the pediatric emergency department. FLACC score and heart rate were not significantly affected by either intervention. For pacifier use, subgroup t-test analysis revealed a mean crying time difference of 77 sec ($p < 0.0171$) in the 0–1 month group, 124 sec ($p < 0.0029$)in the 1–3 month group and no significant effect in the greater than 3 months group. By t-test analyis the use of sucrose resulted in lower pain scores, crying time and heart rates although statistical significance was not achieved. Further analysis revealed that as post natal age and gestational age increased, so did crying time in response to pain. **Conclusions:** The effects of nonnutritive sucking appear to significantly decrease pain experienced from venipuncture for infants 0–3 months. Sucrose (44%) also appears to be beneficial although further study is needed to clarify age and treating environment-related effects. **Key words:** pain, pediatrics, randomised controlled trial

221

Analgesic effect of the transdermal fentanyl patch in the acute trauma patient.

Won HK, Oh SB, Lee KH, Kim YK, Kim SH, Kim H, Hwang SO. Department of Emergency Medicine, Wonju College of Medicine, Yonsei University, Wonju, *South Korea*

Introduction: Fentanyl is a potent opioid that can be delivered by the transdermal route. Once the patch is applied to the skin, the drug diffuses into the subcutaneous tissues and forms a reservoir. The patch provides a constant analgesic effect for 48 hours. It is less work loading to the nurse and less injection pain to the patients. The use of NSAIDs in trauma patient is common, but the effect of transdermal fentanyl patch in the acute pain management of trauma patient is not well known. **Methods:** All 32 patients with injury after trauma were enrolled at this study during the 15 month period (from February 2004 to April 2005) prospectively. Alert patients who were older than 10years were included. But the patients were excluded if they displayed any of the following criteria: hemodynamically unstable status, hypersensitivity to fentanyl, pathologic fracture, patients for emergency operation. Initially, pain control were performed by emergency physicians with opioid or NSAID. And the patients were randomly classified into 4 groups(group 1: diclofenac beta-dimethyl aminoethanol 90 mg IM q 8hrs, group 2: fentanyl patch 25 mcg/hr. group 3: fentanyl patch 50 mcg/hr, group 4: diclofenac beta-dimethyl aminoethanol 90 mg IM and fentanyl patch 25 mcg/hr). Numeric rating pain scale was used for pain assessment. The patient rated pain score by using a numeric rating scale and the vital sign in every 8hours. And we checked the side effects of fentanyl patch in the patients. **Results:** Initial pain score and pain score after 48hours were 8.8±2.0 and 3.2±1.9 in group 1, 10.0 and 5.4±0.9 in group 2, 9.4±1.2 and 4.0±1.9 in group 3, and 8.0±2.2 and 3.9±2.2 in group 4. There were no differences the reduction rate of pain score and side effects in each group. **Conclusion:** The analgesic effect of fentanyl patch on pain after trauma is as good as NSAID. Fentanyl patches are convenient and simple method of pain management on trauma. **Key words:** pain, fentanyl, trauma

222

A prospective, randomised controlled trial of virtual reality hypnosis for the management of acute musculoskeletal back pain in the Emergency Department.

Smit P deV, Papadopoulos P, Considine J. Emergency Department, The Northern Hospital, Epping, Victoria, *Australia*

Introduction: Back pain is a common presenting complaint in the Emergency Department (ED), posing certain challenges regarding analgesia and timely disposition. The objective of this study was to determine if virtual reality hypnosis (VRH) is beneficial as an adjunct to conventional therapy for the management of acute musculoskeletal backpain in the ED. **Methods:**This is a prospective, randomized controlled study. Patients with musculoskeletal back pain were randomised to a control group (conventional therapy) or an experimental group (conventional therapy plus VRH). Both groups received the same oral analgesics. The primary outcome measures were pain scores measured using Visual Analogue Scale (VAS). Secondary outcome measures were physiological parameters, adverse effects, need for ongoing analgesia, perceived patient effectiveness, willingness to undergo same treatment and ED length of stay. Our hypothesis was that the experimental group receiving hypnosis would show a greater reduction of pain scores by at least 2 cm compared to our control group. **Results:** A total of 52 patients were enrolled in the trial (control group: n=26 and experimental group: n=26). The control group had a median reduction in pain of 1.7 cm while the experimental group had a 2.1 cm reduction in pain on a VAS. When between

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group differences were examined, this study failed to detect significant differences in effect of treatment (U = 271.00, p = 0.220). Examination of within group differences showed that both treatments were effective in reducing pain. Even though there were no statistically significant differences in our secondary outcomes the experimental group reported less adverse effects and required less ongoing analgesia. **Conclusions:** This study failed to detect a clinically significant difference in pain reduction with the hypnosis intervention. However, both therapeutic arms were effective in reducing pain. **Key words:** randomised controlled trial, pain, hypnosis

223*

Impact of a pain management practice guideline on narcotic administration in emergency department patients undergoing trauma team activation.

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Introduction: Numerous studies have found suboptimal analgesic use in emergency department (ED) patients. We sought to determine the impact of a pain management practice guideline (PG) for major trauma patients at a tertiary hospital. Our primary hypothesis was that the PG would result in at least a 30% relative reduction in the median time to analgesic administration (a difference deemed a priori to be clinically significant). **Methods:** An interdisciplinary team developed and disseminated a pain management PG that categorized trauma patients into three groups based on hemodynamic stability. Charts of all patients associated with a trauma team activation over a three-period time series were reviewed using explicit criteria: the 6 months immediately prior to and 6 months immediately after release of the PG (P#1 and P#2); and the 6 months commencing 18 months after release of the PG (P#3). **Results:** 252 patients were enrolled between 2002 and 2004 (P#1 n = 81, P#2 n = 2, P#3 n = 89). There was an increase in the proportion of patients receiving analgesics between P#1 and P#2, which was not sustained in P#3 (59.3%, 74.4%, and 51.7% respectively). The median (mean) time from arrival to an ED stretcher to first analgesic was 39.5 (76.6) minutes in P#1; 20.0 (47.5) minutes in P#2; and 25.5 (59.3) minutes in P#3 (p = 0.077 by Kruskal–Wallis Test for overall downward trend). The reduction in the median time to first analgesic between P#1 and P#3 was 35.4% (absolute reduction 14 minutes). Use of fentanyl as the first drug, advocated by the PG over other agents due to its rapid onset, increased throughout the study periods (P#1: 37.5%, P#2: 50.8%, and P#3: 56.5%). A trend towards a decrease in the time interval between repeat drug doses across the study periods was also observed. **Conclusions:** Implementation of a pain management PG for trauma patients at our institution resulted in sustained clinically significant improvements in analgesic administration that trended towards statistical significance. **Key words:** pain, trauma, emergency department

224*

Venepunctures in the pediatric emergency department: automating the teaching of coping.

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Introduction: Seventy-five percent of children in the emergency department (ED) experience clinically significant levels of pain during their stay (Chambers et al., 2003). Parent-guided cognitive-behavioural interventions such as distraction may be useful for reducing pain and anxiety in children undergoing medical procedures (Hardial et al., 2004). The number of staff and the demands of the ED make it difficult to maintain a system for training parents how to implement cognitive-behavioural interventions with their children. In the current pilot study, we created an automated (DVD-based) intervention program in parent-guided distraction and relaxation techniques to reduce venepuncture-related child pain and anxiety in the ED. **Methods:** Twenty children (14 M; 6 F) between the ages of 6 and 13 participated in this study. All of the children received the DVD-based intervention, which consisted of two brief DVDs. The first DVD instructed parents and children on how to reduce child pain and anxiety associated with venepunctures. The second DVD was an animated short film that was used as a distraction tool during the venepunctures. **Results:** The DVD-based intervention program worked well and was easily incorporated into the ED routine. The mean of the child anxiety ratings was 3.7 (SD = 3.1) on a numerical rating scale and the mean of the child pain ratings was 3.2 (SD = 2.3) on the Faces Pain Scale-Revised (Hicks et al., 2001). **Conclusions:** This pilot study demonstrated that the DVD-based intervention program was feasible in a busy ED setting. The mean pain rating was on the borderline of our pre-determined cut-off scores for treatment efficacy; however, the small sample size and lack of control group in the current study prevent us from drawing any firm conclusions about the success of the program. A larger randomized controlled trial of the program is currently underway. **Key words:** pain, pediatrics, venepuncture

225

Safety of procedural sedation and analgesia (PSA) in emergency department.

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Introduction: Benzodiazepine and narcotics are one of the most effective and popular combinations for procedural sedation and analgesia (PSA) in emergency departments (ED) which posses analgesic, anxiolytic, sedative, hypnotic and muscle relaxant properties. In PSA, Midazolam and Fentanyl are preferred agents so all emergency physician have to be familiar with their adverse effects. **Methods:** This study was designed as an observational longitudinal study. One standardized protocol consists of Fentanyl and Midazolam was applied to all patients, then a checklist was filled for every patient during a 3 months period and after all these data were analyzed. **Results:** 319 checklists were filled, 13 patients were excluded due to possibility of addiction, insufficient analgesia and sedation or derailment from standardized protocol. 284 patients (92.8%) had no significant complications, 2 patients developed transient apnea (0.65%), they were supported with bag-mask-valve ventilation for less than 3 minutes, both of them were under 25 years old, 6 patients suffered from agitation (1.95%), 5 of them over 65 years old and one under 25, all self limited and 14 patients (4.6%) had prolonged sedation (more than one hour). There was no report of need to intubation or use of reversal agents. All of them left ED without any remarkable side effects. **Conclusions:** Use of protocolized PSA seems to be safe in the hands of emergency physicians especially if it is designed based on local capabilities, proper training and regular outcome evaluations. **Key words:** pain, emergency department, procedural sedation

226

The degree of pain caused by Foley™ catheter and Levin™ tube insertion.

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Introduction: In the emergency department (ED), there are many procedures done to treat patients and some cause pain for a long pe-

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riod of time. But, there are no specific guidelines to control this pain. So this study was set up to find out whether the pain caused by procedures performed in the ER is to a degree in which the pain control is necessary. **Methods:** The subjects (n=146) were patients who had either the Foley catheter or L-tube inserted in the ED from September until November 2005. The control group (n=378) consisted of those who visited the ED during the same period for acute tonsillitis or whiplash injury, currently controlled with NSAIDs. After the two procedures were performed, the patients were directed to indicate the degree of pain caused by these two conditions, and then the severity of pain compared with the control group. The degree of pain was recorded using the pain thermometer, numeric rating scale and visual analog scale, marking a score out of 10. **Results:** The pain investigated 30 minutes, 12 hours, 24 hours and 36 hours of deferment after Foley catheter insertion, was 6.1, 5.5, 4.7, 4.2 and 5.4, 4.7, 4.1, 3.8 for L-tube insertion, respectively. The pain score results in the control group were 5.0 in acute tonsillitis, and 4.9 in whiplash injury. The pain scores right after insertion and 12 hours of Foley catheter deferment were significantly higher compared with acute tonsillitis and whiplash injury but the scores were equivalent or lower after 24 hours ($p<0.05$). L-tube insertion showed significantly higher pain scores directly after insertion compared with the control group, but revealed equivalent or lower scores after 12 hours of deferment ($p<0.05$). **Conclusions:** The pain scores observed up to 24 hours of Foley catheter and L-tube insertion were higher or equivalent to those of the control group. Therefore, we believe when Foley catheter or L-tube is inserted in the ED, controlling the pain with NSAIDs up to 24 hours of deferment is beneficial. **Key words:** pain, emergency department, pain score

227

Management of Pain in the Emergency Department.

Pena R, Venezuelan Society of Emergency and Disaster Medicine, *Venezuela*

The authors of this abstract discuss the current evaluation, management and various modalities of acute pain control in the emergency department. This is from the perspective of the Venezuelan Society of Emergency and Disaster Medicine.

228

Use of Tramadol in Prehospital Field and Emergency Room.

Pena R. Venezuelan Society of Emergency and Disaster Medicine, *Venezuela*

The authors of this abstract discuss use of tramadol in the prehospital field and emergency department. This is from the perspective of the Venezuelan Society of Emergency and Disaster Medicine. **Key words:** pain, emergency department, pain score

229

Use of low-dose ketamine for procedural sedation in adults: a prospective observational study.

Alastair Newton, Larry Fitton. Emergency Department, St Thomas' Hospital, Lambeth Palace Road, London, *UK*

Aims: To establish the efficacy, physiological effects, and adverse events following use of low-dose ketamine for adult procedural sedation. **Methods:** A prospective observational study on 28 patients requiring procedural sedation in the emergency department of a large urban hospital. Sedation was achieved by an initial dose of 0.5mg/kg of ketamine intravenously, with a further dose after five minutes if sedation was inadequate. Heart rate, blood pressure, respiratory rate and oxygen saturation were recorded every five minutes during the procedure. Specific adverse events of laryngospasm, hypoxemia, vomiting, hypersalivation, clonic movements, and agitation were recorded. **Results:** Adequate sedation was achieved in 27 of 28 patients (96.4%). 13 of the 28 patients (46%) obtained an adequate sedation level after the initial dose of 0.5mg. Heart rate (HR) data was available for 26 of 28 patients (92.9%); HR increased by a mean of 31% (SD +/- 20.4%, range 0-79%). Systolic blood pressure (SBP) data was present on 25 of 28 patients (89.3%); SBP increased by a mean of 29% (SD +/- 15.3%, range 6-64%). All patients maintained oxygen saturation above 97%. Adverse events occurred in 9 patients (33%). 3 patients (11%) had transient clonic movements that required no treatment. 5 patients (18%) developed agitation. In two cases no treatment was required; the other three required intravenous midazolam (1mg, 3mg and 10mg respectively). Three of the five patients experiencing agitation were noted to be displaying signs of anxiety or agitation prior to the procedure with a worsening of symptoms after ketamine administration. **Conclusions:** Low-dose ketamine is an effective agent for use in adult procedural sedation. There appears to be a relatively high incidence of anxiety/agitation associated with its use. This would appear to be especially significant in the anxious patient. We would therefore not recommend the use of ketamine for sedation in these patients. **Key words:** pain, emergency department, procedural sedation

THERAPEUTICS TRACK

230

Novel pharmacotherapy of acute hereditary angioedema with bradykinin-b2-receptor-antagonist icatibant.

Bas M, Greve J, Kojda G, Bier H, Hoffmann TK. Department of Otorhinolaryngology, University of Düsseldorf, *Germany*

Sudden occurence of subcutaneous or submucosal swelling - so-called angioedema - is an established and potentially life-threatening condition. Several forms of angioedema seem to be induced by elevated bradykinin (BK) concentrations. They are either caused by increased BK-production like hereditary angioedema (HAE) involving the lack of a functional C1-esterase inhibitor (C1-INH) or by reduced BK-inactivation e.g. during ACE-inhibitor treatment. BK-induced angioedema are not responsive to current standard treatment for other forms of angioedema (e.g. corticosteroids and antihistamines). Until now acute attacks of HAE have been treated with intravenously administered C1-INH concentrate derived from human plasma, generally leading to the reduction of the edema within 24 h. During an ongoing phase III study FAST 2 (For Angioedema Subcutaneous Treatment) we treated several HAE patients with Icatibant, a specific bradykinin-B2-receptor-antagonist. Icatibant is subcutaneous applied and was tested against tranexamic acid. Here we report our own experiences with Icatibant administrations within the open-label part of this study. So far we have administered Icatibant open-label in 26 acute HAE attacks. 12 attacks were located in the head-neck-region (3 involving the larynx), 9 were at the abdominal or extremity-skin and 5 were in the genital region. Following treatment with Icatibant first symptom relief occurred rapidly. Complete remission of symptoms within 12 ±2.5 hours. Laryngoscopy revealed complete remission of laryngeal edema after 4 hours. No cardiovascular or other systemic side effect was detected. However, at the injection site a localized and well tolerated skin irritation was observable. Following open-label treatment in the present study Icatibant was efficacious in the treatment of acute HAE attacks with a rapid onset of symptom relief. The subcutaneous route might also improve the quality of life for HAE patients, particular those who are presenting with frequent recurrences. **Key words:** angioedema, emergency department, icatibant

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231

Comparison of oral prednisolone and oral indomethacin in the treatment of acute gout: a double-blind, randomised, controlled trial.

Man CY, Cheung ITF, Cameron PA, Rainer TH. Chinese University of Hong Kong, Hong Kong, *China*

Introduction: To compare the analgesic efficacy and adverse effects of oral prednisolone and oral indomethacin in the treatment of acute gout in patients presenting to an emergency department. **Methods:** Double-blind, randomised, controlled study in the Emergency Department of a university hospital in the New Territories of Hong Kong. Consecutive patients age >15 years presenting with a clinical probability of gout were randomized to receive either oral prednisolone/paracetamol or oral indomethacin/paracetamol combinations. Primary outcome measures were pain scores, time to resolution of symptoms/signs and adverse effects of the treatment. Secondary outcome measures were need for additional paracetamol, extended stay in the observation ward and relapse rate. **Results:** Between 1st February 2003 and 30th June 2004, 90 patients were randomized into the study: 46 patients to the indomethacin group and 44 patients to the prednisolone group. Baseline characteristics including the pain scores prior to treatment were similar in the two groups. Both treatment groups had a similar decrease in pain score at all time points. Patients in the steroid group consumed more paracetamol than the NSAID group ($P<0.05$). Twenty nine patients in the NSAID group and 12 patients in the steroid group experienced adverse effects ($p<0.05$). The commonest adverse effects in the NSAID group were GI bleeding (N=5, 11%), nausea, indigestion, epigastric pain and dizziness. None of the patients in the steroid group developed GI bleeding. The relapse rate for both treatment groups was similar. **Conclusions:** In the treatment of acute gout, oral prednisolone/paracetamol combination is as effective as indomethacin/paracetamol combination at relieving pain but is associated with less adverse effects. **Key words:** gout, steroids, anti-inflammatories

Tuesday, June 6th: Poster Presentations

ADMINISTRATION TRACK

232*

Who is dissatisfied with emergency department care? An analysis of the association between unmet health care needs and dissatisfaction with care in the emergency department.

Harris DR, Koehoorn M, Hogg B, Innes G. Department of Emergency Medicine, University of British Columbia, Vancouver, BC, *Canada*

Introduction: Satisfaction with emergency department (ED) care has commonly been examined with respect to system factors, such as wait times. Patient factors such as individual health needs, health status, or sociodemographic characteristics may influence patient satisfaction with ED care. The objective of this study was to investigate the association between patients' perceived unmet health care needs and dissatisfaction with ED care, adjusted for health status and sociodemographic factors. **Methods:** This was an analysis of a large cross-sectional health survey, the Canadian Community Health Survey (CCHS) Cycle 2.1, administered in 2003 by Statistics Canada. The study population consisted of a subset of respondents of the CCHS who reported receiving medical care in an emergency department. The study outcome variable was satisfaction with care received (satisfied/dissatisfied) in the emergency department. The primary explanatory variable was self-perceived unmet health care needs (met/unmet). Sociodemographic, health care utilization, and health status indicator variables that may have a relationship to satisfaction were adjusted for in the analysis. Univariate and multivariable logistic regression was employed to examine possible associations between patient factors and dissatisfaction with ED care. **Results:** Dissatisfaction was associated with unmet health care needs (adjusted odds ratio = 2.34; 95% confidence interval [1.81, 3.01]). After adjustment, being female, aged 30–54 and in the highest income category were all associated with a statistically significant increased risk of reporting being dissatisfied. Those who reported consuming two or more alcoholic drinks per day and those with difficulty performing daily activities were also more likely to report being dissatisfied. **Conclusions:** Patient factors do play a role in reporting dissatisfaction with ED services. Interventions to improve satisfaction in emergency departments should be tailored to patient expectations recognizing patient demographics. **Key words:** emergency department; patient satisfaction; health care needs.

233*

Are patients with chronic illness less satisfied with emergency department medical care?

Harris DR, Koehoorn M, Innes G, Stenstrom R. Department of Emergency Medicine, University of British Columbia, Vancouver, BC, *Canada*

Introduction: The current literature is not clear about the role that patient health status has on satisfaction with emergency department (ED) medical care. The objective of this study was to investigate the association between chronic illness and dissatisfaction with ED care, adjusted for sociodemographic factors. **Methods:** This was an analysis of a large cross-sectional health survey, the Canadian Community Health Survey (CCHS) Cycle 2.1, administered in 2003 by Statistics Canada. The study population consisted of a subset of respondents of the CCHS who reported receiving medical care in an emergency department. The study outcome variable was satisfaction with care received (satisfied/dissatisfied) in the emergency department. The primary explanatory variable was the self-reported presence of a chronic condition (yes/no). Self-rated health, self-rated mental health, specific chronic conditions and sociodemographic variables that may have a relationship to satisfaction were adjusted for in the analysis. Univariate and multivariable logistic regression was employed to examine possible associations between these factors and dissatisfaction with ED care. **Results:** Our study population included 1,966 respondents. Dissatisfaction was not associated with the self-reported presence of a chronic condition (adjusted odds ratio = 0.88; 95% confidence interval (0.66, 1.16)). After adjustment, being young (less than 29 years old or 30 to 44 years old) and from the lowest or highest income category were the only patient factors that were associated with a statistically significant increased risk of reporting being dissatisfied. There was no association between any of the selected chronic diseases and dissatisfaction with ED care. **Conclusions:** Contrary to some of the published literature, our study found that patients with chronic conditions are not more likely to be dissatisfied with ED care. **Key words:** emergency department; patient satisfaction; chronic illness

234

Design of a care plan for cost-effective management of community-acquired pneumonia among elderly patients.

Heng BH, Chong WF, Lim TK, Seow E, Mahadevan M, Lee CY, Cheah TS. Emergency Department, Tan Tock Seng Hospital

Introduction: To design a care plan for cost-effective management of elderly patients with pneumonia. **Methods:** Data from NHG's data warehouse, 2004, was analyzed to evaluate the burden of pneumonia

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among elderly patients among NHG institutions, using SPSS v13. Recent developments in evidence-based management of pneumonia and administrative policies were considered in design of the plan. **Results:** In 2004, pneumonia among elderly patients was the top cause of emergency admissions, contributing 25,000 patient-days and costing NHG $14m. While average length of stay was 5-10 days, 7.5% stayed one day and 15.5% stayed two days. A program was designed aimed at managing such patients more cost-effectively without compromising quality of care and patients' safety. It comprises an algorithm for (a) mandating hospitalization; or (b) a home care plan. The home care plan, residing in the Emergency Department, identifies patients for assessment of clinical severity using a validated tool (Fine Pneumonia Severity Index), administration of oral antibiotics, observation for clinical stability and finally discharging them with an advisory and an appointment for clinic review. A telephonic contact, and home visits for selected cases, will follow within 24-48 hours. If the management goals cannot be achieved in the home care plan or if the treatment plan is failing, the patient will be transferred back to hospital. Measures of both effectiveness and patients' safety are incorporated in the plan. **Conclusion:** We have designed an evidence-based and cost-effective home care plan for community-acquired pneumonia in the elderly appropriate for the local setting. **Key words:** pneumonia; elderly; cost effectiveness; care plan.

235

Gender perspectives in Emergency Medicine- Glimpses from the Indian subcontinent.

David SS, Christian Medical College, Vellore - *India*

1990 was celebrated as the South Asian Association for Regional Cooperation (SAARC) Year of the Girl Child. Gender perspectives have since been of significant global interest. In the Indian subcontinent, there has been recent awakening to this concern. The issues are numerous and rather complex; to name a few - patriarchy, arranged marriages, dowry deaths, selective female feticide, etc. are issues that need to be investigated in the light of an intricate societal structure. These concerns are clearly governed by a host of factors that include conventionality of the society, community characteristics, selective distribution of basic benefits, reduced awareness of signs and symptoms due to lack of education and hesitancy to seek treatment without family consent, etc. In the Indian system of medical education, teaching of gender-related issues is non-existent. There is documented higher percentage of infectivity in children due to longer period of contact with mothers and older women caregivers. Interestingly, there is gender–related disease predilection for conditions such as Schistosomiasis, which is more prevalent in women since they have prolonged contact with water. On the contrary, women in India have demonstrated a lower risk to Malaria since they spend the early evening hours cooking on open furnaces. Among women health care professionals, a career in Emergency Medicine seems to be a 'Choice by constraint'. There is no existing literature regarding their perceptions. A study conducted at the Emergency Department of the Christian Medical College, Vellore, South India, has truly been an eye-opener in more ways than one. Lack of adequate Maternity Leave, non-existent Crèche facilities, inflexible work schedules, etc. are among the host of factors cited. The presentation does full justice to all aspects pertaining to gender issues in the Indian sub-continent. **Key words:** emergency medicine; gender; women's health.

236*

Emergency department wait times prolonged by elective medical and surgical admissions.

Langhan TS, McLoughlin K, Yarema MC, Curry DG. Department of Emergency Medicine, University of Calgary, Calgary, Alta., *Canada*

Introduction: Emergency departments across Canada continue to struggle with prolonged patient wait times. In a finite system, Emergency Departments compete for acute care beds with elective admissions from other services. Elective surgical and medical admissions occur predominantly during the regular workweek. We examined the impact of elective admission volume on Emergency Department (ED) wait times in our center. **Methods:** A retrospective administrative database review of all adult admissions to acute care beds in the Calgary Health Region was conducted for the 2004 calendar year. The regional ED database was reviewed to collect data regarding ED admission wait times from time of admission decision to time of discharge from the ED. This data was correlated to the day-to-day variability of elective acute care admissions by medical and surgical services. **Results:** In the Calgary Health Region during the 2004 calendar year, there were 102,575 adult admissions to acute care beds; of these 43,425 were admitted via the ED and 59,150 were elective medical and surgical admissions via other bed allocation procedures. The demand for acute care beds from the ED was 118.65 acute care bed requests per day (111.50–125.27, STD dev. 5.22). Elective acute care bed demands had a daily average of 161.64 (84.44–204.62, STD dev. 21.94). Elective acute care bed requests had wide variability associated with day of week. This daily variability showed a correlation with Emergency Department wait times. Waiting time data are in process of collection, values to follow in early 2006. **Conclusions:** Elective medical and surgical admissions are one of many contributing factors leading to Emergency Department overcrowding and prolonged wait times. A prospective study examining the effect of elective admission cancellations when the hospital approaches capacity should be undertaken to validate the association between elective admissions and prolonged Emergency Department waiting times. **Key words:** emergency department; waiting times; hospital admission

237*

Triage as a predictor of emergency physician workload.

Dreyer JF, Zaric GS, McLeod SL, Anderson CK, Carter MW. Division of Emergency Medicine, University of Western Ontario, London, Ont., *Canada*

Introduction: The Canadian Emergency Department Triage and Acuity Scale (CTAS) is a 5 level triage tool used in Canadian Emergency Departments. This score is based primarily on patients' presenting complaints and symptoms. It is also used to determine emergency department physician staffing levels for a number of emergency departments (EDs) in Ontario. We sought to determine if CTAS is a good predictor of emergency physician (EP) workload (WL) and to determine if factors related to patient demographics, treatments, and the state of the ED contribute to EP workload. **Methods:** Eleven hospital-based EDs participated in this study. Data was collected on 11,716 patient encounters by research assistants (RAs) over 592 shifts. The RAs directly observed EPs for entire shifts and recorded on a moment-by-moment basis the activities of the physicians. The individual times of all physician activities associated with a given patient were summed to derive a directly observed estimate of the amount of EP time required to treat a patient. Times per patient were fitted to lognormal survival models to identify predictors of workload. **Results:** 11,716 patients were observed in this study. CTAS was shown to be a significant predictor of workload, both in univariate and multivariate analysis. Other patient variables that were significant predictors of EP WL included: patient age, mode of arrival, previous visit to the ED within 30 days, laboratory and imaging investigations, mental health, social work and medical/surgical consultations, residents of long-term care facility, discharge disposition, shift and hospital type, and absolute patient volume. **Conclusions:** CTAS alone is a significant predictor of EP

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workload, even when other factors related to patient demographics and treatment are considered. Models that use CTAS as well as other factors achieve a much better fit than those that use CTAS only. Additional factors should be considered when determining appropriate staffing levels in Ontario EDs. **Key words:** triage; emergency department; physician staffing; workload

238*

Emergency physician time by activity and hospital type.

Dreyer JF, Zaric GS, McLeod SL, Anderson CK, Carter MW. Division of Emergency Medicine, University of Western Ontario, London, Ont., *Canada*

Introduction: The emergency department (ED) is an environment with a broad mix of patient types and acuity. In order to more accurately predict physician productivity we undertook an analysis of the distribution of emergency physician (EP) time by activity during a shift. **Methods:** Eleven EDs participated in this study. Hospitals were divided into peer groups and were classified as being either teaching, rural or community institutions. We visited four teaching, five community and two rural EDs. Research assistants (RAs) collected data on handheld Personal Digital Assistants (PDAs) using specially developed custom software. The RAs directly observed EPs for 592 shifts around the clock, and recorded on a moment-by-moment basis the activities of the physicians. **Results:** On average, across all sites 84.2% of an EP shift was spent caring for patients. EPs spent the largest portion of their time in patients' rooms for all hospital types (rural 32.9%; community 41.2%; teaching 31.6%). EPs working in community hospitals spent more time charting (24.1%) than their colleagues in rural (17.4%) and teaching (17.6%) hospitals. Just over 13% of EP time in a teaching hospital is spent consulting with medical students and postgraduate trainees, compared to their colleagues at rural (0.6%) and community (3.0%) hospitals. Other EP time related to patient care represented 4.3% of a shift in rural and community hospitals, compared with 6.5% of an EP shift in the teaching hospitals. These times do not include walking from one area of the ED to another to see a patient. **Conclusions:** EPs spent very little time during their ED shifts in non patient-care related activity. Overall physician productivity of 84.2% was considered to be high. EP efficiency cannot be commented on in this study. **Key words:** emergency department; physician productivity

239*

Frequency, determinants, and impact of overcrowding in emergency departments in Canada: a national survey of emergency department directors.

Rowe BH, Bond K, Ospina MB, Blitz S, Afilalo M, Campbell SG, Schull M. Department of Emergency Medicine and University of Alberta Evidence-Based Practice Centre, University of Alberta, Edmonton, Alta., *Canada*

Introduction: Several reports have documented the prevalence and severity of emergency department overcrowding (ED) at specific hospitals or cities in Canada; however, no study has examined the issue at a national level. The objective of this study was to describe the frequency, impact, and factors associated with ED overcrowding in Canada as perceived by ED directors. **Methods:** A descriptive, cross-sectional study was distributed to 243 ED directors in Canada using a 54-item self-administered postal or web-based questionnaire. Data collected included ED census and site characteristics, frequency, impact, and perceived causes of overcrowding. **Results:** The survey was completed by 158 (65% response rate) ED directors, and 62% reported overcrowding as a major or severe problem during the past year. Directors attributed overcrowding to a variety of issues including a lack of admitting beds (85%), lack of acute care beds (74%) and the increased length of stay of admitted patients in the ED (63%). The majority of ED directors perceived that ED overcrowding had a major impact on increasing stress among nurses (82%), ED waiting times (79%), the boarding of admitted patients in the ED while waiting for beds (67%), ED staff satisfaction (66%), and on increasing stress among physicians (65%). Most ED directors perceive access block or an insufficient number of inpatient beds to be the main cause of overcrowding. These respondents believe that overcrowding lowers both the quality and accessibility of emergency care, as well as increasing ED staff turnover. **Conclusions:** Overcrowding is a serious and frequent problem in EDs across Canada. It is not limited to large urban centres, nor is it limited to academic and teaching hospitals. ED directors' perspective on this problem reinforces the need for further examination of effective policies and interventions to reduce ED overcrowding. **Key words:** emergency department; overcrowding

240*

Measuring overcrowding in emergency departments: a systematic review.

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Introduction: Emergency department (ED) overcrowding is a term widely used to describe a situation where the demand for services exceeds the ED capacity. Relatively little is known about the characteristics of the measures that document this problem. This systematic review identified the measures used in the scientific literature on ED overcrowding. **Methods:** Searches of 24 electronic databases (up to December 2004) and grey literature were conducted. Studies were required to report measures of events related to ED overcrowding. Two reviewers independently assessed the relevance of the studies for the review. A qualitative synthesis of the results is presented. **Results:** The search yielded 486 potential studies of which 169 were included in the review. From these, 735 overcrowding measures were identified (median: 3/study; interquartile range: 2, 5). Operational definitions of ED overcrowding were infrequently reported (31%). The measures focused on delays in the ED care process (39.7%), overall volume of patients in the ED (11.6%), volume of patients waiting for care (8.8%) and the proportion of patients seen at different stages in the ED (7.6%). ED access block (7%), ambulance diversion (7%), patients who left without being seen (5.5%), and length of stay (4.2%) were less commonly reported. Throughput measures were commonly used (67.8%) followed by input and output measures (19.5% and 11.8%, respectively). System measures were reported less often (0.8%). **Conclusions:** There is no uniform definition of what ED overcrowding is, or how it can best be measured. Inconsistent use of definitions and measures has created a confusing and contradictory research base. There is little agreement on standardized definitions and measures that take into account regional variations and differences between individual EDs. Without a greater knowledge of the measurement properties of ED overcrowding measures, study results will remain difficult to interpret and of limited value to policy makers, clinicians, and patients. **Key words:** emergency department; overcrowding; methodology

241*

Identification of measures to document overcrowding in Canadian emergency departments: a Delphi study.

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Introduction: There is no uniform definition of emergency depart-

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ment (ED) overcrowding or how it should be measured. It is unclear what measures of ED overcrowding are important to researchers, ED providers, and administrators. The objective of the study was to obtain consensus among a group of Canadian ED experts on the relevance of a set of measures to document ED overcrowding. **Methods:** A two-round modified Delphi study was conducted from February to April 2005 to elicit and combine the judgments of 38 participants considered experts in some aspect of ED operations. Participants rated the relevance of 36 measures of ED overcrowding on a seven-point Likert scale and ranked the nominated measures according to their relative importance. Values for the mean score and standard deviation were chosen a priori to determine consensus. **Results:** The response rate was 87%. The most important measure identified was the percentage of the ED occupied by inpatients (mean on 7-point scale: 6.53, standard deviation (SD: 0.80). The other nine measures, in order of importance, were: total ED patients (mean: 6.35; SD: 0.75), total time in the ED (mean: 6.16; SD: 1.04), percentage of time ED is at or above capacity (mean: 6.16; SD: 1.08), overall bed occupancy (mean: 6.19; SD: 0.93), time from bed request to bed assignment (mean: 6.06; SD: 1.08), time from triage to care (mean: 5.84; SD: 1.08), physician satisfaction (mean: 5.84; SD: 1.22), time from bed availability to ward transfer (mean: 5.53; SD: 1.72), and number of staffed acute care beds (mean: 5.53; SD: 1.57). **Conclusions:** Ten relevant and clinically important measures of ED overcrowding were identified. This set of measures is concordant with indicators that researchers in other English-speaking countries have identified as important for documenting ED overcrowding. Measures developed by consensus techniques have face validity, but, to optimize their effectiveness for documenting ED overcrowding, they should be tested for acceptability, feasibility, reliability, sensitivity to change, and validity. **Key words:** emergency department; overcrowding; methodology

242*

Interventions to reduce overcrowding in emergency departments.

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Introduction: Various interventions have been used to address the problem of emergency department (ED) overcrowding; however, little is known about their effectiveness on reducing or controlling ED overcrowding. This systematic review identified interventions designed to reduce or control overcrowding in the ED from the scientific literature. **Methods:** Searches of 24 electronic databases (up to December 2004) and multiple grey literature sources were conducted. Studies were required to report data for interventions used to reduce or control events related to ED overcrowding. Two reviewers independently assessed the relevance of the studies for the review. A qualitative synthesis of the results is presented. **Results:** The search of over 12,000 citations yielded 169 potentially relevant studies of which 66 were included in the review. The number of interventions employed per study varied from 1 to 51. Interventions that targeted throughput processes were the most commonly studied (51 studies), followed by input (4 studies) and output (3 studies). The interventions studied were grouped as fast track (23 studies), multi-faceted interventions (12 studies), staffing changes (8 studies), triage (6 studies), diversion strategies (4 studies), physician order entry (3 studies) and short stay units (2 studies). Eight studies reported on unique single interventions that could not be placed in any of the above categories. **Conclusions:** A large number of interventions of varying complexity, intensity and duration have been applied in an attempt to alleviate or control ED overcrowding. The large majority of these have had a positive effect on the overcrowding outcome measured; however, it is difficult to determine the relative value of these interventions, and the lack of comparison studies makes it impossible to say which ones work best. There is a need for further studies on the specific effects of a variety of interventions and how they might impact the quality of care and patient outcomes. **Key words:** emergency department; overcrowding; literature review

243*

Preferential access to health care: a survey of health care consumers regarding beliefs and practices.

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Introduction: We surveyed public impressions regarding preferential access to health care. **Methods:** Households were randomly selected from the Toronto telephone directory. English speakers age eighteen or older were solicited. Policy questions and case-based scenarios centered on "two tier medicine" and "queue jumping." **Results:** 15% (n = 101) of 668 solicited were surveyed. 95% (CI [89%, 98%]) advocated equal access based on need. 77% (CI [68%, 84%]) agreed that allowing greater access for payment creates unfair disparities. 36% (CI% [27%, 46%]) supported being allowing payment for quicker access. Support for queue jumping in the ED was strong for cases of emergency (100%, [CI 96%, 100%]), severe pain (90%, CI [83%, 95%]) and pediatrics (83%, CI [74, 89%]), equivocal for police (50%, CI [40%, 60%]), and minimal for the homeless (20% CI [13%, 29%]), doctors (12%, CI [7%, 20%]), hospital administrators (6%, [2%, 12%]), and government officials (3%, [1%, 8%]). To improve a position on a waiting list, approximately half surveyed would call a friend who is a doctor (59%, CI [49%, 68%]), works for a doctor (48% [CI 38%, 58%]), or is a hospital administrator (45%, CI [36%, 55%]). 16% (CI [10%, 24%]) reported having done this. Likelihood of offering material inducement for preferential access was 30% (CI [22%, 40%) and 51% (CI [41%, 61%]), for low and high impact medical scenarios respectively. Likelihood to offer non-material inducement was 56% (CI [46%, 65%]) and 71% (CI 61%, 79%). Responses were not associated with gender, occupation, or education. **Conclusions:** Respondents expressed support for equal access based on need. Policy and scenario type questions elicited different responses. Expressed beliefs may vary from personal practice. **Key words:** access to health care; public preferences

244*

Consultations in the emergency department: exploring rates and complexity.

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Introduction: Consultation is a common and important aspect of Emergency Medicine, yet surprisingly, little research has been conducted on this topic. Through both quantitative and qualitative methods, we prospectively examined consultation rates, processes and outcomes in two tertiary care hospitals in Canada. **Methods:** Emergency physicians volunteered to be involved in the study (11 at site 1, and 10 at site 2). Each physician recorded consultations during 5 randomly selected shifts over an eight week period. Physicians recorded information on all consultations using a standardized form within 24 hours of completing a study shift. Physicians were specifically asked about their prediction of need for admission, and if they experienced any difficulties with the consultation. Subsequent computer outcome data were extracted for each patient encounter. **Re-**

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sults: From 105 shifts, involving 1930 patient encounters, at least 1 consultation was requested in 733 (38%) patients; rates did not vary between sites. Overall, 92% required a single consultation, 7% required 2 consultations, and 1% had 3 consultations. Study physicians were 94% accurate in predicting need for admission and 83% accurate in predicting no need for admission when compared to the final outcome. Of the 733 consultation requests, 43 (6%) of them were perceived as "difficult" by study physicians. An EP was more likely to report at least 1 difficult consultation during the shift at site 2 (18% vs 44%, $p = 0.005$), during higher daily patient volumes (mean = 187 vs 196, $p = 0.03$), and higher direct consultation cases (mean = 11 vs 14, $p = 0.001$). On the patient level, only site 2 was associated with a difficult consultation (2.5% versus 9.8%, $p < 0.001$). Age, gender and CTAS levels were not associated with difficult consultations. **Conclusions:** Consultation is a common process in the ED and difficult consultations are relatively uncommon. Knowledge of factors associated with difficult consultation may be useful in creating interventions to reduce them. **Key words:** emergency medicine; consultation

245*

The influence of emergency department consultations on patient flow.

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Introduction: Overcrowding is a common and potentially dangerous aspect of Emergency Department (ED) care in many locations. While many factors are involved, the role of consultations has been infrequently studied. This study examined the effect of consultation on patient flow through the ED in two tertiary care hospitals in Canada. **Methods:** Emergency physicians volunteered to be involved in the study (11 at site 1, and 10 at site 2). Each physician recorded consultations during 5 randomly selected shifts over an eight week period. Physicians recorded information on all consultations using a standardized form within 24 hours of completing a study shift. Physicians were specifically asked about their prediction of need for admission, and if they experienced any difficulties with the consultation. Subsequent computer outcome data were extracted for each patient encounter. **Results:** From 105 patients, at least one consultation was requested in 733 (38%) patients. Rate of consultation differed by CTAS level (I = 64% to V = 9%), and consulted patients were older (55 vs 42, $p < 0.001$). Time from triage to assessment were shorter for RN (37 min vs 60 min; $p < 0.001$) and MD (78 min vs 97 min; $p = 0.002$) for consulted patients; however, time to disposition was longer (482 min vs 235 min; $p < 0.001$). Median time from consult request to arrival was 174 min. Overall, 407 patients were admitted; all but 16 had a consultation reported. **Conclusions:** Patients who require consultation in the emergency department have significantly increased lengths of stay and often require admission. Interventions to reduce consultation delays and divert consultations from the ED appear warranted. **Key words:** emergency department; consultation; length of stay

246

Need to change of discharge protocols.

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Introduction: One of the most important criteria for evaluating the quality of patient satisfaction. leaving against medical advice (LAMA) rate is one of the significant factors that are indirectly indicative of the patient satisfaction. Higher LAMA rate can mean lower satisfaction rate and vice versa. The primary end point of this study is to determine LAMA rate in our trauma center. **Methods:** This study is a retrospective, descriptive study carried out in a major community trauma center in Tehran during November 2005. All patient files were evaluated for LAMA and if the patient had left the Emergency department (ED) against medical advice, the cause for leaving was documented. The overall LAMA rate was determined and the different causes were categorized. **Results:** During November, 1445 patients were admitted. Five hundred seventy of them left the ED against medical advice. Of this 570, 385 (68%) were males and 185 (32%) were females. 522 (76%) of 570 patients were admitted for minor surgical and orthopedic problems. Time from admission till LAMA was determined to be <1 hr for 25% of victims, 1-6 hrs for 72% of victims and >6 hrs for 3% of victims. The LAMA causes were categorized into four groups: 323 (56%) of patients left the ED because of feeling better, they believed there was no reason for more observation. 43 (7%) left the ED because of transferring the patient to other trauma centers. 33 (5%) LAMA because of full ICU beds, financial problems, CT scan problem, or the need for some subspecialties not available at our center. 24 (3%) described the reason for LAMA as dissatisfaction with welfare facilities. In the remaining (26%), the precise causes were not recorded in files. **Conclusions:** The main reason for LAMA was patient's belief of recovery and need for discharge, but based on our discharge protocols, the patients should have stayed under observation. This study showed that our discharge protocols must be revised by the ED managers to decrease LAMA rates and increase patient satisfaction. **Key words:** emergency department; patient satisfaction; leaving against medical advice.

247

The right emergency care project: An evaluation of a new model of care to the emergency department.

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Introduction: The "Right Emergency Care" project is a new model of care for the Emergency Department (ED) at Monash Medical Centre to achieve key performance indicators (KPI, and to provide patients with improved care. Our main aim is to evaluate the improvement of our two key KPIs: 80% of patients requiring admission to be admitted to an inpatient bed within 8 hours of arrival, and 80% of patients not requiring admission to be discharged within 4hrs of arrival. **Methods:** Observational study of the effects of a new model of care to the ED for 3 months (Dec 2005-Feb 2006) This period will be compared with a historical matched control of a similar 3 months (Dec 2004 - Feb2005). Adult patients presenting to the ED were allocated at triage into likely admission or likely discharge streams. These patients were then managed by specific admission and discharge teams within the ED. Improvements implemented to achieve our aims included: -Dedicated teams with clear operating guidelines -Lower triage acuity patients seen in time-order -Redesign of coordination role of the nurse-in-charge, -Hourly monitoring of patient flow by nurse & emergency physician in charge. -System to identify & track delays in patient flow, -Escalation & action plans to manage specific causes of delays -Mentoring & coaching of staff We will attempt to reduce confounders in the intervening period by matching controls in the design and by multivariate logistic regression in the statistical analysis. **Results:** We are in the process of implementing this project and will present collect data till the end of March 2006. **Conclusions:** We hope to use this data to make further recommendations both at a local network and state wide level to improve the model of care in our ED. **Key words:** emergency department; care model; management.

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248

Does the 4-hour target result in poor quality care?

Cooke MW, Fisher JD. Warwick Medical School, Coventry, *UK*

Introduction: While waiting times have decreased in English Emergency departments, there have been suggestions that this has been at the expense of patient quality of care. However, the discussions have lacked high quality data to support either view. **Methods:** Routinely collected data from one large Acute trust, covering two emergency departments (120,000 ED attendances per year), has been analyzed using both ED information system data and also routinely collected performance data. Data for each Octobers and Aprils from October 2002 to April 2005 were analyzed. **Results:** Data revealed that performance against the four-hour target improved dramatically. Mean and median times spent in the ED decreased in parallel and across all groups, although most marked in low triage categories. In the last 15 minutes before 4 hours, there was an excess of 3-9 patients per day over the expected in this time period. The wait to be initially seen decreased uniformly and in all triage groups. Numbers attending and being admitted have increased but the admission rate has decreased. Routine hospital data has shown no change in the readmission rate after emergency admissions or the mortality after emergency admission and after selected emergency operations. The length of stays for emergency admissions has decreased during the study period. Complaints have reduced as have patients leaving without being seen. **Conclusions:** Analysis of a variety of routinely collected outcome measures has failed to show any adverse effect from the improve four hour performance. At the same time as this improvement, some measures have demonstrated improved quality. Further work is underway to gain national data. **Key words:** emergency department; quality of care; waiting times.

249*

Factors associated with emergency department length of stay in patients presenting with abdominal pain.

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Introduction: Decreased throughput is one important factor related to emergency department (ED) over-crowding. Our objective was to determine the factors which are associated with ED length of stay (ED LOS) in patients with undifferentiated abdominal pain. **Methods:** 2288 Patients presenting to the emergency department from 2003–2005 with CTAS level III abdominal pain who were discharged home on that visit were included. Age > 60 years, gender, number of hospital encounters, having any blood test, an abdominal x-ray, ultrasound, or CT, the hour of the day, referral to a consultant, receiving a parenteral narcotic medication, number of emergency physicians (EPs) working in the department, and the aggregate acute ED volume were considered as potential predictor variables. **Results:** 2288 patients met the eligibility criteria. Range of ED LOS was 30 minutes to 48 hours (mean 4.4 hours; SD = 2.6 hours). Multiple linear regression with ED LOS as the dependent variable and the independent variables listed in Table 1 predicted 41% of the variation of ED LOS (F [7, 2278] = 157.1; $p < 0.001$). The table summarizes the contribution of each factor to ED LOS, adjusted for all other factors. **Conclusions:** When adjusted for age, narcotic administration, lab tests, x-ray use and number of EPs in the department, CT scan, ultrasound and referral to a consultant markedly increased ED LOS at our institution. If these processes could be expedited, ED throughput could be increased. **Key words:** emergency department; length of stay; abdominal pain

Table 1, Abstract 249.

Variable	*N* (%)	Change in ED LOS	*p* value
CT scan	199 (8.7)	+ 3.4 h	<0.001
Ultrasound	297 (13.0)	+ 2.3 h	<0.001
Referred to consultant	234 (10.3)	+ 2.8 h	<0.001
Lab tests	1811 (79.2)	+ 1.6 h	<0.001
Parenteral narcotic	816 (35.7)	+ 1 h	<0.001
X-ray	841 (36.8)	+ 0.9 h	<0.001
No. of EPs (1,2 or 3)	n/a	– 0.6 h/ extra EP	<0.001
Age >60 yr	255 (11.1)	+ 0.43 h	0.027

250*

Improving flow within the emergency department by matching physician staffing to patient demand.

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Introduction: Previous studies of emergency department (ED) overcrowding have focused on factors beyond its control such as a lack of inpatient beds and delays in obtaining investigations and consultations. No study has examined the effect of targeted physician (MD) staffing on flow within the ED. In this study we identified a time of day when there was a consistently long wait between patients receiving a bed and seeing a physician and evaluated the impact of adding an additional shift during this time. **Methods:** Data were collected from a computerized database on patients visiting the ED at a tertiary care hospital. All CTAS II and III patients triaged to the main ED were included in the study. These data were used to identify a time period from 11am to 3pm when patients were waiting considerably longer to see a physician. A new shift was created to add another MD during this time. Data were analyzed for eight months before and after this intervention. Outcome measures included the change in time from bed assignment to physician sign-up (bed to MD time), the time from presentation at triage to physician sign-up (triage to MD time), and the total length of stay in the ED. **Results:** 98,901 patients visited the ED during the study period. Of these, 52,391 patients were included in the study. The additional physician coverage significantly reduced the median bed to MD time from 80 to 38 minutes ($p < 0.05$), and the median triage to MD time from 133 to 91 minutes ($p < 0.05$). These differences were sustained over the entire eight month post-intervention period. The median total length of stay in the emergency department decreased from 348 to 343 minutes (p = NS). **Conclusions:** Using the bed assignment to physician signup time to address physician staffing resulted in a significant and sustained reduction in the amount of time patients waited before being seen by a physician. Further study is required to identify and improve the multiple factors contributing to total length of stay in the ED. **Key words:** emergency department; overcrowding; waiting time; physician staffing

251*

The British Columbia Emergency Department Physician Workforce Study: operating characteristics and staffing patterns of emergency departments in British Columbia.

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Introduction: It is unclear how emergency departments (EDs) in British Columbia are staffed with physicians. This study sought to

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describe the operating characteristics and staffing patterns of EDs in BC. **Methods:** This was a cross-sectional survey in two parts: Part 1 was a telephone survey of all ED heads; Part 2 was a mail survey to all physicians who work in an ED in BC. In Part 1, ED heads were asked about the operating and staffing characteristics of their ED. EDs were identified from the BC Ministry of Health. An ED was defined as any publicly-funded facility that accepts and treats patients on an emergent basis. **Results:** 87 of 101 (86.1%) ED heads completed the survey. The median population served by EDs in BC was 20,000 (mean = 101,867) with a median 14,000 annual visits (mean = 19,000). Respondent sites had a median 22 inpatient beds (mean = 66) and 7 ED beds (mean = 11). 63/87 sites (72%) are open 24 hours; 30/87 sites (34.5%) have 24-hour physician coverage in house. 33/87 sites (37.9%) have in house physicians; 50/87 (57.5%) have on call physicians, and 5/87 (5.7%) have a combination of both. EDs with in house physicians had a median 14 physicians in their group, with a median 4 shifts per 24 hours – they worked a mean 44 hours per week. EDs with on call physicians had a median 5 physicians who worked a median 7.5 days per month on call and had a median 12 calls to the ED per day. 63/87 sites (71.5%) trained residents; 52/87 sites (60.0%) trained medical students. Larger sites (>14,000 annual visits) were more likely to have emergency medicine specialty-trained physicians (Chi-square test = 88.4, $p <$ 0.0001). Those sites that train residents were also more likely to have residency-trained physicians (Chi-square test = 12.9, $p <$ 0.001). **Conclusions:** There is significant variability in the operating and staffing characteristics of emergency departments in BC. This information would help define the ideal staffing and resources required for EDs in BC and potentially at a national level. **Key words:** emergency department; physician staffing; resources

252

Digit preference bias in the recording of Emergency Department times.

Locker TE, Mason SM. School of Health and Related Research, University of Sheffield, *UK*

Introduction: Digit preference bias has previously been described in a number of different clinical settings. This paper aimed to assess whether digit preference bias affects the recording of the time patients arrive and leave Emergency departments. **Methods:** An observational study of 137 Emergency Departments in England and Wales was conducted. Each department was asked to submit details of the time of arrival and time of departure from the Emergency department for each patient attending during April 2004. In addition, interviews with the lead clinician were undertaken to determine the method used to record the time of departure. The degree of digit preference bias was assessed using a modification of Whipple's index. **Results:** 123(86.9%) departments submitted data detailing 648 203 ED episodes. 114875 (18.0%) episodes had a recorded minute of departure of '0' or '30', with a further 281890 (44.1%) having other values with a terminal digit of '0' or '5'. The mean modified Whipple's index for time of departure was 316.9 (range 70.9 to 484.4). The method of recording time of departure was known in 105 (85.4%) departments, of which 42 (40%) recorded the time of departure using computerized systems and 63 (60%) recorded the time manually. Linear regression demonstrates a small but significant inverse relationship between the modified Whipple's index and the mean total time in department (b= -0.05, 95%CIs –0.09 to –0.0004, p=0.048). **Conclusions:** Some departments show considerable digit preference bias in the recording of time of departure from the Emergency Department. Such bias may cause difficulty in assessing changes in the performance of departments. **Key words:** emergency department; digit preference, length of stay.

253

Defining frequent use of an Emergency Department.

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Introduction: Previous definitions of frequent use of an Emergency Department have been based upon arbitrary limits of numbers of attendances within a given time frame. This study aimed to develop a definition of frequent use by comparing differences in the observed frequency distribution with that of a theoretical frequency distribution. **Methods:** A retrospective analysis of Emergency Department and Minor Injury Unit attendances in one city, over one year was conducted. From this data the expected frequency distribution of attendances was determined based upon a Poisson distribution. **Results:** During the period studied 75141 individuals attended on 98908 occasions. The theoretical frequency distribution demonstrated that there were 2764 (3.7%) 'frequent users' presenting repeatedly due to non-random events. These patients made 12316 (12.4%) attendances. Frequent users were older than chance users (mean age 49.7 vs. 44.5 years). A greater proportion arrived by ambulance (55.3% vs. 27.5%), presented with psychiatric problems (5.8% vs. 1.1%) or alcohol intoxication (1.3% vs. 0.5%) and were admitted to hospital (37.4% vs. 19.6%). **Conclusions:** We have identified that there exists a group of patients who present repeatedly due to non-random events, confirming the existence of 'frequent users'. Their characteristics are clearly different to other Emergency Department patients. **Key words:** emergency department; frequent users.

254*

Impact of a multidisciplinary team on the performance of an academic emergency department.

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Introduction: The province of Québec has been fraught with huge problems of flow in its EDs for the last decades. One of the proposed solutions from the government has been to put in place specialized workers such as pharmacists, social workers, nurse managers and medical coordinators to ease the flow of patients. The implementation of such a multidisciplinary team and its impact has not yet been studied. We postulated that a multidisciplinary team would have a positive impact on the current provincial indicators for ED flow and patient load. **Methods:** The impact of the implantation of a multidisciplinary team in 2005 on the performance of our ED was studied with data from the SIURGE software. We compared data on length of stay and proportions of stays of more than 24, 36 and 48 hours in 2005 with the identical data from the same period for the previous year. The chi-squared was used for p value calculation. **Results:** 4,531 patients were stretcher bound in 2005 by comparison to 4,407 in 2004. Notwithstanding this increase of 124 patients (2,74%) between the three months of the two reference years, the number of patients who stayed in the ED more than 24, 36 and 48 hours decreased by 14.7%, 33.3% and 58.3% respectively. The percentage of patients on a stretcher for more than 24 hours decreased from 12.68% to 9,98%, an absolute difference of 2.7% and a relative difference of 21.29% ($p <$ 0,0001). The mean length of stay (for all ED patients) decreased from 6.79 to 6.10 hours. The global satisfaction regarding the implementation of the multidisciplinary team was positive, giving each ED physician a new perspective and some expertise on the managerial aspects of their clinical practice. **Conclusion:** The introduction of a multidisciplinary team had a positive impact on the performance of our ED according to provincial indicators for flow and patient load. **Key words:** emergency department; waiting times; lengths of stay; multidisciplinary teams; patient satisfaction

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255*

Consultation outcomes in the emergency department: a systematic review.

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Introduction: Consultation is a common and important aspect of Emergency practice. At times, consultations may excessively delay patient dispositions, which is a concern in an already overcrowded environment. This review evaluates the scientific evidence describing consultation in the ED and examining interventions to change consultation rates in this setting. **Methods:** Comprehensive searches of computer databases (e.g., EMBASE, MEDLINE, Cochrane Library, Web of Science, Health Star, and Google Scholar), the grey literature, reference lists and communication with authors were performed to identify eligible studies. Eligible studies involve patients presented in the emergency department. Two reviewers extracted the data from each study regarding the proportion of consultations in the emergency department or a specific patient sub-group. All study design types were considered for this review. Individual study proportions were calculated along with 95% confidence intervals (CI). **Results:** From more than 10,000 pre-screened citations, 51 were potentially relevant to the topic and 11 were included in the review (kappa = 0.71). Overall, 6 studies described consultations, 2 were follow-up studies and 3 examined interventions to improve consultations. All but 1 article was published in North America, and most studies examined distinct sub-populations of emergency patients (e.g., psychiatry referrals). Based on the available data it appears that consultation research has ceased since the mid-1990s. The rate of consultation varies widely based on the setting and the types of patients. For example, there is some evidence that consultation rates at urban tertiary care centers are higher than other locations. **Conclusion:** Consultation research in the emergency setting is limited and variable; interventions to change consultations are similarly rare. This systematic review outlines the state of the literature and suggests that further research is urgently needed. **Key words:** consultation, emergency medicine, systematic review

256

Why are we waiting? A qualitative questionnaire based study of patients' perspectives on their protracted stays in the emergency department.

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Introduction: Emergency Department personnel are aware of the impact of overcrowding on the running of their departments. This study solicited patient opinions on the subject. **Methods:** A questionnaire was administered by two members of the research team (IS, VG) to 114 patients who had been waiting more than twelve hours for admission. **Results:** A total of 85 (75%) patients consented to the study and completed the questionnaire. Background: 68% of patients had a prior ED visit with 57% having had a previous extended stay. Of these patients only 6% believed that it affected their health outcome; 39% of patients said that the prolonged stay made them feel angry or annoyed, 32% said it made them feel very uncomfortable, while 34% said they didn't mind the extended stay. Of the 25% who felt their privacy or dignity had been violated, the most common complaint was having their consultation conducted in the open, while 33% thought that the worst aspects were the combination of waiting to be attended to, the anticipation of results, and the delayed work-up. Regarding cause: 58% felt that the lack of inpatient beds was the main reason for the delays and 86% felt that health authorities were not doing enough to address the overcrowding issue. Regarding impact: 32% considered leaving prior to getting transferred to the ward and > 35% of patients stated that the prospect of an extended stay affected their willingness to come now and in the future. **Conclusion:** The majority of ED patients dislike protracted wait times and feel the health authorities are doing little to solve the capacity problem, however, few felt the delays negatively impacted their health outcomes. **Key words:** emergency department, overcrowding, patient satisfaction

257

Fatigue in a case of chronic subdural hematoma – A rare case report

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Introduction: Chronic subdural hematoma has long been recognized for its diverse clinical presentations and is subtle masquerader. We report an unusual case of chronic subdural hematoma in a 68-year old woman presenting with fatigue following a trivial fall without evidence of focal neurological deficit, a history of headache or loss of consciousness. Non specific symptoms such as fatigue may be commonly attributed to depression, cerebrovascular events or dementia and preclude the request for an urgent computerized tomography. Currently referral of such patients heavily relies on symptoms such as vomiting, headache or loss of consciousness and the absence of focal neurological deficits often influences clinical opinion. Such patients are considered low risk and discharged home without further follow-up. This case highlights the need for increased awareness of a condition which has a very good prognosis with neurosurgical intervention and if left undiagnosed can be fatal. **Conclusion:** In this patient there were no apparent symptoms or signs suggesting a chronic subdural hematoma, and only a high index of suspicion and awareness can lead to the proper diagnosis in similar cases. **Key words:** subdural hematoma, case report, computerized tomography

258

Role of physician assistants in the accident and emergency departments in the UK.

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Introduction: The Accident and Emergency departments in the UK are under severe pressure to expand their staffing levels in a bid to try and comply with the 98% target for 4-hour waiting times set by the government. Increasing staffing levels is proving to be very difficult when a majority of Staff Grades have already left or are leaving to become General Practitioners for financial gains and better working hours. This combined with a limited number of FY2 doctors being allowed to work in Accident and Emergency poses new challenges to staffing within Accident and Emergency. The objective of this study was to evaluate the training requirements, GMC regulations and supervision required to perform a suitable role in Accident and Emergency following the appointment of two Physician Assistants at City Hospital, Birmingham. **Methods:** The activities of two Physician Assistants at City Hospital were monitored for two months. All case records were reviewed and the number and type of patients seen by the assistants recorded. These were then compared with the records of those patients seen by Senior House Officers. Monitored information included number of patients seen, type of patients seen as well the quality of the notes. **Results:** On average Physician Assistants at City Hospital treated 3-5 patients/hour compared to 1.5-2.5/hour seen by Senior House Officers. Physician Assistants were able to deal with most medical, surgical, orthopaedic and gynaecological problems with minimal supervision. The med-

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ical records revealed that documentation was better by Physician Assistants. **Conclusion:** Senior Physician Assistants from the USA are an effective way to improve staffing within Accident and Emergency Departments within the UK. Physician Assistants saw more patients and required less supervision than Senior House Officers. Physician Assistants proved to be a cost effective method of supporting Accident and Emergency doctors at City Hospital, Birmingham. **Key words:** physician assistants, emergency department staffing

259

Comparing approaches to quality in emergency care in England and Australia

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Introduction: The growth in research evaluating approaches to health care and health systems has led some to ask whether these comparisons are fair or useful. In this study, one focus of these comparisons, quality management, will be evaluated using case studies from emergency care in England and Australia. This will be appraised against thematic approaches to quality management. **Methods:** A literature review was conducted between January 2004 and November 2004 of the Health Management Information Consortium database (consisting of the libraries of the King's Fund and the UK Department of Health), Pubmed and Medline. **Results:** Emergency care in England is driven by different approaches to quality management. The reconfiguration of emergency services proposed by the Department of Health is characteristic of a total system approach. The remaining examples are dominated by a service specific approach to quality management. The Australian literature demonstrates that quality management in emergency care is driven by the principles promoted by the Australian Council on Healthcare Standards: continuous improvement, self-assessment and peer evaluation and all the case studies are characteristic of a total system and service specific approach to quality management. **Conclusion:** There is a drive to improve quality in emergency care in England and Australia - In England, national policy directives and a political imperative influence quality management practice. Change tends to be implemented universally. - In Australia, quality management is driven by local emergency departments, addressing the needs of local populations - Quality improvements in Australia tend towards innovation and in England implementation - A lack of integration with other services is encouraging collaborative working with other health and social care providers - Quality management needs to be appropriate to solve local and national problems - Different approaches are an opportunity for international learning. **Key words:** quality management, literature review, emergency services

260

A case-control study of the utilization of emergency service by patients presenting with deliberate self-harm.

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Introduction: The aim of this study is to provide epidemiological data on patients presenting with deliberate self-harm (DSH) as well as studying the pattern of service utilization for these patients in the preceding one year. **Methods:** This is a retrospective case-control study. Cases were selected from the patient database by searching diagnosis coding for "suicide" and "self-inflicted injury or poisoning" that required admission to our hospital in 2nd half of 2002. Controls were matched with the cases by age, sex, race, types of accommodation, pay-code and date of emergency department attendance. The clinical details and number of attendances within the preceding year were recorded The frequencies of attendances were compared using Chi-square and Mann-Whitney tests. **Results:** There were 130 cases and controls in the study. Seventy percent of cases were female. Self-poisoning was the most common method of self-harm, in which hypnotics were the most common poison. Fifty percent (65 of 130) of cases vs. 41.5% (54 of 130) of controls had attended the emergency department in the preceding year but the difference was not statistically significant (Chi-square test $p<0.2$). There was also no statistical significant difference in the average number of attendances between the two groups (Mann-Whitney test $p<0.15$). However, cases had more previous attendances related to cardiovascular and emotional complaints (Mann-Whitney Test, $p<0.05$). There was significantly more cases with past history of psychiatric illness or DSH than controls (Fisher-exact test $p<0.05$). The odds ratio of DSH history as a risk factor was 43 (95% CI 5.8-326). Of the 65 cases with a history of attendance in the preceding 1 year, 14 (22%) had an immediate last attendance due to self-poisoning. **Conclusion:** Patients presenting with DSH did not have more frequent attendance in the emergency department than controls in the preceding year overall. Cases did present more frequently with non-specific chest symptoms, emotional and psychiatric problems. **Key words:** self –inflicted injury, poisoning, emergency department utilization,

261

A study on the investigative method of cause of death for making out a death certificate.

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Introduction: Making out of a death certificate as well as a medical certificate of death is one of several duties by a doctor in emergency department, and scores of, or in some cases hundreds of the death certificates are issued each year. **Methods:** The data were collected through notices about the drawing up of the death certificate, which include the death certificate, the medical record in emergency department, plain chest, cervical spine lateral and pelvic bone, and any x-rays associated with traumatic injuries resulting in death. **Results:** For cases having a death certificate issued, their average age was 68.1±18.8 (0-107) years, and the number of males greater than females ; 414 (55.9%) to 327 respectively. In terms of place of death, most were at home (537), 120 at others, 48 were D.O.A, 20 on the road, 12 in public institutions, 2 at industrial factories, and 1 in a medical institution. To help clarify the cause of death, a chest x-ray was taken in 560 patients, a lateral x-ray of cervical spine in 37, skull x-rays in 37, and x-rays of the pelvic in 26. There were 22 patients with cardiac enzymes measured, and among them, 19 patients had positive results. Also 2 of 4 patients had positive lumbar punctures. By evaluating the studies used to help identify the cause of death, in ninety-two (16.4%) of the 562 patients the tests were found to have been helpful. In the cases of death from external causes except the death from diseases, 109 patients were surveyed, and in 46 (42.2%) tests helped in the diagnosis. Likewise, the studies helped in 14 (60.7%) of 23 patients to find the cause for sudden death. **Conclusion:** Simple x-ray and laboratory examinations were used to help identify the cause of death in drawing up a death certificate, and these were more helpful in cases of death from external causes than in deaths from disease. They were especially helpful identifying causes of sudden death. **Key words:** sudden death, death certificate, cause of death

262

Research on the patients who have suffered sexual assault in mid- and small-sized cities.

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Introduction: We have treated victims of sexual assault incorporating with a university hospital, social organizations and sexual assault

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consultation centers. Then, we initiated this study to investigate the realities of the sexual assault crimes by examining the victim who had received medical treatments in the emergency room. **Methods:** The study covers the sexually-assaulted victims who have been treated from January of 2002 to August of 2005. Some cases are excluded if they are uncertain to be categorized as a sexual assault and are inappropriate to collect data. The study is based on the questionnaire that includes basic personal information of patient and aggressor, evidence of sexual assault, medical examinations and result from obstetrics and gynecology. **Results:** There have been 98 patients who came to the emergency room because of a sexual assault. Six of them were excluded because the involvement of sexual assault was not evident and three of them were excluded due to lack of data acquisition. Thus, the actual patients involved in this study are 89. The average age of sexual assault victims is 21.5±10.7 and age ranges from 5 to 76 years old. There were 88 females and 1 male. There were 39 patients (43.8%) from 11 to 20 years old and 33 patients (37.1%) from 21-30. Dividing the day into 6 hour slots starting from midnight, the highest concentration of attacks occurred in between 12 midnight and 6am with 37 cases responsible for 41.6% of all attacks. 53 cases (59.6%) of the crime were done by a stranger, 31 cases (34.8) by an acquaintance or a friend, 3 cases (3.4%) by a relative, and 2 cases (2.2%) were done by lovers. There were 31 (34.8%) cases where the sperm of the attacker was found inside the victim's body. **Conclusion:** According to the study done with the victims of sexual assault in the university hospitals, the majority of the attacks happened to victims between the age of 11 and 30 between midnight and 6am.

263

Implementation Of A Nurse Practitioner Program In An Australian Emergency Department.

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Introduction: Sunshine Hospital ED, in Melbourne, managed 56 629 patients in 2004. Experience elsewhere suggested that NP's provide safe and timely patient management, reduced waiting times and total length of stay. Contributions to the education of junior medical and nursing staff were also described. NP's are new to Australian ED's. **Methods:** Visits were made to other Melbourne hospitals where the NP's role was already implemented. The submission of a business case showing the viability of NP's was presented to Western Health Executive. Following successful grant application to the Victorian Government, a project officer and two suitable candidates were appointed. Senior ED medical staff supervised the education and accreditation of the candidates. Hospital and community services, inherently linked to ED practice were notified of the NP program. NP candidates commenced a Masters of Advanced Nursing, including a module on pharmacology. Clinical practice guidelines (CPG), developed by the NP candidate, are evidence based or based on current best local practice. **Results:** 2 full time NP candidates started on 5/10/2004 and on 17/01/2005. In the period between 01/02/2005 to 31/07/2005, the NP candidates managed 860 cases (512 (59.5%) male). Fractures (165 (19.2%)), soft-tissue injuries (198 (23%)) and wounds (133 (15.5%)) predominated although a variety of presentations will be presented. Mean waiting time and total ED length of stay (LOS) fell by 25.8% and 23.5% respectively when compared with the corresponding 6 month period in 2004. Patient satisfaction surveys will be undertaken in early 2006 **Conclusion:** NP's have been accepted within an Australian ED. This was achieved via a collaborative process in developing clinical practice guidelines and appropriate education. Early results suggest an improvement in length of stay and waiting times for patients managed by NP.

264

Implementation of a risk stratification protocol in upper GI haemorrhage in the emergency department

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Introduction: Upper Gastrointestinal Haemorrhage (UGIH) is a common reason for presentation to the ED ranging from a self-limiting tear to life threatening haemorrhage. Courtney, Mitchell, Rocke et al (EMJ 2004) proposed a risk stratification in UGIH to identify low risk patients for safe discharge. **Methods:** A retrospective review of all patients presenting with UGIH between May 2005 and Sept 2005. The risk stratification model was then applied to assess appropriate patient placement. **Results:** The notes of 53 patients were examined, 35 males and 18 females. There were no mortalities.44/53 patients were admitted (83%) 8/53 patients were discharged (15.1%) 1 patient discharged himself against advice. 16 inpatients required endoscopy; of these patients: 1 patient required laparotomy for a perforated duodenal ulcer 1 patient required variceal banding. No high risk patients were missed by the protocol No low risk patients had in patient endoscopy. 12/44(27.2%) admitted patients could have been safely discharged with tighter protocol adherence. Presence of malaena documented in 58.4%. Haemetemesis was quantified by amount in 32%. Liver Disease was asked about in 90.5%. Systolic BP was recorded in Medical Notes in 96.2%. Orthostatic blood pressure was recorded in 0%. Haemoglobin was checked in 98%. Co morbidity or previous medical history enquired about in 96.2%. Warfarin therapy was enquired after in 50.9%. **Conclusion:** This data favours usage of our risk stratification protocol. The protocol correctly identifies high and low risk patients. It also demonstrates, however, that protocol adherence is poor. We suggest that robust adherence to this protocol could result in safe discharge of low risk patients with UGIH, with considerable savings to the trust. This will be the subject of a prospective study in our department. **Key words:** gastrointestinal hemorrhage, risk stratification, protocol

265*

Inter-observer agreement in the assessment of headache patients with possible subarachnoid hemorrhage.

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Introduction: We are developing a clinical decision rule for alert patients with an acute headache to rule out subarachnoid hemorrhage (SAH). In order to create a dependable rule, we evaluated the inter-observer agreement for potentially important variables from the history and exam. **Methods:** This prospective cohort study was conducted at 6 university tertiary care EDs. Patients >15 years, with normal neurological exam and a complaint of a non-traumatic acute (<1 hour to peak) headache were enrolled. Excluded were patients with a history of recurrent headaches, referral of confirmed SAH, papilledema, previous SAH or brain neoplasm. Two independent emergency physician assessments were completed prior to investigation. Analysis included simple kappa coefficients with 95% CIs. **Results:** See Table 1. **Conclusion:** There was substantial agreement for onset with: headache awaking patient, transient loss of consciousness, onset with sexual activity, vomiting, symptom of neck pain and onset with exertion. Other variables had low inter-observer agreement and should not be considered for use in a decision rule. All clinical components of the proposed Canadian SAH Rule showed excellent inter-observer agreement thereby suggesting that physicians should be consistent in their evaluation of headache pa-

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tients. **Key words:** subarachnoid hemorrhage, decision rules, headache

Table 1, Abstract 265.

Variable	Kappa	95% CI
Headache awoke patient	0.93	0.84–1.0
Loss of consciousness	0.88	0.71–1.0
Onset with sexual activity	0.82	0.58–1.0
Vomiting	0.80	0.67–0.92
Symptom of neck pain	0.66	0.51–0.81
Onset with exertion	0.64	0.42–0.86
Isolated to occipital area	0.51	0.27–0.74
Worse headache ever	0.45	0.15–0.73
Obliged to rest or legs buckled	0.28	0.09–0.48
Neck stiff on flexion/extension	0.24	0.00–0.53

266*

Perceived barriers to the implementation of the Canadian C-spine rule and the Canadian CT head rule.

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Introduction: Successful implementation of clinical guidelines and decision rules requires active local strategies to overcome local barriers. We sought to determine the likely barriers to ED physician use for both the Canadian C-spine rule (CCR) and the Canadian CT head rule (CCHR). **Methods:** We conducted a survey of all attending and resident emergency physicians at 6 community and 6 teaching hospital EDs. The survey instrument was piloted on a group of 20 physicians. Local study nurses distributed the surveys and assured completion by physicians. Questions included demographics, practice patterns, 17 specific potential barriers, and the opportunity to add additional barriers and facilitators. We calculated descriptive and univariate analyses as appropriate for the data. **Results:** The 223 respondents, representing an 81% response rate, had these characteristics: mean age 39.7 years, male 78.8%, years in emergency medicine 9.5, attending physician 84.2%. Fifty-two and a half percent of physicians selected no potential barriers to using the rules with the remainder selecting the following (%): 1. other services will order anyway 20.2%; 2. forget the rule details 15.1%; 3. evidence for the rules flawed 5.0%; 4. no clinical advantage to using 2.5%; 5. rules take too much time 1.7%; 6. not safe for patients 1.7%; 7. resent rules and guidelines 0.8%. Examples of additional barriers included: "patient and family expectations", "lack of resident knowledge of rules". Potential facilitators included: "speeds patient removal from boards and discharge", "academic environment", "support of my peers". **Conclusions:** While a minority of physicians identified specific local barriers to implementation of the CCR and CCHR, important issues include the perception that other services will order imaging regardless and physician ability to remember the rules. Efforts to actively implement these and other ED guidelines should identify then address local barriers. **Key words:** clinical guidelines; emergency medicine; decision rules

267

ED utilization: analysis of patients with and without primary care providers.

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Introduction: The Asheville VA Medical Center Emergency Department (AVAMC ED) will conduct an ongoing retroactive review of all patients presenting for care to determine their primary care provider (PCP) and insurance status. This retroactive chart review will be incorporated into the Medical Center Quality Improvement program, e.g., assignment of PCP. A major issue of the AVAMC ED is patients presenting multiple times to the ED for non-emergent medical needs, e.g., medication refills, due to being in "snowbird" status, while awaiting assignment of a PCP, or instead of making an appointment with their assigned PCP. Objectives: to determine the effectiveness of timely PCP assignment; decrease the number of visits to the ED for non-emergent medical needs; determine the effectiveness of timely PCP assignment; decrease the number of visits to the ED for non-emergent medical needs. **Methods:** The ED logs of all patients who present to the ED for treatment. Patients will be categorized as follows: age (5 year brackets), gender, race, service connected status (SC), EMS utilization and insurance status, e.g., none, private, Medicare, Medicaid, other government. The following will be analyzed against the above categories: number of visits to the ED within six (6) months and symptoms at time of ED visit(s). **Results:** Data, including graphs, will demonstrate the utilization, including over utilization, by patients requiring care who are not assigned PCP within a reasonable timeframe and the resources necessary to care for them. **Conclusions:** Patients appropriately assigned PCP will cease to utilize ED resources for non-emergent needs. This information will be shared with all other ED's within the Department of Veterans Affairs, the largest health system internationally. **Key words:** emergency department utilization; primary care provider; Canadian snowbirds.

268

The effect of application of injury area to overcrowding indices in regional emergency department.

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Introduction: We need some efficient standard criteria to evaluate in hospital stage emergency service and it is useful method that utilize overcrowding index. We want to know the change of the overcrowding index in regional emergency center that solve it's overcrowding with patients' withdrawal and ambulance diversion after operation injury area. Injury area means that a area at which assigned duty physician only manage the patients with injury such as traffic accident, fall down, assault, collision, laceration, amputation, burn, intoxication, asphyxia, drowning, animal bite, sexual assault, etc. **Methods:** We started to operate injury area in our ED from late 2004. So, we collected patients' data from hospital order communication system from January to June in 2004, and same interval in 2005 respectively, and got age, sex, assigned department, result out of the patients to figure out overcrowding indices and result indices. We found out daily patients' count, turn over rate, admission rate, ICU admission rate, emergency operation rate, ED stay duration, ED patient-volume as overcrowding indices. Also we found out withdrawal rate, transfer rate, mortality as result indices. We compared these indices between 2004 to 2005 with t-test. **Results:** There was significant increase in daily visited patients' count in 2005. And in overcrowding indices such as turn over rate, admission rate, ICU admission rate, emergency operation rate, there were also statistically significant increase in 2005 ($p<0.001$). In result indices, there was noticeable decrease in withdrawal. (11.77/day in 2004 to 4.53/day in 2005). **Conclusions:** It is beneficial to operate injury area in mild overcrowded local regional emergency center for correcting deteriorated solving method about overcrowding such as withdrawal, ambulance diversion. It will be valuable to evaluate the effect of operating injury area and it's efficacy about hospital finance with similar

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study with analysis about patients during longer duration. **Key words:** emergency medicine; overcrowding; injury area

269

Awareness of ED staff regarding occupational hazards: Is it a necessity?

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Introduction: To determine awareness of physicians, interns, and emergency department (ED) staff of Hazrat Rasoul Akram and Firuzgar Hospitals about "occupational hazards". **Methods:** In this descriptive – cross sectional study we used a questionnaire for data collection and SPSS software for data analysis (frequency, chi-square and T-test). **Results:** Among the 150 participants, 22% (n=33) were residents 57.3% (n=86) were interns and 20.7% (n=31) were nurses. Males made up 32.7% and 67.3% were female. Mean age was 27.7 years of age. Frequencies of scores in three groups of low, moderate, and high level of awareness were 7.3%, 85.3% and 7.3% respectively. All participants had been vaccinated against HBV. **Conclusions:** Overall awareness level (85.3%) of residents, interns, and nurses of ED of Hazrat Rasoul and Firuzgar Hospitals about occupational hazards was at moderate level. Grades of participants had a correlation with their awareness. We suggest that "occupational hazards" must be added to text books of medical students and nurses during education. **Key words:** emergency medicine; occupational hazards; occupational safety

270*

Diagnosing cerebrovascular ischemia in the emergency department.

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Introduction: Recent evidence suggests that patients presenting to the emergency department (ED) with a diagnosis of transient ischemic attack (TIA) are at significant risk of suffering a stroke within a short time. Accurate identification of TIAs and strokes is crucial to the management of these patients. We sought to determine the ability of emergency physicians to identify potential cerebrovascular ischemic events among patients presenting to the ED. **Methods:** A retrospective chart review of all ED referrals to a centralized stroke prevention clinic between July 1, 2003 – June 30, 2004 was performed. Four abstractors reviewed the data; three were blind to the study purpose, one was not. As part of the stroke clinic referral package, emergency physicians were asked to indicate on a 6-point Likert scale the likelihood that their patient had experienced a TIA or stroke. This score was compared to the final diagnosis assigned to the patient by a stroke clinic neurologist. **Results:** 170 charts were identified which met the inclusion criteria. The linear-weighted kappa score for blinded vs. unblinded data abstractors was determined to be very high (k = 0.91). Overall, 69% of referrals received a final diagnosis of ischemia. When analyzed according to the Likert value assigned by the emergency physician, the proportions of patients receiving a diagnosis of ischemia were as follows: Score = 6: 84%; Score = 5: 58%; Score = 4: 44%; Score ≤3: 9%. Among those patients misdiagnosed as ichemia in the ED, the most common diagnoses assigned by the neurologist were non-ischemic vertigo (16%), migraines (12%), non-neurogenic syncope, and anxiety (9% each). **Conclusions:** The initial assessment by an emergency physician correlates with the likelihood of a diagnosis of cerebrovascular ischemia. Our findings suggest that while emergency physicians' clinical impressions can be used to help risk stratify patients referred for follow-up in stroke prevention clinics, further evaluation will often reveal a non-ischemic diagnosis. **Key words:** cerebrovascular ischemia; emergency medicine; stroke prevention

271

Disparity in documentation: A comparison of senior and junior grade doctor documentation practices in the Emergency Department.

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Introduction: Accurate documentation is an important requisite for avoiding litigation and maintaining continuity of care. We compared the documentation practices of senior grade doctors and junior grade doctors to determine if there is any difference in documentation between both grades in the emergency department. **Methods:** We assessed twenty five emergency medical records of patients seen by junior grade doctors (JG) and 25 records of patients seen by senior grade doctor (SG) group for documentation of following parameters: presenting complaint, history of presenting complaint, allergies, family history, past medical history, medications, family history, examination findings, investigations or procedures, of investigations or procedures, overall assessment, management plan. Notes were also assessed for documentation of date, time of examination, presence of author's name, signature and legibility. **Results:** Junior grade doctors demonstrated more complete documentation than senior grade staff, ($p < 0.001$). Parameters with significant difference were history of presenting complaint (40% of SG vs. 100% of JG), allergies (8% of SG vs. 84% of JG), past illnesses (4% of SG vs. 92% of JG), medications (4% of SG vs. 92% of JG), date of examination (36% of SG vs. 92% of JG) and time of examination (66% of SG vs. 100% of JG). Only 64 % of senior grade documentation was deemed to be legible compared to 84 % of junior doctors. **Conclusions:** Our study has shown that there is a significant difference in documentation by senior grade and junior grade doctors. Structured, problem-specific preformatted charts have been recommended to improve quality of documentation. These charts may help avoid disparity in documentation between senior and junior grade doctors in the emergency department. **Key words:** documentation; emergency medicine; medical records

272*

The British Columbia Emergency Department Physician Workforce Study: current and projected emergency physician workforce requirements.

Marsden J, Harris DR, Stenstrom R, Hamidizadeh R, Innes G, Christenson J, Hunte G, Newbery P. Department of Emergency Medicine, University of British Columbia, Vancouver, BC, *Canada*

Introduction: It is unclear how many physicians practice emergency medicine in British Columbia and whether there is a need for more physicians to provide this care. This study sought to quantify current and projected needs for emergency physicians. **Methods:** This was a cross-sectional survey in two parts: Part 1 was a telephone survey of all emergency department (ED) heads; Part 2 was a mail survey to all physicians who work in an ED in BC. In Part 1, ED heads were asked to quantify the number of physicians currently working in their ED, the number of physicians they need to hire at present and over five years. In Part 2, individual physicians were asked about their future work plans. The number of individual physicians was determined from the initial ED chief telephone survey; all surveys were coded and anonymous. **Results:** 87/101 (86.1%) ED heads completed Part 1; 418/929 (45.0%) physicians completed Part 2. Thirty-eight percent of ED heads responded having problems staffing their ED with physicians; there was no difference between larger and smaller sites (chi-square 0.79, $p = 0.38$). Seventy-two and a half full-time physicians are needed at present; 196 physicians are needed over the next five years. The preferred qualifications for hiring are: family physicians with ATLS/ACLS certification – 33.7%;

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CCFP with enhanced skills – 18.1%; CCFP(EM) – 22.9%; FRCPC, ABEM or CCFP(EM) – 13.2% and; FRCPC – 6.0%. The average age of respondents was 44 years with 29.0% expecting to decrease their clinical workload over the next five years. Of those who plan to decrease their clinical workload, 93/121 (76.9%) practice in centers > 14,000 annual patient visits. Currently, BC produces 4 CCFP(EM) physicians and 3 FRCPC physicians per year. Based on estimated physician needs from this study, BC would have a shortfall of 160 emergency physicians over the next five years. **Conclusions:** Currently there is a need for more physicians to meet the EM needs in BC – more residency positions are needed and most of the residency positions should be CCFP(EM). **Key words:** emergency medicine; emergency physicians; staffing

273*

The British Columbia Emergency Department Physician Workforce Study: Who is working in emergency departments in British Columbia?

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Introduction: It is unknown who practises emergency medicine (EM) in British Columbia in 2005. This study surveyed those physicians who provide medical care in emergency departments (EDs) in BC. **Methods:** This was a cross-sectional survey in two parts: Part 1 was a telephone survey of all ED heads; Part 2 was a mail survey to all physicians who work in an ED in BC. In Part 2, individual physicians were asked about their training experience, current work and future work plans. Physicians were identified from the initial ED chief telephone survey; all surveys were coded and anonymous. **Results:** 929 physicians practised EM, full- or part-time, in BC in 2005 – 418 (45.0%) completed the survey. 311/418 (74.4%) worked in EDs with >14,000 annual visits. Mean age was 44.1 years (sd 8.6) and 79% were male. Male emergency physicians (EPs) were older than female EPs (mean age = 45.1 vs. 39.7 years, $p < 0.0001$). 172/418 (41.1%) had some EM specialty designation (CCFP[EM], FRCPC or ABEM). Physicians who only worked in an ED worked a mean 29.7 hours/week (sd 10). 271/418 respondents (64.8%) work in other settings; 84% of them work as family physicians. Physicians who did not exclusively work in an ED worked a mean 19.3 hours/week in the ED (sd 13.8) and a mean 24.1 hours/week (sd 20.1) elsewhere. Respondents from the smaller centers spent a median 0 hours/week (mean =1.7) on research and teaching (IQR = 0–2 hours) whereas those from larger sites spent a median 2 hours/week (mean = 4.3; IQR 0–4 hours) – this difference was statistically significant (Mann–Whitney U Test $p < 0.001$). Twenty-four of 418 respondents (5.7%) planned more clinical work in the next 5 years; 121/418 (28.9%) planned less. Seventy-six of 418 respondents (18.2%) planned more non-clinical work in the next 5 years; 88/418 (21.1%) planned less. **Conclusions:** This is the first study to provide in-depth information regarding the characteristics of those providing ED care throughout BC. This information will be vital to those charged with planning future physician needs in EM. **Key words:** emergency medicine; emergency physicians; staffing

274

Clinical management in the Emergency Department – do we 'stay and play' or 'cut and run'?

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Introduction: The current vogue for delivering a total package of care for patients attending the ED with certain presenting clinical symptoms and signs has heralded many changes to the way EDs are organized and deliver patient care. Objective: To identify to what extent these practices have been taken up by departments in England and Wales as part of their standard approach. **Methods:** All large EDs in England and Wales were invited to participate in this study. Data were collected through an interview with the lead clinician at each consenting ED. Data collected related to the presence or absence of ED clinical decision units (CDU), or beds. Clinical scenarios where 'rule out' or clinical decision unit strategies might be employed were posed, 10 relating to adults and 3 to children. Participants were asked to comment to what extent the patient would be managed entirely in the ED both in and out of hours. **Results:** 137 (65.2%) EDs consented to participate and interviews were completed in 116 (84.7%). There were no differences between consenting and non-consenting EDs in relation to size, case mix and waiting times. Fifty-eight (53%) EDs have a CDU/ED beds/CPU. EDs manage a mean of 48% (sd 19.9%) of cases in hours and 45.2% (sd 18.0%) of cases out of hours. Linear regression demonstrates a trend towards longer mean waiting time in departments that manage a higher percentage of cases in hours but this is not significant (b=0.22, 95% CI: –0.21 to 0.47, p=0.07). However, there is a significant association between mean waiting times and the percentage of scenarios managed out of hours (b=0.29, 95% CI: 0.02 to 0.56, p=0.04). **Conclusions:** This data reflects the variation in current clinical practice within EDs in relation to commonly presenting symptoms and signs and its influence on waiting time performance. Although the effect is small, there is evidence that the greater the extent to which ED manage cases entirely within the ED, the longer the mean waiting time. **Key words:** clinical decision units; clinical management; emergency medicine.

275

Developing a model of organization factors that influence Emergency Department waiting times – results from a national study.

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Introduction: When taking into account existing work on factors influencing waiting times, it is still unclear what the organizational factors are that affect the variation in waiting times observed throughout Emergency Departments (ED). Objectives: To identify organizational factors that influence ED waiting times. **Methods:** All large EDs in England and Wales were invited to participate in this study. Data were collected through three interviews with the clinical lead, head nurse, and business manager at each consenting ED. Data collected related to system factors (workload, case mix, other services) staffing, working practices (clinical management, deployment of staff, team-work and management style). Routine data were also analyzed from each ED and a recent national audit of EDs. Linear regression modeling was used to investigate associations between organizational factors and waiting times, potentially predictive variables being entered into a multivariate model. **Results:** 137 (65.2%) EDs consented to participate. Having controlled for differences in case-mix and department size three factors were found to be predictive of mean waiting time. These were the presence of 'see and treat' (minors fast track) (b= -35.2, 95% CI: -58.6 to -11.8, p=0.004), the percentage of nursing hours lost to sickness (b=2.47, 95% CI: 0.12 to 4.81, p=0.04) and the ED non-pay spend per patients (b= 3.77, 95% CI: 1.62 to 5.92, p<0.001). This model explained 32.6% of the variability in mean waiting time. **Conclusions:** Three factors have been identified which predict mean waiting time. Further investigation is required to establish causation and therefore mechanisms by which waiting times can be addressed. **Key words:** emergency medicine; wait times; workload.

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276

Bereavement care in Emergency Departments: Continued improvement.

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Introduction: Care of the bereaved has been highlighted by a recent UK government report which sets out fundamental principles for good bereavement services. Research in 1992 suggested that care for the bereaved in the Emergency Departments (ED) was good, although, aftercare and facilities could be improved. Given the renewed focus on bereavement care this survey explores whether care for the bereaved in EDs has improved over the intervening 12 years and where this leaves us in meeting the principles set out by the government. **Methods:** A scenario based 38-item questionnaire was sent to all UK Type I and II EDs (N=229) in England, Wales and Northern Ireland. The questionnaire explored facilities, procedures, and processes following bereavement. **Results:** Response from 185 (81%) EDs. Overall improvements were across all areas of bereavement care. Highlights of some improvements are shown in Table 1. The survey found evidence of a multidisciplinary approach including: religious leaders, bereavement officers, support workers, paramedics, specialist nurse, coroner's officer, and social workers. There was an increase in training and support for staff. Almost all had a dedicated relative's room that was comfortable with facilities to reduce the 'clinical' appearance. Nearly all provided written information, although, less than a quarter provided information in other languages. **Conclusions:** Although this research provides evidence on improvements in care, areas for improvement have been highlighted. Remediation would enable departments to provide best care to bereaved relatives, which is vital in the first stage of the bereavement process. **Key words:** emergency medicine; bereavement services; government standards.

Table 1, Abstract 276

Improvement	1992	2005
Specific room	76	97
<10 metres from resuscitation room	19	82
Access via waiting room	24	10
Telephone	48	91
Comfortable seating	31	98
Tissues	56	94
Refreshments	50	97
Written information	68	95
Time alone with deceased	88	94
Remove personal effects	56	82
View body with mutilating injuries	53	76
Ongoing contact	5.1	35
Camera	63	91

277*

Measuring the quality of stroke prevention care: performance in the emergency department.

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Introduction: In Canada, stroke is the fourth leading cause of death and a leading cause of disability. Close to 50,000 strokes occur in Canada each year, and approximately 16,000 stroke victims die as a result of stroke or acute complications. Increasing evidence emphasizes the need for diagnostic evaluation and stroke prevention strategies to be delivered promptly after a cerebral ischemic event. The emergency department (ED) plays a critical role in initiating secondary prevention strategies for patients who present with stroke or TIA. A Canadian expert panel was convened that identified a core set of quality of care indicators for management of patients following stroke. Many of these indicators address care provided in the ED, including the timing and nature of evaluation for selected patient subgroups based on risk of future events. **Methods:** Using a modified Delphi process, a multidisciplinary panel of stroke experts and methodologists rated potential indicators based on the quality of currently available research evidence and on clinical experience. During a one-day meeting a core set of indicators were selected and a risk stratification model was identified that could be applied in ED assessment and management of stroke patients. **Results:** Several quality indicators were identified for secondary stroke prevention. A risk stratification model will enable practitioners to identify patients as emergent, urgent or semi-urgent, and could be used to guide timing of diagnostics and interventions such as neuroimaging, acute thrombolysis, antithrombotic therapy, lipid and hypertension management, and assessment for ongoing rehabilitation needs. **Conclusions:** This is the first comprehensive set of quality of care indicators for stroke prevention in Canada. They emphasize the need for rapid and appropriate assessment of suspected stroke, and will be used to establish benchmarks and standards for continuous quality improvement and monitoring of the performance of EDs, stroke centres and clinics. **Key words:** emergency medicine; stroke; risk stratification

278*

Inter-rater reliabilities of the OQAQ checklist score compared to the OQAQ global scientific quality score among emergency physicians – a pilot study.

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Introduction: There is controversy regarding the most appropriate method of grading an article's scientific quality. Some favor checklists while others believe that a global score is more reliable. The overview quality assessment questionnaire (OQAQ) is a combined nine-item checklist scoring system with a 7-point global impression scale for systematic reviews. This study compares the inter-rater reliabilities of the OQAQ checklist scoring system against the OQAQ global impression scale. **Methods:** Systematic reviews relevant to emergency medicine published in 2005 were selected by consensus. Three raters independently completed standardized OQAQ forms to produce quality scores for each article. Raters were not blinded to the articles' citations. Inter-rater reliabilities were calculated using intra-class correlation coefficients type 2 (ICC) using raters as a random factor. Single rater and average ICCs among the 3 raters were calculated along with 95% confidence intervals. **Results:** Thirteen articles were reviewed. The single rater ICCs for the checklist and global scores were 0.27 (95% CI: 0–0.62) and 0.35 (95% CI: 0–0.68) respectively. The average ICCs for the checklist and global scores were 0.53 (95% CI: 0.16–0.79) and 0.62 (95% CI: 0.27–0.84) respectively. **Conclusions:** There were no inter-rater reliability differences between a checklist scoring system and a global impression scale for rating a systematic review's scientific quality; however, this study was limited by article and rater sample size. **Key words:** systematic review; inter-rater reliability; scientific quality scoring

279*

Reliability of the QUOROM and OQAQ tools in evaluating systematic reviews in emergency medicine literature.

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Introduction: High quality meta-analyses remain one of the

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strongest levels of evidence in medical literature. The overview quality assessment questionnaire (OQAQ) and the quality of reporting of meta-analyses (QUOROM) tools for evaluating the quality of meta-analyses were introduced in 1991 and 1999 respectively. The reliability of these tools has never been assessed. In this paper, we compare the inter-rater reliability of quantitative QUOROM and OQAQ scores in the emergency medicine literature. **Methods:** Systematic reviews relevant to emergency medicine from 2005 were randomly selected according to pre-determined inclusion criteria. Three trained independent evaluators scored the articles according to the OQAQ and QUOROM tools as published. The inter-rater reliability was calculated using intraclass correlation coefficients type 2 (ICC2). The overall scores and inter-rater reliability were reported. **Results:** The average total OQAQ score was 24.8 out of a possible 34 (summation of the checklist score and the overall impression score). The average QUOROM score was 16.2 out of a possible 18. For OQAQ, the ICC2(A,1) = 0.35 (95% CI: 0–0.68), while the ICC2(A,3) = 0.62 (95% CI: 0.36–0.84). For the quantitative QUOROM, the ICC2(A,1) = 0.08 (95% CI: 0–0.46), and ICC2(A,3) = 0.22 (95% CI: 0–0.58). **Conclusions:** The OQAQ and QUOROM tools provide a structured approach to evaluating the quality of meta-analyses, both of which require some knowledge of methodology to appropriately utilize. Of the 13 articles reviewed, overall quality was encouraging compared to previously published scores of systematic reviews using these tools. Both tools provided similar overall quality evaluations of the papers reviewed. However, the inter-rater correlation using the QUOROM tool was very poor. OQAQ correlation was better, however still sub-optimal. Further work is needed to ascertain how these tools perform in the hands of the "lay-reader." **Key words:** meta analyses; quality assessment; inter-rater reliability

280

The need for a common assessment tool to evaluate emergency care systems worldwide.

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Introduction: To date no comprehensive method exists to assess international emergency systems. A common assessment tool is needed to compare and improve frontline care around the world. This article reviews the existing literature on emergency care assessment and proposes a comprehensive tool for assessing emergency care systems. **Methods:** A PubMed database search of English language articles with the search terms "international", "emergency medicine", "assessment", and "trauma" resulted in numerous articles for review. Textbooks, governmental and non-governmental websites provided information on humanitarian and emergency relief assessment. Review of trauma and prehospital care systems were obtained from the World Health Organization website. **Results:** None of the many articles describing emergency care systems in various countries provide a way to assess these systems. Humanitarian and emergency relief agencies have tools to assess care needs but not care systems. Established assessment tools for trauma care and pre-hospital care are not broad enough to describe entire emergency care systems. The proposed common tool aims to assess healthcare systems' ability to identify, manage, treat, and prevent common symptoms of emergency diseases. **Conclusions:** A common tool is proposed to assess, compare, and monitor the development of emergency care systems worldwide. Data from this tool will allow for the improvement of local healthcare systems and the development of emergency medicine as a specialty throughout the world. **Key words:** emergency medicine; international; quality assessment.

AIRWAY TRACK

281*

A valved holding chamber (VHC) manufactured from non-electrostatic materials is more effective than non-conducting VHCs used out-of-package with pressurized metered dose inhalers (PMDIs).

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Introduction: Manufacturers advise pre-washing VHCs with detergent to mitigate electrostatic charge that reduces medication delivery from PMDIs. These instructions may not be followed, particularly in the ED where time-to-treat is critical. We report a study in which delivery of a beta-2 agonist (Ventolin®) GSK plc, 100-µg/actuation salbutamol base equivalent ex metering valve) via a new VHC (AeroChamber® HOSPITAL Anti-static, Trudell Medical International [AC-H]) was compared with non-conducting VHCs (ProChamber™ [PRO], OptiChamber® Advantage [OPT], both Respironics Inc., SpaceChamber™ [SPC], PARI Respiratory Equipment Inc., Pocket Chamber™ [POC], Ferraris Medical Inc.) evaluated directly from their packaging. **Methods:** Fine particle mass (FPM) < 4.0 µm aerodynamic diameter was determined using a Next Generation Pharmaceutical Impactor (n = 3 devices/group) at 30.0 L/min, following the procedure in Canadian Standard CAN/CSA/Z264.1–02:2002. Onset of sampling was delayed for 2-s or 5-s to simulate performance if PMDI actuation is not coordinated precisely with the onset of inhalation. **Results:** FPM[2-s delay] and FPM[5-s delay] (mean ± SD) ex AC-H were 27.3 ± 2.2 µg and 18.2 ± 0.9 µg respectively. These values compare with 2.1 ± 2.0 µg and 1.8 ± 0.5 µg (PRO); 3.5 ± 0.7 µg and 3.3 ± 0.3 µg (OPT); 3.5 ± 0.4 µg and 1.5 ± 0.1 µg (SPC); 2.7 ± 0.6 µg and 1.5 ± 0.4 µg (POC), representing FPM[2-s delay] and FPM[5-s delay] in each case respectively. **Conclusions:** Clinicians should be aware of the dosing implications from these data when prescribing VHCs, especially where there is the likelihood that pre-washing will not be performed. **Key words:** airway, asthma

282*

The feasibility of developing novel clinical decision rules for patients with congestive heart failure or chronic obstructive pulmonary disease.

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Introduction: There are currently no widely accepted or validated guidelines on whether to admit patients presenting to the emergency department (ED) with either congestive heart failure (CHF) or chronic obstructive pulmonary disease (COPD). The aim of this study is to determine the feasibility of developing clinical decision rules for these conditions. **Methods:** This health records review included a consecutive sample of patients presenting with either CHF or COPD to a tertiary care ED over a four month period. Information reviewed included history (chief complaint, past medical history), medications, vital signs, and laboratory and diagnostic imaging investigations. The characteristics of patients with adverse outcomes (admission, BiPAP, intubation, myocardial infraction, relapse, or death) were compared to those without. Statistical analyses included Fisher's exact, Student's t-test, and chi-square tests. **Results:** From March to June 2005, we enrolled 282 patients with these characteristics: CHF 180 (63.8%), COPD 102 (36.2%), mean age 73.7 years, male 53.9%, adverse outcome 59.2% (admitted 48.6%, BiPAP 2.8%, intubated 1.8%, MI 3.9%, relapsed 15.6%, deceased 7.8%). The following compares patients with and without adverse outcomes (Table 1). **Conclusions:**

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We found a very high rate of adverse outcomes and significant differences between patients with and without adverse outcomes. These data suggest that there is good potential for development of clinical decision rules and provide important feasibility information. **Key words:** airways, congestive heart failure, chronic obstructive pulmonary disease, clinical decision rules

Table 1, Abstract 282.

Characteristic	Patients with adverse outcomes	Patients with good outcomes	*p* value
Dyspnea duration	5.8 d	8.5 d	0.13
Nursing home	10%	3%	0.04
Heart rate	98 bpm	91 bpm	0.03
Respiratory rate	26/min	21/min	<0.01
SaO2 room air	91%	95%	<0.01
PO2	87 mm Hg	67 mm Hg	0.02
Blood glucose	8.6 mMol/L	7.6 mMol/L	<0.01
Creatinine	149 μMol/L	119 μMol/L	0.02
TnT	0.14 μg/L	0.01 μg/L	<0.01

283*

Intubating conditions and hemodynamic effects of etomidate for rapid sequence intubation in the emergency department: an observational cohort study.

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Introduction: To evaluate intubating conditions and hemodynamic effects of etomidate in patients undergoing rapid sequence intubation (RSI) in the emergency department (ED). **Methods:** We conducted a prospective, observational study of patients who received etomidate for induction for RSI over a 42-month period in a tertiary care teaching hospital. Intubating conditions were determined for both sedation/paralysis and for technical difficulty using a 5-pont Likert scale. Hemodynamic effects were evaluated pre, post and every 5 minutes for 15 minutes following administration of etomidate. Hemodynamic effects were evaluated using repeated measures analyses of covariance. **Results:** 522 patients were included in the final analysis. Lidocaine and fentanyl were used as pretreatment in 65.1% and 26.1% of patients respectively, while succinylcholine was the paralytic in 94.3% of intubations. Sedation/paralysis were rated as excellent or good in 88.1% and 8.9% of patients respectively, while technical difficulty was very easy or easy in 60.7% and 19.0% of patients, respectively. Baseline systolic and diastolic blood pressure (SBP/DBP) and heart rate (HR) ± SD were found to be 132.7 ± 35.4 mmHg, 69.5 ± 21.2 mm Hg and 96.1 ± 26.2 beats/min, respectively. Overall, there was a clinically insignificant elevation in SBP ($p < 0.0001$), DBP ($p = 0.0002$) and HR ($p < 0.0001$) immediately post-intubation. Elevations in SBP persisted at 5 minutes ($p = 0.0230$) and 10 minutes ($p = 0.0254$) post-intubation while DBP and HR returned to and remained at baseline 5 minutes post-intubation. In the subgroup of 80 patients with a pre-intubation SBP <100 mm Hg, there was a 12.1 mm Hg elevation in SBP ($p < 0.0001$) and a 7.3 mm Hg elevation in DBP ($p = 0.0001$) immediately post-intubation which persisted throughout the 15-minute post-intubation assessment period. **Conclusion:** Etomidate appears to provide appropriate intubating conditions and hemodynamic stability in a heterogeneous group of patients undergoing RSI in the ED even in patients with low-pre-RSI blood pressure. **Key words:** airway, rapid sequence intubation, etomidate

284*

Use of lidocaine and fentanyl premedication for neuroprotective rapid sequence intubation in the emergency department.

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Introduction: Autoregulation is dysfunctional in the injured brain, and as such increases in intracranial and arterial pressure may result in extension of the primary injury. Rapid sequence intubation (RSI), is a well known to cause surges in both arterial pressure and intracranial pressure (ICP). Neuroprotective agents, namely lidocaine and fentanyl, have the potential to minimize the pressure surges implicated in secondary brain injury. The purpose of this study was to determine the frequency with which neuroprotective agents were used for neuroprotective RSI in the ED. **Methods:** We conducted a retrospective chart review of all 139 patients intubated in the VGH ED between Mar–Oct 2003. Patients were eligible if there was an indications for neuroprotective agents defined as presumed intracranial pathology and MAP >85 mm Hg. Contraindications to fentanyl included MAP <85 mm Hg or allergy to fentanyl. Data are reported using standard descriptive statistics. The primary outcomes for this study are reported as proportions presented using percentages with 95% confidence intervals (CI). **Results:** 77 patients were included in the final analysis. Indication for intubation included non-traumatic causes ($n = 37$), including cerebrovascular accident or intracranial hemorrhage and closed head injury ($n = 40$). The mean age (± SD) was 52.3 ± 20.4 years and 31.4% were female. 74% of patients had indications for neuroprotective agents, without contraindication. When neuroprotective agents were indicated, lidocaine and fentanyl were used in 84.2% (95% CI 72.6–91.5%) and 33.3% (95% CI 22.4–46.3%), respectively. 11% of the intubations were performed with a fentanyl dose of >2 μg/kg, which is the lower limit considered effective. **Conclusions:** Despite the potential benefit of using lidocaine and fentanyl in appropriate patients undergoing neuroprotective RSI in the ED, our study identified a significant underutilization of optimal premedication. Identification of barriers to use and implementation of strategies to optimize use are necessary. **Key words:** airway, rapid sequence intubation, lidocaine, fentanyl

285*

Post intubation hypotension: incidence, risk factors and outcomes.

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Introduction: Post intubation hypotension (PIH)is a potentially life threatening adverse event. The objectives of this study were to determine the incidence, risk factors, impact on length of stay (LOS), and mortality associated with PIH after emergency department (ED) intubation. **Methods:** A structured chart audit was performed for patients over 16 years of age requiring emergent endotracheal intubation (EETI) in a single tertiary care ED between March 1, 2004 and July 1, 2005. Data collected included admission diagnosis, medications (outpatient and those used during ETI), comorbidities, vital signs, in-hospital length of stay, and mortality. PIH was defined as a decrease in systolic blood pressure (SBP) to <90 mmHg, a decrease in SBP of 20% from baseline, or a decrease in mean arterial pressure

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(MAP) to <60 mm Hg in the 2 hours following EETI. In patients with pre-intubation hypotension (SBP <100 mm Hg in the hour before EETI), PIH was defined as a further decrease in SBP of 5 mmHg or more. **Results:** Overall, 218 patients intubated in the ED were identified. The incidence of PIH of 64.3% and resulted in a 9.5 day prolongation in the median length of stay for those who developed PIH than for those who did not (24.1 vs. 14.6). PIH was not associated with an increase in in-hospital mortality. Risk factors for development of PIH included COPD (23.3% of those with PIH vs. 4.0%, $p = 0.0003$), outpatient calcium channel blockers (12.8% in PIH vs. 2.7%, $p = 0.0161$), angiotensin receptor blockers (10.4% vs. 2.7%, $p = 0.0434$), or bronchodilators (12.8% vs 4.1%, $p = 0.0416$). In addition, the use of vasopressors during ETI was associated with PIH (33.8% in PIH vs. 8.1%, $p < 0.0001$). **Conclusions:** PIH is a common adverse event after EETI and is associated with a prolonged length of stay. Outpatient medications and the need for vasopressors during EETI are associated with PIH. **Key words:** airway, intubation, hypotension

286*

A comparison of the bougie with a rigid fiberoptic scope: Does the Levitan FPS Scope® perform better than the bougie in a simulated difficult airway?

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Introduction: In this study we compared the use of a relatively new intubating stylet (FPS Levitan®fiberscope) with the bougie in a simulated difficult airway setting. **Methods:** A total of 103 participants were recruited for our study. Our study population included paramedics, respiratory therapists, medical residents, and medical students. Participants were excluded from the study if they had prior experience with the fiberscope. Following a 20 minute video participants practiced with feedback during 6 intubations with each tool. Following this, participants were required to attempt intubation using both instruments on two manikins with differing but fixed laryngoscopic views where only the epiglottis is seen (Cormack and Lehane grades 3A and 3B). Our two primary outcome measures were total intubation time and success rate. **Results:** Intubation on the 3A airway was successful 103 times (100%) using the bougie and 98 times (95%) using the fiberscope. The difference between these outcomes was not statistically significant. Intubation of the 3B airway was successful only 9 times (9%) using the bougie and 101 times (98%) using the fibersope. This difference was statistically significant ($p > 0.0001$). The mean time to intubation of the 3A airway was 31 seconds for both methods. The mean times to intubation of the 3B airway were 114 and 33 seconds for the bougie and the fiberscope respectively. Eight participants required two attempts at intubating the 3A airway using the fibersope while only one participant required two attempts to intubate the 3A manikin using the bougie. Eleven participants required two attempts to intubate the 3B manikin with the fibersope. **Conclusions:** We conclude that the Levitan stylet fiberscope used as an adjunct to direct laryngoscopy performed as well or better than the bougie in simulated difficult airways. **Key words:** airway, intubation, bougie, fiberscope

287*

Severe hypotension following endotracheal intubation.

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Introduction: Post intubation hypotension (PIH) is common after emergent endotracheal intubation (EETI). Little data is available on the effects of severe post intubation hypotension (SPIH) after EETI. The objective of this study is to identify the risk factors, the impact on the length of stay (LOS) and the mortality associated with SPIH compared to those who develop less severe PIH. **Methods:** A structured chart audit was performed for patients over 16 years requiring emergent intubation in a single tertiary care referral center between March 1, 2004 and July 1, 2005. Data collected included admission diagnosis, medications (outpatient and those used during ETI), comorbidities, vital signs, in-hospital length of stay, and mortality. SPIH was defined as as an absolute decrease in SBP to <80 mm Hg or a decrease in mean arterial pressure (MAP) of 60 mm Hg occurring in the 2 hrs after ETI. **Results:** The incidence of SPIH was 14.0% in 218 patients who required EETI, as compared to 64.3% incidence of less severe hypotension. The median length of stay in hospital was 7.6 days longer for those who developed SPIH than for those who developed less severe hypotension (9.0 vs. 16.5 days). SPIH was not associated with in hospital mortality. Patients with SPIH also underwent more invasive procedures ($p = 0.003$). Risk factors for SPIH included age over 70 years ($p = 0.0003$), pre-incident beta blocker use ($p = 0.040$), and administration of nitrates ($p = 0.0176$), vasopressors ($p < 0.0001$) or neuromuscular blocking agents ($p = 0.010$) during EETI. A diagnosis of pneumonia was also associated with SPIH ($p = 0.0142$). **Conclusions:** SPIH is a common complication of ETI with a significant impact on length of stay in hospital and the need for invasive procedures when compared to patients with less severe PIH. **Key words:** airway, intubation, hypotension

288

Emergency department rapid sequence intubation: choice of intravenous induction agent.

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Introduction: The ideal intravenous induction agent for emergency department (ED) rapid sequence intubation (RSI) should be rapidly acting, permit optimum intubating conditions and be devoid of side effects. An ideal agent does not exist, but thiopentone, etomidate, and propofol are commonly used in the UK. Recent reports have advised that etomidate should be used with caution, or an alternative be used, due to effects on adrenocortical function. We analysed our database of ED RSI to establish the choice of induction agent over the last 6 years. **Methods:** Prospectively collected data from all intubations performed in the ED of the Royal Infirmary of Edinburgh (RIE) from January 1999 to June 2005 were analysed. This time period was broken down into 3-month blocks and the induction agents used were grouped and given as a percentage of the total RSIs during each 3-month block. We also analysed the immediate complications of desaturation, hypotension and cardiac arrest for each induction agent. **Results:** From January 1999 to June 2005, 1966 patients were intubated in RIE ED. 1245 (63%) were RSI. Etomidate was used in 20% of RSIs over the first year and this increased to 44% over the last year. A reciprocal decrease in thiopentone usage was found. Propofol usage remained relatively constant, averaging 10%. Complication rates for thiopentone, etomidate and propofol were 6.5%, 7.8% and 9% respectively. **Conclusions:** We found an increased use of etomidate for ED RSI over the last 6 years. This is despite concerns about its potentially adverse effects on adrenocortical function. The immediate safety profile gave no cause for concern. Further studies are necessary to confirm or refute the safety of etomidate in anaesthesia of the critically ill patient. **Key words:** airway, rapid sequence intubation, thiopentone, etomidate, propofol

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289

Use of antibiotic in the treatment of COPD patients presenting to the emergency department and upon discharge.

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Introduction: Chronic Obstructive Pulmonary Disease (COPD) has a high mortality and significant socioeconomic impact. In absence of previous information pulmonary function, a diagnosis of COPD is accepted if the patient reports habitual difficulty in breathing. The Group of Spanish Society of Emergency Medicine for study of COPD´s exacerbations presents a study on the use of the antibiotics in COPD exacerbations. **Methods:** All the patients with a documented diagnosis of COPD presenting to the emergency departments of the hospitals in Spain during the 14th to 27th of February, 2005 with exacerbation of their symptoms were eligible for the study. We applied Anthonisen's criteria for the prescription of antibiotics to the patients and analyzed all the patients to compare those who were prescribed antibiotics and those who were not. **Results:** Of 1190 patients that presented with COPD exacerbation, 591 (49.66 %) met Anthonisen's criteria. Of these, 250 (42.30 %) received prescriptions for antibiotics. Of patients consulted to the Hospital Service of Urgencies, 510 (42.86 %) were discharged home. Of these antibiotics were prescribed to 386 (75.68%) fulfilling the criteria. **Conclusions:** 1. In spite of existing guidelines for the use of antibiotics in patients with COPD exacerbation, they are poorly prescribed for patients presenting to the emergency department . 2.We must improve the prescription of antibiotics in the Hospitable Services of Urgencies. 3. It is necessary to widely distribute the clinical practice guidelines in order to increase its use. **Key words:** airway, COPD, antibiotic, guidelines

290*

Prospective multicenter trial of an action plan following emergency department discharge for acute asthma.

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Introduction: Action plans (AP) are effective in the management of chronic asthma; however, few asthma patients presenting to the ED employ these strategies. Our objective was to examine the effectiveness of an AP strategy in the ED for patients discharged home after treatment for acute asthma. **Methods:** 3 Canadian EDs enrolled patients (pts); enrolled pts underwent a structured ED interview and telephone interview 3 and 6 weeks later. Inclusion criteria were MD diagnosis of asthma, age 8–55, and discharged from the ED. Pts were randomized to AP or asthma education (AE) using concealed allocation. AP pts received a standard paper-based AP, paper-based education, and encouragement to return to their primary care provider (PCP); AE pts received paper-based education materials only. PCP follow-ups, AP review with PCP, and use of inhaled corticosteroids (ICS) 4 weeks after ED discharge were recorded. Data analysis used Chi-2, t-test, K–W test. **Results:** Of 104 pts, 53 (51%) were assigned to AP and 51 (49%) were assigned to standard AE. Age (21 years), sex (55% female), smoking status (9% current smokers), previous admissions (60%), and prior use of (ICS (66%) were similar for both groups. The groups differed on ED beta agonist treatment (AE = 100%, AP = 92%, $p = 0.05$). At discharge, all pts received oral corticosteroids and a similar proportion of new or existing ICS prescriptions were documented (87% vs 96%). At final follow up, the AP group had fewer follow-ups with their PCP (45% vs 68%, $p = 0.02$); however, 67% of the AP group had discussed their action plans with their PCP at their visit. Similar proportions were still taking ICS (79% vs 81%). **Conclusions:** Despite universal access to health care, this sample of discharged asthmatics did not take advantage of care opportunities despite encouragement and provision of AP in the ED. Future research might target other education interventions, such as web-based tools or in-ED AE, to improve follow-up in this high-risk group. **Key words:** airway, asthma, action plans

291*

Prospective multicenter study of admissions to Canadian hospitals for acute asthma.

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Introduction: Hospitalization after ED treatment of acute asthma varies across jurisdictions, and limited previous research has involved health systems with universal access and high use of preventive medications. Our objective was to determine the factors associated with hospitalization after ED treatment for asthma in Canada. **Methods:** 16 Canadian EDs enrolled patients (pts) over the study period. Enrolled pts underwent a structured ED interview and telephone interview 2 weeks later. Inclusion criteria were MD diagnosis of asthma, age 18–55, and no evidence of COPD. Admission was defined as an acute visit that resulted in a formal admission to that hospital. Data were analyzed using Chi-2, t-test, K–W test, and logistic regression. **Results:** Of 694 subjects, 91 (13%) were admitted to the hospital; site admission proportions ranged from 0–38%. Pts who were admitted differed from those discharged in age (36 vs 31 years, $p < 0.001$) but not gender (65% vs 63% females). There was no difference in the number of ED visits in the previous 2 years between admitted and discharged pts. Those already receiving oral (20% vs 8%; $p < 0.001$) or inhaled (75% vs 65%; $p = 0.08$) corticosteroids (CS) were more often admitted. Treatments in the ED differed based on admission status; admitted pts more frequently received systemic CS (34% vs 7%; $p < 0.001$) or MgSO4 (22% vs 2%; $p < 0.001$). Similar proportions received beta-agonists (69% vs 68%) and/or ipratropium bromide (62% vs 60%) within 1 hour. LOS for admitted patients varied (median: 3 days; IQR: 2, 5). Significant predictors of admission in multivariate testing were age (OR = 1.6/10 years; 95% CI: 1.3–2.0) and already receiving oral CS (OR = 2.4; 95% CI: 1.3–4.4). **Conclusions:** Admission to Canadian hospitals for acute asthma from the ED varies; however, is lower than other studies. Those already treated for their exacerbation with oral CS were more likely to be admitted. Further efforts to reduce admissions seem warranted. **Key words:** airway, asthma

292*

Prospective multicenter study of treatment and relapse following emergency department discharge for acute asthma.

Rowe BH, Mackey D, Tyler L, Blitz S, Lang E, Walker A, Ross S, Sivilotti M, Borgundvaag B. Department of Emergency Medicine, University of Alberta, Edmonton, Alta., *Canada*

Introduction: Risk of relapse after ED treatment of asthma exacerbations is uncertain, and previous North American research has included limited data from Canada. Our objective was to determine the treatment and relapse rate after ED treatment for asthma. **Methods:** 16 Canadian EDs enrolled patients (pts) over the study period. Enrolled pts underwent a structured ED interview and telephone interview 2 weeks later. Inclusion criteria were MD diagnosis of asthma, age 18–55, and discharge to home. Relapse was defined as an urgent visit to any ED or clinic within 2 weeks of ED discharge; pts lost to follow-up were counted as non-relapses. Data were analyzed using

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Chi-2, t-test, K–W test, and logistic regression. **Results:** Of 694 pts, 603 (87%) were discharged from the ED; follow-up was available in 527 (87%). Most patients were discharged on oral (79%) and inhaled (88%) corticosteroids (CS); self-reported compliance rates were 92% and 84%, respectively. Relapse was 9% at 1 week, and 13% (95% CI: 10%–16%) at 2 weeks. Females were more likely to relapse than males (16% vs 8%, $p = 0.01$) as were pts receiving oral CS (18% vs 7%, $p < 0.001$) and/or inhaled CS (78% vs 63%, $p = 0.01$) at the initial presentation. More pts who relapsed had at least one ED or urgent clinic visits for acute asthma during the past 2 years (71% vs 53%, $p = 0.004$). Relapse pts were more likely to report at least 2 days of activity limitations before the ED visit (69% vs 56%, $p = 0.03$). Relapse was not associated with any initial vital signs nor discharge medications. Controlling for age (OR = 1.2/10 years; 95%CI: 0.9–1.5) and female sex (OR = 1.8; 95% CI: 1.0–3.2), prior ED or urgent clinic visits (OR = 2.0; 95% CI: 1.2–3.4), and already receiving oral CS (OR = 2.3; 95% CI: 1.2–4.6) were associated with relapse. **Conclusions:** Overall, demographics (age and sex), past asthma control (number of ED visits) and recent treatments (especially oral CS) were associated with asthma relapse. Future research is required to target this high-risk group. **Key words:** airways, asthma, corticosteroids

293

Airway management in the emergency department: a six month study of 100 tracheal intubations.

Masumi GR, Torabi M, Ferdowsi G. Department of Emergency Medicine, Iran University of Tehran, *Iran*

Introduction: To describe the methods, success rates, and immediate complications of tracheal intubations, up to 15 minutes, performed in the emergency department of an urban teaching hospital. **Methods:** This was an observational, consecutive series under-taken in an urban university hospital with an emergency medicine residency training program and an annual ED census of 45,000 patients. The study population included all patients for whom intubation was attempted in the ED and data form was filled out during a 1-year period (July 1, 2005 through September 31, 2005). At the time of each intubation, the intubator filled out an intubation data collection form. If an intubation was performed in the ED but no form was filled out, this case has been excluded. **Results:** A total of 100 patients filled out airway control form in the ED; all of them were intubated by emergency medicine interns, residents or attending physicians. Modified rapid-sequence intubation (RSI) was used in 89 (89%). A total of patients were successfully intubated in 128 attempts; any patient could not be intubated. In 14 patients, inadvertent placement into the esophagus occurred; all such situations were rapidly recognized and corrected. Nine (64%) of the 14 esophageal intubations were by interns or early started residency attempts. Overall, 17 patients (17.0%; 95% confidence interval [CI], 16% to 19%) experienced a total of 23 immediate complications (23%; 95% CI, 21% to 25%). Four patients had cardiac arrest after intubation whom recovered by a few compressions .Three tracheal injuries, which were presented by subcutaneous emphysema. **Conclusion:** At this institution, most of ED intubations were performed by emergency physicians and modified RSI was the most common method used. Emergency physicians intubated critically ill and injured ED patients with a very high success rate and a low rate of serious complications. **Key words:** airway, intubation, rapid sequence intubation

294

Airway management in the emergency department: a six month study of 100 tracheal intubations.

Masumi GR, Torabi M, Ferdowsi G. Department of Emergency Medicine, Iran University of Medical Sciences, Tehran, *Iran*

Introduction: To describe the methods, success rates, and immediate complications of tracheal intubations, up to 15 minutes, performed in the emergency department of an urban teaching hospital. **Methods:** This was an observational, consecutive series under-taken in an urban university hospital with an emergency medicine residency training program and an annual ED census of 45,000 patients. The study population included all patients for whom intubation was attempted in the ED and data form was filled out during a 1-year period (July 1, 2005 through September 31, 2005). At the time of each intubation, the intubator filled out an intubation data collection form. If an intubation was performed in the ED but no form was filled out, this case has been excluded. **Results:** A total of 100 patients filled out airway control form in the ED; all of them were intubated by emergency medicine interns, residents or attending physicians. Modified rapid-sequence intubation (RSI) was used in 89 (89%). A total of patients were successfully intubated in 128 attempts; any patient could not be intubated. In 14 patients, inadvertent placement into the esophagus occurred; all such situations were rapidly recognized and corrected. Nine (64%) of the 14 esophageal intubations were by interns or early started residency attempts. Overall, 17 patients (17.0%; 95% confidence interval [CI], 16% to 19%) experienced a total of 23 immediate complications (23%; 95% CI, 21% to 25%). Four patients had cardiac arrest after intubation whom recovered by a few compressions .Three tracheal injuries, which were presented by subcutaneous emphysema. **Conclusion:** At this institution, most of ED intubations were performed by emergency physicians and modified RSI was the most common method used. Emergency physicians intubated critically ill and injured ED patients with a very high success rate and a low rate of serious complications. **Key words:** airway, intubation

295

Emergency room endotracheal intubations-an Indian perspective.

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Introduction: This is an ongoing prospective study to get current descriptive data on endotracheal (ET) intubations done in our emergency room (ER) and to detect the success rate of intubations performed by emergency physicians. An attempt is also being made to assess the need of secondary confirmation of the ET tube placement. **Methods:** A total of 100 patients have been included in the study. Of these 79 are males and 21 females. 91 patients are adults, rest being in the pediatric age group. The study has been performed in the Department of Emergency Medicine, Apollo Hospitals, Jubilee Hills, Hyderabad, India. This is a 400 bedded tertiary care hospital with a well-equipped 11 bed Emergency Room. All the emergency physicians who performed the ET intubations were at Senior Resident level and above in their emergency medicine training. **Results:** The most common indication for intubation was cerbrovascular accidents (20%) followed by cardiac emergencies (19%), head injuries (17%) and sepsis (14%). 95% of the ET intubations were performed by emergency physicians and 5% by anesthetists. Rapid sequence intubations (sedation & paralysis) were done in 46% of the patients, sedation only was used in 18% of patients and no premedications were used in 34% of patients. 85% of the patients were intubated in the first attempt, 13% in the second attempt and 1 patient in the third attempt. There was only 1 patient where the emergency physician failed to intubate and required an anesthetist to do it. **Conclusions:** Appropriately trained senior residents in emergency medicine have a high success rate of ET intubation -Non availability of secondary confirmation devices did not lead to wrong or failed intubations. **Key words:** airway, intubation, rapid sequence intubation

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296

A comparative study of asthma in the Western Region of Saudi Arabia and the West Mindlands in the UK.

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Introduction: Asthma is a common disease seen in the Western Region of Saudi Arabia and the West Midlands in the UK. In the UK 5.2 million people suffer with asthma currently and this figure is rising. Deaths are relatively uncommon as a direct result of being asthmatic, but the death rate continues to rise worldwide despite a better understanding of the disease and medication. This increase is often attributed to inadequate assessment and treatment of the disease. Guidelines are in place for the management of asthma in the UK as well as in Saudi Arabia.The objective of this study was to compare the diagnosis and management criteria used in a sample of patients in both Saudi Arabia and the UK. **Methods:** This is a retrospective study based on the medical records of 304 cases of asthma seen at King Khalid National Guard Hospital, Jeddah and a similar number reviewed at City Hospital, Birmingham. The diagnostic and management criteria was noted for each of these patients and compared with the latest asthma guidelines available in Saudi Arabia and the UK. **Results:** The results showed that in the UK the vast majority (99.2%) of patients had at least one observation recorded out of four recommended by the guidelines (peak expiratory flow, O2 saturation, chest examination and respiratory rate). In Saudi Arabia this figure was very similar (99.4%). It was noticed that in the UK all four observations were recorded in 17% of patients whilst in Saudi Arabia this figure was 26%. **Conclusions:** This study showed that although guidelines were being followed in both Saudi Arabia and in the UK, they were not being implemented as well as they could be. The results indicated that guidelines were followed better in Saudi Arabia than in the UK. This could be a reflection of better awareness of the Saudi guidelines, more stringent protocols and easier access to forms based on the guidelines. **Key words:** airway, asthma, guidelines

BIOETHICS TRACK

297*

Northern Ontario attitudes toward the practice of invasive procedures on the newly dead.

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Introduction: Newly dead patients have long been used to practice invasive procedures (IP). Canadian patients have not been surveyed regarding this practice. We surveyed a Northern Ontario population regarding their attitudes toward the practice of IP on the newly dead. **Methods:** An anonymous, written, bilingual survey was conducted on a convenience sample of patients, friends, and relatives in the Sudbury ED waiting room in March–April 2005. Respondent demographics were queried. A hypothetical scenario was described. Respondents were asked: (1) if consent from the closest friend or relative (CFR) is needed to practice IP on the newly dead; (2) if they would agree to have IP of varying invasiveness performed on themselves or a friend/relative; (3) if they were comfortable with their CFR making this decision for them. Responses were on a 5-point Likert scale. Descriptive statistics and the chi square test for trend were used. Research ethics committee approval was obtained. **Results:** There were 148 completed surveys (mean age: 39; 64% female). One hundred eleven (75.0%) agreed that consent should be obtained. As the CFR of the deceased, respondents would provide consent as follows: cardiac ultrasound, 82.4%; intubation, 75.7%; central line insertion, 75.0%; pericardiocentesis, 72.3%; thoracostomy, 71.6%; thoracotomy, 52.7%. As the deceased, respondents would be willing to have IP practicsed on them as follows: cardiac ultrasound, 85.1%; intubation, 81.1%; central line insertion, 79.7%; pericardiocentesis, 75.7%; thoracostomy, 73.0%; thoracotomy, 57.4%. A favourable response correlated with decreasing invasiveness ($p < 0.05$). One hundred twenty-two respondents (82.4%) were comfortable with their CFR making this decision for them. **Conclusions:** The majority of this Northern Ontario population: (1) believes consent is required; (2) would give consent to an IP being performed on a deceased friend/relative; (3) is willing to have an IP practiced on them if deceased; (4) is comfortable with their CFR making this decision for them. **Key words:** bioethics, newly dead patients, invasive procedures

DIAGNOSTIC IMAGING TRACK

298

Coverage quality increase, and time saved by using fast echography

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Introduction: Patients delays in the emergency department (ED) is a major issue. Patients comfort is a high priority. Long wait times in the ED can be a source of numerous complaints, especially when patients must several hours wait for an additional examination. It appears that certain pathologies which frequently present to the ED might benefit from bedside echography. As has been done in other countries, French ED physicians were trained to do fast echography. The purpose of this study was to determine if this significantly decreased the time ED patients waited for echography. **Methods:** This is a prospective study including 323 patients presenting to the ED for suspicion of leg phlebitis or nephritis colitis,or cholecystis. During 2 months, we studied the length of time patients spent in the ED before obtaining echography. Patients were randomly separated in two groups. We used a LOGIC 500 MD echograph. We measured the time from ED admission to discharge. The first group includes 153 patients. They had echography completed in the ED; the second group of 161 patients had their echography completed in the radiology department requiring their transfer by nurses. The rest of the patients (9)left the ED before having any examination **Results:** Our fast echography practice decreased significantly the time patients spent in the ED. Over 81% of patients spent less than one hour before their departure from the ED in our first group versus 21%. Patients in the first group had their echography in an average of 105 minutes versus 235 minutes. The longest time spent in the first group was 153 minutes versus 360 minutes. **Conclusion:** The use of echography by trained physicians should decrease the spent time in the ED. This will certainly improve the quality of our ED, and generate significant time savings. **Key words:** diagnostic imaging, bedside ultrasound

299*

Discrepant interpetation of emergency department radiographs: early experience with using PACS.

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Introduction: The use of a new electronic X-Ray tracking system

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was evaluated to determine the number and types of discrepancies in radiograph interpretation between emergency physicians (EPs) and radiologists, and the adequacy of patient follow-up. **Methods:** Retrospective cohort study of discordant radiographs in the first month of utilization of PACS (Picture Archiving and Communication System). Radiographic reports were classified as: normal, abnormal but clinically insignificant or abnormal and clinically significant. Abnormal reports were compared to the interpretation by the EP, and all discrepant cases were reviewed. The clinical record was reviewed to determine the Emergency Department management, and the type of follow-up. Total numbers of discrepant reports, time to dictation/transcription of reports, and compliance with use of the electronic system were also determined. **Results:** A total of 486 consecutive plain film radiology reports were reviewed. Of these, 153 (31.5%) were classified as abnormal and clinically significant. The EP interpretation was either discrepant or not documented in 54 (35%) of these 153 abnormal cases. Of the 54 discrepant cases, 40 (74%) had proper follow-up, either by telephone after discharge, or by referral to the appropriate service. The remaining 14 (26%) discrepant cases did not receive any documented follow-up. Average time to dictation by radiology was 1.5 days (range 0–35), and average time for the report to be transcribed was 5.6 days (range 0–39). **Conclusions:** In this study the majority (74%) of plain film discrepant reports were managed appropriately, however appropriate follow up was not achieved in 14 cases (26%) during the first month of use of the PACS system. Although this is a small subset of the total number of films ordered (n = 486), improvements need to be made in the electronic charting and identification of discrepant reports to optimize patient care and outcomes. **Key words:** diagnostic imaging, information technology

300

A sonographic lung score for the detection of extravascular lung water in patients with CHF.

Soldati G, Bergamini C. Emergency Department, Castelnuovo Garfagnana General Hospital, Lucca, *Italy*

Introduction: Multiple "comet tail" artifacts, or B Lines, at chest sonography correlate with extravascular lung water [1,2]. To the purpose of a better clinical interpretation of "comet tail" finding in urgency, a correlation between the artifactual grading, detected with US, and plasmatic BNP values has been looked in subjects with dyspnea. **Methods:** A total of 27 patients with acute onset of dyspnea (12 males and 15 females) were studied in the ED. Chest sonography was performed in all patients within the first 30' after admission. In each intercostal space, at the parasternal, midclavear, anterior and midaxillary sites, the sum of the US comet-tail signs yielded a lung echoscore. In all patients blood was sampled on admission for point of care determination of BNP (Triage BNP, Biosite Diagnostics , San Diego, CA). **Results:** Congestive heart failure (CHF) was confirmed in 16 patients (59,2%). Patients with CHF had significatively higher BNP levels and lung echoscore than patients without CHF, respectively 140 pg/mL vs 992 pg/mL and 8 vs 54 comet tail ($p< 0.01$). The correlation between logBNP values and echoscore was statistically significant ($r = 0.71$, $p< 0.01$). A BNP value > 118 pg/mL had a sensitivity rate of 100% and a specificity rate of 64% for detecting CHF. An echoscore > 20 comet tail had a sensitivity of 84% and a specificity of 100 % for detecting CHF. **Conclusions:** In the diagnosis of CHF, a BNP cutoff value of 100 pg/mL achieves high sensitivity. However many patients without CHF show BNP values higher than 100 g/mL. In these cases (gray zone), a low lung echoscore could be of diagnostic utility in excluding CHF. **Key words:** diagnostic imaging, ultrasound, congestive heart failure, diagnosis

301

Chest sonography in the diagnosis of congestive heart failure.

Soldati G, Bergamini C. Emergency Department, Castelnuovo Garfagnana General Hospital, Lucca, *Italy*

Introduction: Comet-tail (or B Lines) US artifacts are echogenic, wedge-shaped signals originating from the pleural line [1,2].Our purpose was to provide a comet tail measurement in the acutely dyspnoic patient in order to validate the diagnosis of Congestive Heart Failure (CHF). **Methods:** 51 patients (24 males and 27 females, mean age 72,4 yars +/- 14) with dyspnea were studied with chest sonography in Emergency Room. The probe (3,5 MHz) was placed along the parasternal, emiclavear, anterior and mid axillary lines. The sum of comet tail artifacts yielded a lung echoscore. A sonographic lung echograding was then produced as follow: 0 to 8, normal; 9 to 25 grade 1; 26 to 50, grade 2; 51 to 100, grade 3 and >101, grade 4. The chest radiograms were recorded within 30' and a blind, four steps grading for CHF was produced. To determine the patient's final diagnosis, we reviewed all medical records pertaining to the patients. **Results:** CHF was diagnosed in 26 patients. The mean number of comet tail in CHF patients was 55, 8 in patients without CHF ($p< 0.01$). A correspondence between radiographic and sonographic diagnosis was shown (McNemar $p= 0.68$; k 0.75). Sonographic and chest x ray grading were positively correlated ($p< 0.01$). Sensitivity and specificity of chest sonography in discriminating patients with or without CHF was respectively 96% and 76% ($p < 0.01$). There were six false positive US examinations. **Conclusions:** Chest sonography is sensitive as chest radiography for the evaluation of CHF However, comet tail artifact is not a specific sign of cardiogenic pulmonary edema, rather it is an elementar finding of congestive, inflammatory or productive interstitial disease. **Key words:** diagnostic imaging, ultrasound, congestive heart failure, diagnosis

302*

Comparison of CT head interpretation between emergency physicians and neuroradiologists.

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Introduction: Cranial computed tomography (CT) is widely used in ED 24 hours a day with radiologist interpretation often not immediately available. We compared the accuracy of CT head interpretation between the staff emergency physicians (EP) and neuroradiologists (NR). **Methods:** We conducted a health records review of patients who required head CT in the ED of a tertiary care hospital. We included the first 110 adult patients for five consecutive months and excluded patients who did not have EP interpretation, whose charts were missing or cases of stroke code or trauma code. We reviewed all cranial CT images and reports, the ED charts, and categorized findings as normal, insignificant, or clinically significant findings. We prepared descriptive and kappa statistics with 95% CIs. **Results:** Of 548 CT head cases reviewed, 442 were eligible for this study. The mean age was 57.9 years; females were 56.0%. Indications for CT: head injury 31.0%, TIA/CVA 21.9%, acute headache17.7%. CTs were reported as: normal or non-acute 81.5%, insignificant 3.8%, and significant 14.7% with the most common abnormal findings subdural hemorrhage (SDH) 15 cases, intracerebral hemorrhage (ICH) 14 cases, acute/subacute infarction 13 cases, and mass lesion 8 cases. The agreement between EP and NR was: all cases 92.8%, normal 95.4%, insignificant 63.6%, and significant 82.5%. The weighted Kappa for agreement was 0.83 (95% CI 0.76–0.90). Among disagreements, these were judged clinically unimportant for 6.6% and important for 0.7%. 3 important cases missed were 1) traumatic intraventricular hemorrhage without hydrocephalus, 2) 9mm SDH deemed non-surgical, and 3) brain atrophy which mis-read as

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posterior fossa SDH. 82.8% of patients with unimportant findings had appropriate follow-up arranged. **Conclusion:** Clinically important findings on CT head are not commonly missed by EPs and patients rarely have inappropriate disposition. EPs in our study can competently interpret cranial CT with very good agreement with NRs. **Key words:** diagnostic imaging, computed tomography, diagnosis, accuracy

303

A retrospective analysis of emergency department bedside ultrasound in the diagnosis of cholelithiasis.

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Introduction: The objective of this research project was to determine if emergency department (ED) physicians could use bedside ultrasound (BUS) to accurately diagnose cholelithiasis. BUS does not expose patients to the radiation that a Computed Tomography (CT) scan does, and is a quicker and less expensive alternative to radiological imaging, the most common imaging modality for the diagnosis of cholelithiasis. **Methods:** This study retrospectively reviewed 37 consecutive months of ED gallbladder BUS scans at a Level I trauma center. Both attending and resident physicians in the ED who performed these scans had previous experience ranging from 50-1000 supervised scans of various types. As part of the standard of patient care, the Emergency Department Ultrasound Process Improvement Committee (EDUPIC) reviews all BUS scans. The results of the BUS scans were compared to those of the EDUPIC and those of radiology; the results of the EDUPIC were then compared to those of radiology as well. **Results:** Of the 1690 ED gallbladder BUS scans that met the study's inclusion criteria, 575 (34%) also received radiological imaging. When compared to the EDUPIC, the ED physicians were 88% sensitive (95% Confidence Interval [CI], 85-90) and 97% specific (95% CI, 95-98). When compared to radiology, sensitivity was 88% (95% CI, 84-91) and specificity was 87% (95% CI, 82-91). The EDUPIC interpretation was 90% sensitive (95% CI, 87-93) and 90% specific (95% CI, 85-93) when compared to radiology. **Conclusions:** The results from this research study indicate that ED physicians are both sensitive and specific in the diagnosis of cholelithiasis with BUS. These results also suggest that patients who present to the ED do not need to be subjected to the radiation emitted by a CT scan. Additionally, patients can benefit from a quicker diagnosis, as well as a less expensive alternative when compared to radiological imaging. One important limitation to this study was the inability to determine the experience of the ED physician who performed the BUS scan. **Key words:** diagnostic imaging, ultrasound, cholelithiasis, diagnosis

304

What is the incidence of diagnostic radiological findings on presentation chest x-ray in patients with pulmonary contusion following blunt trauma?

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Introduction: Studies looking at the use of CT imaging in blunt thoracic trauma have found pulmonary contusion not visible on plain films in 17-20% of patients. Our objective was to determine how many patients with a diagnosis of pulmonary contusion following blunt chest trauma had diagnostic changes on chest x-ray at presentation. **Methods:** We used STAG data collected in Scotland to identify patients with a diagnosis of pulmonary contusion. Patient case notes were retrospectively reviewed to see whether the attending emergency physician diagnosed pulmonary contusion from the admission chest x-ray. These films were then reviewed and reported by a radiologist who was blinded to the aims of the study. **Results:** We were able to identify and find case notes and x-rays for 37 patients. 31 RTAs, 4 falls from height, 1 crush by a tree and 1 quad bike injury. The attending emergency physician noted changes of pulmonary contusion in 21 of the presentation x-rays. The radiologist reported contusion in 20 cases. There was a 65% concordance in reporting between the emergency physician and the radiologist. Only 14 x-rays (37%) were interpreted by both as demonstrating contusion and 10 x-rays (27%) were reported by both to show no evidence of contusion. Eleven of the sixteen cases not identified by the emergency physician were found on CT scan, four by repeat chest x-ray and one at postmortem. Time to diagnosis for these patients ranged from 2 hours to 120 hours (median 4hours). **Conclusions:** This study shows a lower rate of diagnostic changes on initial films than previously reported. The emergency physicians diagnosed only 57% and the radiologist diagnosed only 54% of these cases from the presentation x-rays. Failure of interpretation may have contributed, as there was only 65% concordance in reporting but it is important that physicians are aware that initial chest x-rays may not demonstrate clinically relevant pulmonary contusion. **Key words:** diagnostic imaging, computed tomography, trauma, pulmonary contusion, diagnosis, chest x-ray

305*

Diagnostic accuracy of shunt series and CT in the initial evaluation of ventricular shunt malfunction in children presenting to the emergency department.

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Introduction: Cerebro-spinal fluid shunting malfunction might result in surgical revision of the shunt. Since clinical signs and symptoms in the emergency department (ED) are only partially contributory to the diagnosis of obstruction, imaging such as shunt-series (SS) and CT scan are important. The aim of this study was to determine sensitivity, specificity, positive and negative predictive values of both diagnostic procedures for patients who present to the pediatric-ED. **Methods:** Retrospectively, charts were reviewed on all patients with a shunting device that presented to a tertiary pediatric-ED and had a SS over a two year period. A pediatric neuroradiologist, blinded to previous radiological readings, reviewed all SS and CT scans, and was able to compare them to earlier films. Data collected included demographic information and medical history, and whether revision was performed. Sensitivity, specificity, positive, and negative predictive values were calculated. **Results:** A total of 335 visits were reviewed. 34 (10%) SS were read as abnormal. CT was done in 290 (87%) of the visits. Of the visits with CTs, 68 (23%) had findings suggestive of shunt malfunction. In 22 (8%) hydrocephalus was found but no previous CT scans were available and 104 (36%) had hydrocephalus unchanged from previous CT. Both were excluded from the diagnostic ability analysis. Nine had abnormal findings on SS but not on the CT, but only one needed revision. In total, a third of all visits (101, 30%) ended in a shunt revision. Sensitivity, specificity and positive and negative predictive values of SS for the need of revision procedure were 25%, 96%, 78% and 74% respectively and of CT scan were 85%, 72%, 82%, and 77% respectively. **Conclusions:** Diagnostic imaging has a limited accuracy in identification of children who need shunt revision. Shunt series has very modest contribution and prospective studies should evaluate the cost-effectiveness of SS in children. All previous CT scans should be reviewed and compared with the scan at presentations to the ED. **Key words:** diagnostic imaging, computed tomography, diagnosis, cerebro-spinal fluid shunt

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306*

The need for CT scans in patients under 50 years of age presenting with symptoms of renal colic.

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Introduction: Given the expense and high radiation of CT scans together with renal colic largely being a benign albeit painful disease, this study looked at the evidence to support a subgroup of patients who may forego a CT scan. **Methods:** We conducted a chart reviews of 796 patients from a large community hospital over a 2 year period. The study consisted of patients between 18–50 years of age who visited the ER with a diagnosis of renal colic. Patients over 50 were excluded as most ER doctors would see a CT scan as imperative in this age group to rule out serious diagnoses like a ruptured AAA. The data looked at the number of patients requiring intervention and whether return visits to ER resulted in intervention. Comparisons were made with respect to the amount of analgesic to determine any pattern for intervention. Finally, the data was assessed for any deleterious outcomes. **Results:** 93% of patients had CT scans done. 86.5% of patients passed their stone without intervention. 13.5% required an intervention which was either lithotripsy, cystoscopy, retrieval of stones, stents and percutaneous nephrostomy. Return visits to the ER for the intervention group was 62% suggesting unremitting pain. There was no significant difference in the mean dosage of morphine between the intervention group and non-intervention group – 14.79 mg vs. 11.79 mg. There was no appreciable difference in mean morphine dose when comparing size of stone – 12.16 mg for stones greater than 5 mm and 10.42 mg for stones less than 3 mm. Virtually all patients received a dose of indomethacin. None of these patients in this study had an adverse outcome. **Conclusions:** It may be reasonable on the first visit to forego a CT scan in a young healthy patient where there is a high degree of certainty of the diagnosis and whose pain resolves quickly with small doses of anlagesics. The amount of morphine administered did not prove to be a marker for those who would require an intervention. However, return visits to the ER may be a precursor for future intervention. **Key words:** diagnostic imaging, computed tomography, renal colic

307*

Length of stay considerations when selecting an imaging strategy for high-risk patients with suspected pulmonary embolism: an analysis of the pulmonary embolism diagnostic study.

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Introduction: The Pulmonary Embolism Diagnosis Study (PEDS) is the largest randomized trial to compare computerized tomographic pulmonary angiography (CTPA) to ventilation-perfusion lung scanning (VQ) as the initial imaging strategy in patients with suspected pulmonary embolism (PE). While the PEDS trial revealed equivalence in terms of the 3-month rates of symptomatic VTE, this analysis seeks to determine which imaging strategy is most advantageous to a busy ED by reducing index visit length of stay (LOS) and admission rates (AR). **Methods:** PEDS was a prospective, randomized double blind trial (clinicians, outcome adjudicators) with concealed allocation. Eligible patients from our ED setting were "high-risk" by either a "likely" pre-test probability (Wells) or a positive d-Dimer and underwent randomization to either VQ followed by bilateral compression ultrasonography (CUS) in the event of indeterminate (non-high, non-normal) results or CTPA followed by CUS for all negative studies. Data on time intervals, LOS and AR from all relevant ED visits was retrieved through our center's administrative databases. **Results:** 238 patients were randomized at our center; 118 to VQ scan and 120 to CTPA. Baseline characteristics were similar in regards to age, sex, presenting complaint, co-morbidities, d-Dimer result and pre-test probability of PE. The mean ED LOS in the VQ group was 19.2 hours versus 23.5 with CTPA (Difference = 4.8 hours; 95% CI 0.65 – 7.95) in CTPA. This difference in LOS favoring VQ was equally distributed between delays from presentation to thoracic imaging (VQ or CTPA) and delays from thoracic imaging to disposition. A higher admission rate was noted in the CTPA arm than the VQ strategy (26.9% vs. 15.7%; difference 11.2%; 95% CI 0.9–21.5%). **Conclusions:** In our center, a VQ initiated imaging strategy is a more efficient means of investigating suspected PE by virtue of a reduced ED LOS. Differences in the rate of admission warrant further analysis. **Key words:** diagnostic imaging, computed tomography, pulmonary embolism, ventilation-perfusion scanning, length of stay

308*

How valid is the concept of clinically unimportant lesions on computed tomography for minor head injury patients?

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Introduction: The Canadian CT Head Rule (CCHR) was developed to help physicians predict which minor head injury patients have important brain injury (IBI) on CT. This sub-study evaluated the clinical validity of the concept 'clinically unimportant brain injury' (CUBI) as previously endorsed by academic neurosurgeons. **Methods:** The prospective cohort study enrolled adults with loss of consciousness, amnesia, or confusion and GCS 13–15 at 10 teaching EDs. Data included MD dataforms, neuroradiologist CT reviews, hospital records, and 14-day follow-up. Patients were considered to have CUBI, hence requiring neither admission nor specialized follow-up, if neurologically intact with one of these CT lesions: solitary contusion <5 mm in diameter, localized subarachnoid blood <1 mm thick, smear subdural hematoma <4 mm, or closed depressed skull fracture not through inner table. We compared groups by chi-square and t-test analyses. **Results:** From 5,828 study patients, 685 (11.8%) had acute lesions on CT: 496 (72.4%) IBI and 189 (27.6%) CUBI cases. CUBI patients were younger (37.2 vs 46.8 years), had fewer skull fractures (13% vs 43%), had fewer admissions (63% vs 94%), were more likely to return to normal activities at 14 days (44% vs 19%), underwent no craniotomies (0% vs 9%) or other interventions (0% vs 8%), and had no deaths (0% vs 2%). The 2 groups had these CT findings and CCHR performance (Table 1). **Conclusions:** Minor head injury patients with CUBI had no severe CT lesions, fewer admissions and fol-

Table 1, Abstract 308.

CT finding	CUBI, %	IBI, %
Epidural hem	0	12
Intravent hem	0	10
Intracereb hem	0	5
Cerebral edema	0	3
Contusion	43	61
Subarachnoid	43	47
Subdural hem	15	35
Depressed #	2	6
CCHR criteria		
High risk	55	83
Medium risk	29	14
Low risk	15	0

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low-up problems, no neurological interventions, and no head injury deaths. This study validates the CUBI concept and further confirms the accuracy of CCHR for IBI cases. **Key words:** diagnostic imaging, computed tomography, head injury, brain injury, decision rule

309*

An international survey of emergency physicians' knowledge, use, and attitudes toward the Canadian C-spine rule.

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Introduction: The derivation and validation of the Canadian C-Spine Rule (CCR) has been published in emergency medicine and general medical journals. Little, however, is known of its international diffusion and use. The purpose of this study was to determine the knowledge, attitudes and behaviour of emergency physicians (EPs) in Australasia, Canada, the UK and US regarding the CCR. **Methods:** A prospectively conducted self-administered email and postal survey was sent to members of 4 national EP associations using a modified Dillman technique. Random samples of members from ACEM (Australasia), CAEP (Canada), BAEM (UK) and ACEP (US) were sent a prenotification letter followed by at least 4 mailouts. Awareness, use and attitudes regarding the CCR were analyzed using descriptive and univariate statistics with 95% CIs. **Results:** Overall, 1043 (35.1%) responses were received. Physician demographics included: 74% male, mean age of 46 years and mean of 16 years' experience (see Table 1). **Conclusions:** There is a very high level of knowledge of the CCR in all study countries except Australasia. The CCR was viewed favourably across multiple measured dimensions. Usage, however, varied significantly by country with Australasian EPs reporting the least use. A better understanding of the factors related to increased use of decision rules will facilitate strategies to enhance derivation, dissemination and implementation of future rules. **Key words:** diagnostic imaging, computed tomography, decision rule, C-spine injury

Table 1, Abstract 309

	Australasia	Canada	UK	US	*p* value
Response rate, %	53	57	12	41	
Aware of CCR, %	66	98	91	94	<0.0001
Use CCR always/most of time	36	74	63	47	<0.0001
CCR is useful in my practice	66	83	83	77	<0.0001
Patients benefit from use	70	80	73	67	<0.0001
Improves use of resources	66	81	69	75	<0.0001
Using another rule or strategy	52	20	29	51	<0.0001

310*

Physician attitudes toward a clinical decision for subarachnoid hemorrhage in acute headache patients: an international survey.

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Introduction: It is often recommended that patients with acute headache undergo computed tomography (CT) followed by lumbar puncture (LP) to rule out subarachnoid hemorrhage (SAH). Our objective was to determine current practice and physician attitudes towards investigating acute headache patients. **Methods:** We surveyed 1772 emergency physicians from 3 countries (USA, Canada, Australia) by taking a random sample of members of their respective emergency physician associations (ACEP, CAEP, ACEM). We used a modified Dillman technique with 3–5 notifications plus pre-notification letter using a combination of e-mail and/or letter mail. Physicians were asked a series of questions about neurologically intact patients with acute headache (peaking within one hour of onset). Analysis included appropriate descriptive statistics. **Results:** Of physicians surveyed, 996 (56%) responded: USA 41%, Canada 57%, Australia 53%. The mean physician age was 42.5 years (range: 28–85) with 76.5% male. 50% of physicians replied that all such patients should be investigated with CT (USA 58%, Canada 45%, Australia 49%). 56% of respondents felt CT should be always be followed by lumbar puncture (USA 52%, Canada 58%, Australia 55%). In their current practice, 61% stated they either always, or most of the time order a CT followed by LP (USA 60%, Canada 58%, Australia 63%). 96% reported that they would use a clinical decision rule for neurologically normal acute headache patients to rule out SAH: 98% USA, 97% Canada, 94% Australia. The median required sensitivity of a rule was 99%, which was uniform for all three countries. **Conclusion:** This large international survey determined that current practice differs from the recommendations of texts and authorities on SAH and shows wide variations of practice patterns. Substantial support exists for a clinical decision rule for headache patients. The required sensitivity of a rule was realistic with few physicians requiring 100% sensitivity to be deemed acceptable. **Key words:** diagnostic imaging, computed tomography, subarachnoid hemorrhage, headache, decision rule

EMS TRACK

311*

Canadian emergency medical services airway survey, 2005.

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Introduction: The provision of basic-to-advanced prehospital airway management is variable across the country. Emergency medical services (EMS) do not necessarily share data relating to protocols and standards. The Canadian EMS Airway Survey was designed to survey 11 of Canada's largest EMS providers and report on the airway skills and pharmacology being used at Basic Life Support (BLS) and Advanced Life Support (ALS) levels. **Methods:** Institutional research ethics board approval was obtained. A web search was performed to identify a convenience sample of 11 of Canada's largest EMS systems that provide BLS and ALS services. Each service was asked to characterize the proportion of paramedics trained to each level and the distribution of the levels of training on ground and air ambulances. **Results:** BLS crews have similar airway management skill sets across the country and none supplement their protocols with pharmacological adjuncts. A single BLS group uses the combitube. Though all services surveyed have ALS trained personnel, the relative proportion of ambulances staffed with these capabilities ranges from 1%–99%. While ground ALS crews have similar skill sets across the country, their pharmacological armamentarium have greater variation. The majority of air medical services use muscle relaxants for airway management. The staffing and levels of training varies the most for air medical crews in the services surveyed. **Conclusions:** We have described how 11 of Canada's largest EMS services train and staff their ground and air ambulances and what skill sets and pharmacological adjuncts are

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used for airway management at the BLS and ALS levels. BLS airway management is consistent across the nation. There is variation in both the provisions of ground ALS services and the pharmacology being used despite a relatively consistent skill set at this level. Our results are limited as this was a convenience sample of 11 services and thus may not be representative of all EMS services across the nation. **Key words:** EMS, airway

312*

Does the prehospital Glasgow Coma Scale score reliably reflect anatomical brain injury in major trauma patients?

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Introduction: The prehospital Glasgow Coma Scale (GCS) score is used by paramedics to make management decisions, such as intubation, for major trauma patients. We sought to correlate the initial GCS score with the presence of anatomical brain injury in prehospital trauma patients. **Methods:** This prospective cohort study was conducted as a substudy of the Major Trauma component of the Ontario Prehospital Advanced Life Support (OPALS) Study: a controlled clinical trial conducted in 17 cities and which enrolled all adult major trauma (Injury Severity Score [ISS] >12) patients during BLS and subsequent ALS phases. Data were abstracted from the Ontario Trauma Registry, then ambulance, centralized dispatch and ED records. In this study, we compared the prehospital GCS score to the Abbreviated Injury Score for Head and Neck (AIS-HN). We conducted univariate analyses as appropriate for the data. **Results:** The 2,867 patients enrolled were 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); survival 81.1%. Comparing patients with valid prehospital GCS scores, those <9 (n = 495) to those 9 (n = 1,619) for AIS-HN (Table 1). Among GCS <9 patients with AIS-HN 0–2, mean scene systolic blood pressure was 57.5 mm, intubation attempts 48.6%, mean ISS 33.3, mortality 48.6%. Among patients with GCS >9 and AIS-HN 3–6, mean ISS was 23.8 and mortality 12.8%. **Conclusions:** A surprising number of patients with prehospital GCS <9 do not have serious head injury but do have very high morbidity and mortality. A significant number of GCS 9 patients have serious-critical head injury. In major trauma, prehospital GCS does not reliably predict the presence of anatomical head injury but is strongly associated with morbidity and mortality. **Key words:** EMS, Glasgow Coma Scale, brain injury

Table 1, Abstract 312.

AIS–HN	GCS <9, %	GCS ≥9, %
0 – None	11	41
1 – Minor	1	0
2 – Moderate	3	16
3 – Serious	12	12
4 – Severe	19	19
5 – Critical	52	12
6 – Maximum	2	0

313

Beyond cultural competence: culturally responsive emergency care.

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Introduction: Many health agencies use a model of 'cultural competence' to deliver culturally appropriate care to patients from culturally and linguistically diverse (CALD) backgrounds. Cultural competence is defined as 'a set of congruent behaviours, attitudes, and policies that come together in a system, agency, or among professions and enable that system, agency, or those professionals to work effectively in cross-cultural situations' (Cross in Diller 2004:11). The aim of this paper is to challenge the use of this model and recommends that it is timely to move beyond cultural competence. **Methods:** A review of the literature was conducted to identify models currently in use for training health care professionals. **Results:** Cultural competence is a prevalent model used internationally and is under discussion by the National Health and Medical Research Council for national use in Australia. This model informs healthcare professionals to develop 'a set of congruent behaviours, attitudes, and policies' to become competent in treating CALD patients. Other health related models were identified in the literature and also inform this research. **Conclusion:** Cultural competence gives the impression that healthcare professionals can develop and offer culturally appropriate care but it masks the impossibility of achieving 'cultural competence'. The model is over presumptive as it promotes to CALD patients the idea that western healthcare professionals can possess CALD cultural beliefs and belies a lifetime of cultural learning which create and confirm culturally nuanced health beliefs. Cultural competence is useful when seen as part of the continuum of developmental thought. It is time to move beyond this to a more contemporary model which embraces the idea that we cannot be competent in all cultures. The next step on the continuum encourages and presents a way for western healthcare professionals to unpack their own cultural heritage and healthcare beliefs 'before' encountering the 'other'. **Key words:** EMS, cultural competence

314

Patients with acute coronary syndromes in a new emergency department at the University Hospital Of Bydgoszcz(Poland).

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Introduction: Acute Coronary Syndromes(ACSs) are the most life-threatening manifestation of coronary heart disease. Each year, about 160,000cases of ACS are diagnosed in Poland; 25 –30% of them involve acute myocardial infarction. In a modern emergency care system, Hospital Emergency Departments (HEDs) play an essential role as an organisational unit in the multi-profile hospital structure. One HED serves a population of 200,000 persons and covers an area within a perimeter of 10-15 kilometers. HED has been established to deal with any emergency situation. The Department of Emergency Medicine at the University Hospital in Bydgoszcz has been in operation since 2001. Emergency Medical Services in Bydgoszcz are equipped with electrocardiographs capable of providing telemetric transfer of information. Since 2001, a 24-hour duty service of Invasive Cardiology has been performed at the Department of Cardiology,University Hospital,Bydgoszcz. The aim of the study was to assess the implementation of guidelines for managing ACS in accordance with internationally accepted standards of emergency medicine clinical practice. **Results:** From 2003 to 2004, 9678 patients were admitted as emergency cases to the University Hospital. 3598 of these patients were transfered to the Invasive Cardiology Unit, 2367 were monitored in the outpatient area of the Dept. Of Emergency Medicine up to 2 hours, and 128 patients were hospitalized in the Intensive Care Unit of this Department up to 24 hours and underwent monitoring and serial assess-

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ments of myocardial necrosis markers. Among the hospitalized patients, no deaths occurred, 2 patients diagnosed with dissecting aortic aneurysm and alimentary canal perforation were appropriately transfered to other departments, 68 patients were qualified for exercise testing in the outpatient setting, whereas 58 patients were discharged from hospital after coronary heart disease had been ruled out as a cause of chest discomfort. **Key words:** acute cornary syndrome, guidelines

315

Quality improvement of prehospital intervention through a hospital-based clinical training of the emergency technician.

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Introduction: Previous studies have shown that prehospital emergency technicians (EMTs) in Korea have insufficient ability for evaluating and treating victims. We performed this study to evaluate the improvement of managing victims by the EMTs through a hospital-based clinical training course. **Methods:** Three EMTs-level 1 were assigned to a regional emergency medical center from May to July 2005 and trained in accordance with the designed training program. In the course of first month, they were trained in the emergency room, but in the other months, they alternatively run to the scene for the field training under the physician supervising. We compared the appropriateness and completeness of the prehospital intervention between two groups, in which the first group was the patients managed by trained EMTs (Intervention group) and the second group was the patients managed by non-trained EMTs (Control group). The completeness and appropriateness were evaluated by 3 groups, each consisting of 3 emergency physicians, using guidelines and professional opinion. **Results:** There were no significant differences in demographic findings between intervention group (N=121) and control group (level 1 control, N=221; level 2 control. N=224). In the evaluation of completeness, the intervention group (78.29%)checked vital signs more thoroughly than the control group (level-1 group, 14.93%; level-2 group, 9.82%; p<0.001). In the evaluation of appropriateness, the intervention group was significantly superior to the control group in both evaluation of chief complaint and prehospital management (p<0.001). In the evaluation of inter-panel agreement, weighted kappa values were all above 0.4 except on one factor (k=0.28). **Conclusions:** Quality of prehospital EMT significantly improved through the hospital-based clinical training, especially in thorough vital sign assessment, appropriate evaluation of chief complaint, triage, and prehospital care. **Key words:** EMS, education, quality improvement

316*

Arrival in the emergency department by ambulance for headache; a marker of high risk for subarachnoid hemorrhage.

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Introduction: There is currently little emphasis on the mode of arrival of emergency department (ED) headache patients with regard to risk of non-traumatic subarachnoid hemorrhage (SAH). This study assessed the use of ambulance for acute headache patients for the outcome of SAH. **Methods:** This prospective cohort study was a sub-study of a large multi-center study to derive a clinical decision rule for SAH. Six university tertiary care EDs in 5 medium to large cities participated in this study. Consecutive adult patients with an acute headache, without neurological deficit were enrolled. Analysis included descriptive statistics with appropriate univariate analysis and odds ratios (OR) with 95% confidence intervals (CI) for arrival by ambulance and referral from rural ED for the outcome of SAH. **Results:** There were 3051 enrolled patients with mean age 43.5 years (SD 17.4), 60.2% female, and 157 (5.2%) SAH cases. Overall, 629 (20.6%) of the patients arrived by ambulance and 8.8% were referrals. Of patients who arrived by ambulance, 91 (14.5%) had SAH. Univariate chi-squared analysis found that arriving by ambulance was highly significant for SAH ($p < 0.001$), OR 6.0 (95% CI: 4.3–8.4). This compares with the OR 2.5 (95% CI: 1.7–3.9) for patients referred from other EDs. Excluding patients referred from other EDs, did not alter the OR for arrival by ambulance (OR = 6.3, 95% CI: 4.4–9.1). **Conclusion:** This was the first prospective study to determine the relationship between arrival by ambulance and subarachnoid hemorrhage in neurologically intact headache patients. This study demonstrates that patients or their relatives are more likely to request an ambulance based on the seriousness of the condition. Physicians should consider mode of arrival as part of the diagnostic assessment of acute headache patients. **Key words:** EMS, headache, subarachnoid hemorrhage

317*

Effectiveness of dispatch-assisted CPR instructions: successes and challenges.

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Introduction: We sought to determine the frequency of agonal breathing during cardiac arrest (CA), its impact on the ability of 9-1-1 dispatchers to recognize CA, and the impact of dispatch-assisted CPR instructions on bystander CPR rates. **Methods:** We conducted a before–after trial enrolling out-of-hospital cardiac arrest adult patients for which resuscitation was attempted in a single city, with a BLS-D/ ALS tiered EMS service. We measured victim, caller, and system characteristics during two successive 9-month periods before and after the introduction of dispatch-assisted CPR instructions. Trained reviewers used a standardized data collection form when listening to 9-1-1 tapes. We report descriptive and absolute risk statistics with 95% CI. **Results:** There were 529 cardiac arrests between July 1st, 2003 and December 31st, 2004. Victim characteristics were similar in the before (n = 295) and after (n = 234) phase: mean age 68.3, male 66.7%, witnessed 50.1%, call to vehicle stop 6:37 min:sec, VF/VT 34.2%, and survival 4.0%. We located 82.1% of 9-1-1 tapes for the after period. Callers were female 63.5%, victim's spouses 29.2%, and previously trained 24.0%. Dispatchers recognized 56.0% (95% CI 48.9–63.0%) of cardiac arrest cases; agonal breathing was present in 37.0% (95% CI 30.1–43.9%) of all cardiac arrest cases and accounted for 50.0% (95% CI 39.1–60.9%) of missed diagnosis. CPR instructions were offered to 75.2% and accepted by 53.7% of callers; 13.4% declined instructions because of prior training. 16.7% and 8.3% of callers provided ventilations and chest compressions as a result of the intervention. Delays occurred between call-to-diagnosis 2:37 min:sec, and during ventilation instructions 1:48 min:sec. Bystander CPR rates increased from 16.7% to 26.4% (AR 9.7%; 95% CI 8.3–11.1% p = 0.006). **Conclusions:** Before dispatch-assisted CPR instructions, no other intervention had succeeded in improving bystander CPR rates in our community. Agonal breathing and ventilation instructions had a negative impact. **Key words:** EMS, CPR, cardiac arrest

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318*

Effectiveness of a paramedic assistant on enrollment rates for prehospital research studies.

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Introduction: Patient enrollment by paramedics in prehospital studies is often lower than expected, for a variety of reasons. We sought to determine the impact of a paramedic research assistant on the enrollment rate in the Canadian C-Spine Rule (CCR) Prehospital Validation Study. **Methods:** We conducted a before–after trial comparing two enrollment strategies for the CCR Prehospital Validation Study by Ottawa BLS and ALS paramedics. Paramedics were asked to voluntarily follow the Canadian C-Spine rule, while continuing to immobilize all trauma patients according to their pre-existing protocols. We compared two successive 3-month periods where a similar multi-intervention enrollment strategy was used: Before – By researchers from an independent research institute; and After – By a paramedic research assistant with direct access to paramedics. We measured patient characteristics, paramedic comfort using the rule, and enrollment rates in the CCR Prehospital Validation Study. We report descriptive and absolute risk statistics with 95%CI. **Results:** There were 686 immobilized eligible trauma cases between April 1st and September 30th, 2005. Characteristics of the enrolled cases were similar in the before (n = 49) and after (n = 269) phase: Mean age 42.1, male 52.0%, trauma from motor vehicle collision 52.7%, and admission to hospital 12.0%. There were 1 significant c-spine injury during the before phase, and 3 in the after phase; none were missed by the rule. ALS paramedics were present at the scene 81.3% of times; and 75.3% of BLS and ALS paramedics felt very comfortable using the rule. Recruitment rates were low during the first 3 years of the study. They increased from 18.1% (95% CI 13.5–22.7%) to 64.8% (95% CI 60.2–69.4%) as a result of the intervention; AR 46.7% $p < 0.0001$. **Conclusions:** Enrollment in the CCR Prehospital Validation Study significantly increased after we hired a paramedic research assistant. EMS researchers should consider doing the same when designing prehospital research protocols. **Key words:** EMS, patient enrollment

319

The introduction of a debrief tool in prehospital care.

Donald M, Paterson B. Department of Accident and Emergency, Ninewells Hospital and Medical School, Dundee, *Scotland*

INTODUCTION: The Ninewells Hospital emergency department based trauma team is among one of the busiest mobile medical teams in Scotland. This study reports the introduction of a formal debrief tool and its impact on staff training, critical incident reporting, psychological stress levels and audit of prehospital care provision. **Methods:** A questionnaire was distributed to all medical and nursing staff involved in the provision of prehospital care to determine current levels of satisfaction with training provision and accessibility of critical incident reporting. A debrief tool was devised and introduced after each primary mission for a period of 6 months and the questionnaire repeated. **Results:** Initial questionnaire revealed a very low level of satisfaction with training provision and an almost non-existent formal vehicle for the reporting of critical incidents occurring in the field. Post introduction of debrief tool revealed a significant increase in satisfaction with training provision and a number of incidents reported that lead to a change in practice or equipment provision. A number of staff also reported a decrease in psychological stress levels after utilising the debrief tool. **Conclusion:** The introduction of a formal debrief tool is beneficial in prehospital care on a number of levels and should be considered as standard practice. **Key words:** EMS, critical incident, debrief

320*

Dispatch-assisted CPR instructions in Canada: a survey of national resources.

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Introduction: Although dispatch-assisted CPR instructions can improve bystander CPR and survival rates for out-of-hospital cardiac arrest victims, the best way to deliver this intervention remains unknown. We sought to determine the prevalence of dispatch-assisted CPR instructions in Canada, the type of instructions provided, and the training of the dispatchers providing these instructions. **Methods:** We conducted a national survey of all Emergency Medical Service (EMS) Health Authorities in Canada. Methodology experts developed the survey and distribution used a modified Dillman technique. Our participants provided information on their: 1) EMS organization; 2) use of dispatch-assisted CPR instructions; 3) type of instructions; and 4) dispatcher qualifications. We weighted each survey response by the population of the catchment area represented by the responding Health Authority (2004 census). We report descriptive statistics. **Results:** We surveyed 82 EMS Health Authorities from 10 Canadian provinces. Our response rate was 73.2%, representing 79.7% of the Canadian population. Respondents were EMS program managers 61.7%, with paramedic training 51.7%. Most EMS Health Authorities provide a multiple-tier cardiac arrest response 89.0% with ALS paramedics 79.5%. Dispatch-assisted CPR instructions are provided to 87.6% of Canadians by 53 EMS Health Authorities. Among those providing instructions, 76.8% use Clawson's Medical Priority Dispatching. Since January 2005, the Clawson system teaches chest compressions only CPR. The other EMS Health Authorities use a variety of locally developed or ad hoc instructions. 9-1-1 callers receive their CPR instructions from paramedics 59.2%, laymen communication officers 40.7%, or nurses 0.1%. **Conclusions:** This is the first National survey describing practices with regard to dispatch-assisted CPR instructions. This information is essential to develop clinical trials testing a variety of educational approaches and delivery methods for telephone CPR instructions. **Key words:** EMS, CPR, dispatch, cardiac arrest

321

Opinions about the emergency medical services in Taiwan among medical personnel.

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Introduction: To evaluate the opinions about Emergency Medical Services (EMS) among medical personnel. **Methods:**A prospective study was conducted from January 1, 2003 through December 31, 2003 sending questionnaires to medical personnel from five cities in Taiwan (Taipei, Tainan, Changhua, Taichung and Hualien). The content of questionnaires included medical personnels' opinions and perception regarding EMS. Chi square analysis was used to evaluate the results and a p value of less than 0.05 was considered to be statistically significant. **Results:**Of the 2000 questionnaires sent out, 1379 were returned and analyzed. On average, 19.9% of the responders were very much satisfied with the EMS services. Most cities could offer early access and early CPR. Most cities could not offer early ACLS on scene. Of medical personnel, 75.18% would sue EMTs if they did not perform CPR on cardiac arrest victims and 74.91% were willing to do CPR on strangers. The emergency residents (87%) and emergency physicians (81%) were the leading two groups having the intention to go out of hospital to perform ACLS on scene.

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Factors influencing satisfaction with the EMS system were being female (90.8%), having a willingness to do ACLS on scene (90.8%) and having a willingness to call 119 when someone collapses (89.7%), ED medical personnel were the groups most likely to express satisfaction. Although there was an improvement, a good quality of service was held to occur by only around 10% of the persons evaluated. **Conclusions:** Only 9.36% of medical personnel were dissatisfied with the EMS service in their area. Only 39.63% and 57.49% of medical personnel in these five cities thought that early ACLS and early defibrillation would be performed. **Key words:** EMS, CPR, cardiac arrest, defibrillation

322

Inhaled methoxyflurane and intranasal fentanyl provide effective prehospital analgesia.

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Introduction: St John Ambulance WA (SJA-WA) provides ambulance services for all of Western Australia – the largest area covered by a single ambulance service in the world. The Paramedic service is a single tier model with Paramedics in the Perth metropolitan area and 11 rural sites working with Volunteer Ambulance Officers. In excess of 100 other rural sites are staffed by Volunteer Ambulance Officers alone. Analgesic options are limited for ambulance personnel. SJA-WA was the first service to introduce inhaled Methoxyflurane 3 decades ago and also the first to introduce intra-nasal Fentanyl as a further option for Paramedics in 2001. Despite use of these agents for some time, little data has been published on their efficacy. **Methods:** Ambulance records were analyzed to determine the demographics of patients treated with Methoxyflurane or IN Fentanyl and the efficacy of treatment. **Results:** Use of both agents has shown a steady increase over time. Currently Methoxyflurane is administered approximately 7,000 times per annum and IN Fentanyl 2,200. The commonest indications are trauma and musculo-skeletal conditions comprising more than two-thirds of all cases. Methoxyflurane was administered in 17% and IN Fentanyl in 6% of trauma cases. 93% of all cases have the analgesic effect described as "good" or "partial" across all age groups. Both agents had a higher proportion describing the effect as "good" in patients under 12 years of age (76% for Fentanyl, 68% Methoxyflurane) than patients over 12 years of age (50% for Fentanyl, 55% Methoxyflurane). **Conclusions:** Inhaled Methoxyflurane and Intranasal Fentanyl provide effective prehospital analgesia in our experience, particularly in the setting of trauma and for children. **Key words:** EMS, methoxyflurane, fentanyl, analgesia, trauma

323*

Continuous positive airway pressure ventilation for acute respiratory failure in the prehospital setting: a randomized controlled trial.

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Introduction: Numerous randomized controlled trials and meta-analyses demonstrate the benefits of continuous positive airway pressure (CPAP) ventilation over endotracheal intubation (ETI) for acute respiratory failure in the Emergency Department and Intensive Care Unit settings, but the evidence for CPAP in the prehospital setting is limited to several case series. We performed a randomized controlled trial to determine whether patients with ARF treated with CPAP in the prehospital setting had lower overall ETI rates than those treated with standard care. **Methods:** Patients presenting to paramedics with acute respiratory distress were included if they were >16 years, had a respiratory rate >25 breaths/min, hemodynamically stable, able to cooperate with ventilatory support measures, and were assessed by paramedics as being in urgent need of ETI and manual ventilation. Patients were excluded if they required ETI for airway protection, had a respiratory rate <8 breaths/min, were hemodynamically unstable, had ongoing cardiac ischemia or any chest pain within 3 hours of presentation, a valid "do not resuscitate" advanced directive, or if paramedics anticipated an inadequate supply of portable oxygen. After initial paramedic assessment, eligible patients were randomized to either usual care (including ETI) or CPAP in a blinded fashion by the paramedic dispatcher. The primary outcome measure was the need for ETI (determined by blinded chart review) from the time of accessing medical care to hospital discharge. A sample size of 65 patients was required to demonstrate a 37.5% difference in ETI rate between the treatment groups. Results were analyzed using Chi-squared analysis for the primary outcome measure. **Results:** Final data analysis had not been completed at the time of abstract submission. Full results will be presented at the conference. **Conclusions:** This is the first randomized controlled study evaluating CPAP in the prehospital setting for acute, undifferentiated respiratory failure. **Key words:** EMS, airway, continuous positive pressure ventilation, respiratory failure

324*

A systematic review of pediatric prehospital care effectiveness: What evidence is provided by RCTs and quasi-RCTs?

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Introduction: The practice of Emergency Medical Services for Children (EMSC) is evolving rapidly. Understanding the effectiveness of prehospital interventions is vital to providing the best, cost-effective care. Since randomized controlled trials (RCTs) remain the best study design to evaluate effectiveness while limiting bias, we aimed to systematically review all RCT and Quasi-RCT studies of EMSC effectiveness. **Methods:** We conducted a comprehensive search of published articles from 1966 to 2005 available through Medline , EMBASE, CENTRAL, and eight other electronic databases. We also hand searched key emergency medicine conference proceedings, and contacted authors of included trials. Studies were included if they: 1) were RCTs or quasi-RCTs, 2) examined any prehospital EMSC intervention, 3) reported any outcome, and 4) included children <18 years old. Two authors independently screened the abstracts and reviewed potentially relevant studies for eligibility. A descriptive analysis was performed. **Results:** The literature search yielded 11,606 articles. 327 were examined for inclusion. Two prehospital RCTs were found. One is a quasi-RCT comparing children undergoing prehospital endotracheal intubation with those receiving bag–mask ventilation (Gausche et al, 2000). No significant difference in survival or good neurologic outcome was found between groups. The other is a cluster randomized trial that randomly assigned ambulance crews to simultaneous compression-ventilation cardiopulmonary resuscitation (SC-V CPR) or conventional CPR (Krischer et al, 1989). This trial enrolled patients of all ages and described children <14 years old as a subgroup. The study revealed worsened survival to both hospital admission and to discharge for the SC-V CPR group. **Conclusions:** RCT study design is rarely used to investigate the effectiveness of prehospital interventions in children. Current policy decisions in EMSC rely on alternative sources of information that may have a higher risk of bias. **Key words:** EMS, pediatrics, systematic review, RCT

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325*

The impact of ambulance diversion on EMS resources.

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Introduction: Ambulance diversion has been proposed as a solution to waiting room deaths and overcrowding. It remains, however, highly controversial. The impact on EMS resources is not known. This study seeks to determine how diversion impacts the availability of ambulance resources. **Methods:** All ambulance responses in 2002 while one of the city's hospitals was on diversion were collected, including those responses during the hour of the diversion and 30 minutes before and after. The time intervals for these responses were time and date matched to 2001, when no hospital was on diversion. Total out of service time, time from departure from scene to arrival at hospital, and time from arrival at hospital to availability for another call were compared using a t-test. **Results:** A small difference was found in the time from scene to hospital (10:42 control vs 11:25 min diversion, $p = 0.03$) but this is of questionable clinical significance. Otherwise the time intervals were not different. **Conclusion:** The fact that the EMS system was able to maintain response and turnaround times during a diversion shows a positive impact of diversion on the availability of EMS resources. **Key words:** EMS, diversion, resources

326*

The effect of the 2000 international emergency cardiac care guidelines on the treatment provided by Canadian advanced life support EMS systems.

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Introduction: Minimal research exists on the uptake of emergency cardiac care (ECC) guidelines. We sought to determine whether the 2000 International ECC Guidelines influenced treatment by Canadian advanced life support (ALS) EMS systems. **Methods:** We conducted a national survey of all 121 ALS EMS systems in Canada. To develop the survey, content experts explicitly reviewed the 2000 ECC Guidelines and established a list of drug and airway changes a priori. Outcomes measures were current and prior use of the interventions of interest, and whether the guidelines were attributed as the impetus for protocol changes. The survey was distributed in September 2005 using a modified Dillman technique. Descriptive statistics are reported. **Results:** Forty EMS systems from 9 provinces participated (33%), representing 1,616,717 annual EMS calls in a catchment of approximately 18 million persons (56% of the Canadian population). The number of systems currently using surveyed interventions were: (1) Airway: endotracheal intubation 38 (95%); combitube 23 (58%); laryngeal mask airway 11 (28%); and (2) Drug: amiodarone 18 (45%); vasopressin 3 (8%). Eleven systems (29%) currently using endotracheal intubation had no advanced rescue airway available. In 22 of the 28 systems (79%) using the laryngeal mask airway and/or combitube there was no indication these were in use prior to the 2000 ECC Guidelines release, however only 8 of the 28 systems (29%) identified the 2000 ECC Guidelines as the impetus for the addition of rescue airway devices. Of the systems using amiodarone, 11 (61%) reported this was due to the 2000 ECC Guidelines. **Conclusions:** This is the first national study on the effect of the 2000 International ECC Guidelines. Our results show substantial variability across ALS EMS systems in the uptake of recommended changes. These findings are of particular relevance to knowledge translation bodies, educators, and EMS medical directors in light of the recent release of the 2005 International ECC Guidelines. **Key words:** EMS, guidelines

327*

Quality assessment of the success rate of endotracheal intubations performed by advanced care paramedics in Ottawa, Canada.

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Introduction: Advanced Care Paramedics (ACP) in Ontario routinely perform pre-hospital endotracheal intubation. Regular qualitative assessment of the procedure ensures the effectiveness and proficiency in an Emergency Medical Service. Current success rate in the medical literature varies in the range of 50 to 90 percent, dependent on the training and skill level of paramedics and patient population. Our study examines the success rate of our program and identifies potential barriers. **Methods:** We conducted a two years retrospective chart review of all Ambulance Call Reports (ACRs) with documented invasive airway attempts between June 2003 and July 2005. Information was extracted from ACRs by three independent extractors on all eligible charts and cross-referenced to resolve interpretation conflicts. **Results:** Of 1028 intubated patients that were reviewed, 516 (50.2%) were pronounced dead on scene; 512 (49.8%) were transported to emergency departments. Majority of the patients were adults (97.9%), with a mean age of 65.4 years (SD 18.5). Overall endotracheal intubation success rates were 82.1% (95% CI: 79.6, 84.3); first attempts: 65% (95% CI: 62.0, 67.8). Higher incidence of successful intubation occurred in VSA patients ($p < 0.001$), pre-intervention GCS = 3 ($p = 0.003$). Nature of ambulance calls was not found to be associated with greater success in intubation ($p = 0.182$). The most common reasons preventing successful intubations were the presence of foreign body or fluid in the airway (27.2%), problems with airway access (9.4%), unable to visualize vocal cords (8.5%), lack of room (6.8%) and clenched jaws/ trismus (5.1%). **Conclusions:** Our rate of success is similar to prior reported rates. Continual quality monitoring and regular training remain essential in maintaining the quality of care that paramedics provide. Recognition of key optimizing factors will improve the success of pre-hospital endotracheal intubations by ACPs. **Key words:** EMS, quality assessment, airway, endotracheal indtubation

328

Field evaluation for severity of injured patients by emergency medical services provider.

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Introduction: Tokyo Fire Department (TFD) is the largest fire-based emergency medical services (EMS) provider in Japan. TFD has about two hundred ambulances and seven hundred thousand ambulance runs. Recently, medical control system (MCS) has been established and the severity evaluation system for injured patients has been reevaluated. The objective of this study is to compare field evaluation by EMS providers with the physicians' evaluation at the emergency room (ER). **Methods:** EMS providers estimated the injured patients in the field according to a severity evaluation system that includes vital sings and mechanism of injury. We collected the data of the severity evaluation system in one district of TFD in 2003 and compared them with the severity evaluation by physicians at ER. The physicians assessed the patients and classified them into five levels: Dead, Critical, Severe, Moderate and Minor. We identified Dead, Critical, and Severe as severe group and calculated the sensitivity and the positive predictive value (PPV) of the EMS providers' evaluation for the physicians'. **Results:** 3,429 patients

were enrolled in this study. 100 patients were judged as severe group by both EMS providers and physicians. Eleven patients were judged as non-severe group by EMS but severe group by physicians (under triage). 143 patients were judged as severe group by EMS provider but non-severe group by physicians (over triage). 3,175 patients were judged as non-severe group by both EMS provider and physicians. Therefore, the sensitivity and the PPV of EMS providers' evaluation for physicians' evaluation were 0.901(100/111) and 0.412 (100/243) respectively. **Conclusion:** We think that the effective severity evaluation system is to limit the rate of undertriage and decrease the preventable trauma death while keeping an adequate balance between over- and under-triage. In our study, this severity evaluation system could permit accurate evaluation for the triage of injured patients. We believe that this system is useful to decrease the preventable death. **Key words:** EMS, triage, injury, trauma

329

Pre-hospital rapid sequence intubation in a rural setting - just as good?

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Introduction: We report the 3 year experience of a pre-hospital Rapid Sequence Intubation (PH-RSI) program in rural New Hampshire. With high intubation success rates, and survival rates similar to those in urban settings, a rural environment is well suited to PH-RSI. **Methods:** A 3-year retrospective review of all patients qualifying for PH-RSI by Frisbie EMS was undertaken. The program included 8 hours of initial training for each Paramedic, with a 4 hour refresher yearly. Protocol medications were Midazolam / Fentanyl / Succinylcholine or Etomidate / Succinylcholine. Patient characteristics, success rate, factors associated with definitive airway control, and survival rates were extracted from patient report forms and analysed using SPSS statistical software. **Results:** During the study period 38 patients qualified for PH-RSI. The average age was 52 (range 22-90) years. The most common indications were trauma (39%), CHF (19%), CVA (11%), and COPD (8%). Average GCS was 8 and average scene time was 9 minutes 32 seconds. 22/38 patients (57.9%) were intubated on the first attempt, 33/38 (86.8%) within 2 attempts. A rescue airway (Combitube) was required in 4 patients (10.5%). There was 1 failed intubation(2.6%) in a patient whose oxygenation was well maintained with bag-valve-mask. 6 of 38 patients (15.8%) expired in the ED. 32/38 (84.2%) were admitted to the local hospital or transferred to a Level I Trauma Center. 30 day survival rate was 21/38 (55.3%). Factors associated with successful airway control were estimated Cormack-Lehane view grade($p < 0.01$) and number of attempts ($p < 0.02$). GCS was also weakly associated. ($p = 0.12$). **Conclusions:** The implementation of a PH-RSI program in a rural setting is achievable, has high success rates, and reasonable survival rates, compared to urban settings.Success in airway control and survival rates compare favorably with previously published series from urban centers. Further prospective studies are needed to assess the real benefit in functional survival. **Key words:** EMS, airway, endotracheal intubation

330*

Novel role and feasibility of a prehospital fibrinolytic/ PCI triage emergency health system.

Bessonette JWS, Walker J, Cain E, Travers A, Petrie D, Ferguson J. Emergency Health Service, Halifax, NS, *Canada*

Introduction: There has been increasing evidence on supporting the role of prehospital care in the diagnosis and treatment of patients with ST segment elevation myocardial infarction (STEMI). This includes prehospital STEMI identification, risk stratification, reperfusion checklist, prehospital fibrinolysis, and/or triage to a centre capable of percutaneous coronary intervention (PCI). Hypothesis: To evaluate the implementation, maintenance and feasibility of a prehospital fibrinolysis program. **Methods:** Emergency Health Services Nova Scotia (EHSNS) is a single, provincial integrated system for the entire province of Nova Scotia. Unique aspects of this centre included [1] a fully structured Advanced Life Support based fibrinolysis program, [2] strong interdisciplinary collaboration between prehospital, emergency, and cardiology department stakeholders, and [3] a unique role of a Communication (COMM) centre in treatment allocation and stakeholder communication. **Results:** Between January 1st and December 31st 2004, over 100,000 calls province-wide were received at the COMM centre, with 15,976 in the region enrolling into the RCT. 10.7% of these calls were for chest pain (1,714/15,976) with 2% (35/1,714) of these cases being enrolled into the RCT trial. The paramedics successfully enrolled patients into the trial. The COMM centre successfully provided ECG transmission notification, multidisciplinary communication, reperfusion checklist review, and randomization for each of the 35 cases. Further description of the profile of all STEMI calls, randomization process/errors, implications for research/practice, and knowledge translation recommendations will be discussed. **Conclusions:** The novel and important role of advanced prehospital STEMI care has been demonstrated to be feasible and practical in a contemporary urban prehospital system. Both the paramedics and the COMM centre has been shown to be a major stakeholder in the implementation and maintenance of prehospital STEMI fibrinolysis/PCI triage systems and protocols. **Key words:** EMS, triage, acute coronary syndrome, STEMI

331*

A model for incorporating research into the paramedics scope of practice.

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Introduction: The introduction of research into any Emergency Health Services (EMS) is difficult due the lack of infrastructure and content expertise on behalf of the prehospital crews themselves. This qualitative study summarizes the research experience and strategies used in the implementation of evidence-based medical research in a busy prehospital practice. **Methods:** Descriptive analyses of research methodologies and strategies spanning three years in a province-wide, single, integrated Canadian EMS System. **Results:** The first strategy was the creation of the EHS Research Consortium of Eastern Canada (ERCEC). This multidisciplinary group oversees the implementation and maintenance of all prehospital research activities in the province. The second research strategy has been to highlight three incremental tiers of involvement for any research project: Tier I: patient identification and transport to study hospital; Tier II: prehospital consent and randomisation of patients; and Tier III: prehospital administration of study intervention. The third strategy has been the creation of a multidisciplinary working group focused on maintaining research collaboration, interest and education. Level I of this group consists of a local paramedic student, an emergency medicine resident, and a senior clinical paramedic; and Level II includes a Principal Investigator, EMS Research Coordinator, and a variety of project specific internal/external collaborators. The fourth strategy has been consecutive annual prehospital research conferences hosted by paramedics. The fifth strategy has been the maintenance of a 'question bank' that tracks all paramedic research questions utilizing standardized evidence-based methodology. To date over 150 (45% clinical based, 36% administrative, and 19% educational) questions have been added to the bank. **Conclusion:** These five strategies have made research

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feasible in the prehospital setting and made EHS capable of providing novel information relevant to the prehospital healthcare provider. **Key words:** EMS, research, evidence based medicine

332*

Novel role and feasibility of a communications centre in a prehospital fibrinolytic/PCI triage emergency health system.

Travers AH, Ferguson J, MacKay D, Cain E, Petrie D, Bata I. Emergency Health Services, Department of Health, Nova Scotia EMS, Halifax, NS, *Canada*

Introduction: There has been increasing evidence on supporting the role of prehospital care in the diagnosis and treatment of patients with ST segment elevation myocardial infarction (STEMI). Our hypothesis was to evaluate the feasibility and role of the COMM Centre in a randomized clinical trial (RCT) evaluating advanced prehospital STEMI care in an urban Canadian city. **Methods:** Emergency Health Services Nova Scotia (EHSNS) is a single, provincial integrated system for the entire province of Nova Scotia. In one region (population 300,000) an ongoing multicentre prehospital RCT is evaluating prehospital fibrinolysis and/or triage to PCI. The COMM Centre's advanced STEMI roles includes: [1] advance notification of inhospital personnel of ECG transmission from field to local emergency department; [2] coordination of communication between field medics, emergency physician, and interventional cardiologist; and [3] review of reperfusion inclusion/exclusion criteria, and [4] randomization and allocation of study arms for both prehospital and inhospital enrollments. All cases were tracked prospectively in a Medical Priority Dispatch System database. **Results:** Between January 1st and December 31st 2004, over 100,000 calls province-wide were received at the COMM centre, with 15,976 in the region enrolling into the RCT. 10.7% of these calls were for chest pain (1,714/15,976) with 2% (35/1,714) of these cases being enrolled into the RCT trial. The COMM centre successfully provided ECG transmission notification, multidisciplinary communication, reperfusion checklist review, and randomization for each of the 35 cases. Further description of the profile of calls, randomization process/errors, implications for research/practice, and knowledge translation recommendations will be discussed. **Conclusion:** The novel and important role of the COMM centre in advanced prehospital STEMI care has been demonstrated to be feasible and practical in a contemporary urban prehospital system. **Key words:** EMS, communication centre, STEMI, acute coronary syndrome, randomized control trial

333*

Public health paramedicine — the next step?

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Introduction: Paramedics within Nova Scotia have proven themselves to be leaders in the delivery of paramedic health care in Canada. This has included initiatives such as a 'community based paramedic program' which has expanded the scope of practices of paramedics working in rural areas. Although not currently established, nor immediately anticipated, the concept of a proposed 'Public Health Paramedic' which could provide oversight in the design and implementation of multiple sustainable expanded scope projects warrants discussion. **Methods:** Descriptive analyses of knowledge translation from other 'Public Health' practitioners to the scope of practice of a paramedic. There are approximately 900 paramedics were registered as active healthcare providers in Nova Scotia including: Primary Care Paramedics (PCP: 55%, 495/900) ; Intermediate Care Paramedics (ICP: 26%, 234/900); Advanced Care Paramedics (ACP: 17%, 153/900); and Critical Care Paramedics (CCP: 1%, 10/900). Additional training has been supplied to approximately 3% of existing paramedics at the Community Based Paramedic level. **Results:** Currently the proposed program would consist of the following strategies with appropriate surveillance systems: [1] Targeted public AED program; [2] Reduction of injury and mortality due to falls; [2] Public early recognition of MI; [3] Reduction of injury and mortality due to MVC; [4] Paramedic health inventory program; [5] Public ECG library; [6] Development of Post Fall Assessment Protocol. The strengths, weaknesses, opportunities, and threats will be identified for the individual strategies required to implement a 'Public Health Paramedic' program. **Conclusions:** The role of the Public Health Paramedic is feasible in concept and deserves further attention and research into the requirements to implement and maintain such a position. **Key words:** EMS, public health

334*

Proposal of an 'end-of-life' program in a prehospital Canadian setting.

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Introduction: Management of patients with 'Do Not Resuscitate' directives or palliative care crises can be difficult for the patient, their families and the prehospital care provider. Moreover, palliative care patients at times require items or service that because of progressive failing health are needed at off hours when other essential support services are not available. Consequently we propose a 3-part contemporary Prehospital 'End-Of-Life' (PEOL) Program in a Canadian community setting. **Methods:** Descriptive analyses of methodologies and strategies of a 3-part pilot PEOL Program in a single, integrated, homogenous, province-wide prehospital care system. **Results:** The PEOL Program proposal consists of the following 3 core elements. The first of these is the maintenance of a prospective Do Not Attempt Resuscitation registry logged by patients and their next-of-kin through the Medical Priority Dispatch System and Communication centre. The second element is the designation of selected rural EHS ambulance bases to house and deploy essential care items and non-traditional EHS services for those palliative at home. This would include: [i] the deployment and administration of a temporary Oxygen concentrator system, and [ii] the administration of Palliative care pharmaceutical kit. Both services would be provided until the formal hospital based palliative care services can be provided. The third element of the proposal is the prehospital administration of interim debriefing and grief counseling until more formal services are provided. The authors in the poster presentation will expand on the current status of this pilot project as well as the strategies, barriers and recommendations to implementing such a program. **Conclusion:** A prehospital end-of-life program is a feasible, interesting and a novel service that warrants further consideration in the optimal care of DNR and palliative care patients. **Key words:** EMS, do not resuscitate, palliative care

335*

Research on emergency prehospital services: tracer conditions.

Dallaire C, Poitras J, Lapointe J. Laval University, Faculty of Nursing, Quebec City, Que., *Canada*

Introduction: Prehospital services and organizations have to mutually adjust and share information to ensure the continuity and quality of provided care. In 2005, a study on prehospital services was done in the Chaudière–Appalaches region, a rural area situated in the province of Quebec, Canada. As a result of this study, technical and professional innovations will be implemented in 2006 to improve the continuity and quality of the current services in the area. Indicators are needed to assess the impact of these innovations. **Methods:** This descriptive prospective study used a sample of some 500 calls to the regional health communication centre to look at structure, process

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and outcomes in prehospital services (Donebedian, 1985; 1980; Spaite et al., 2001; Maio et al., 1999; Garrison et al., 2002). Data was collected from prehospital forms, medical files and various databases. Care encounters were reconstituted using the tracer conditions method; outcomes relating to the prehospital intervention and the overall episode of care were examined. Comparisons were made between the tracer conditions followed by an estimation of the possibilities and limits of each indicator with regard to the innovation's impact assessment. **Results:** Results provided a better understanding on the continuity of services and on the obstacles and strengths of the actual system. Difficulties in assessing prehospital services using indicators pertaining to the flow of information were confirmed. Data on continuity and outcomes exist but definition, accessibility and storage differ. **Conclusion:** Specific recommendations can be made for the assessment of prehospital innovations in order to pick the right indicators of outcomes. Longitudinal studies are recommended to ensure comprehensive recommendations on ways to improve the indicators available and the overall process of information transmission in prehospital services. **Key words:** EMS, quality improvement

336*

A quantitative comparison of two tools used in the pre-hospital setting and one in-hospital setting to determine patient's potential for stroke bypass protocol and treatment with thrombolytics.

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Introduction: Advanced and Primary Care Paramedics (ACP and PCP) in Ontario currently apply a provincial tool to determine patient eligibility for Stroke Bypass and ultimately, for thrombolysis. In Phase I this study examines the provincial tool and a previously developed local tool in terms of their application, identifying the strengths and weaknesses of both. Phase II of this study utilized the same group of patients, examining which patients subsequently met the criteria for thrombolytic therapy using an in-hospital tool and how many patients were deemed ineligible. The study provides recommendations for modifications to the existing tools that would assist the paramedics in identifying acute stroke patients with a higher degree of accuracy. **Methods:** Using a retrospective chart review, we assessed all patients arriving by ambulance (Ottawa Paramedic Service), to the single tertiary teaching hospital in Ottawa. These charts were assessed using the two tools, to determine the accuracy of the tools and any differences in patient identification. For patients meeting bypass criteria, the study identified those who were subsequently thrombolyzed and the differences between the pre-hospital and in-hospital tools. Each tool was assessed over a seven-month period between October 2004 and November 2005. **Results:** A total of 511 patient charts were identified and reviewed. Regardless of the tool utilized, less than 17% of these patients received thrombolysis (numbers and accuracy are pending full result analysis). **Conclusion:** Modifications could be made to either tool to enhance pre-hospital accuracy, and to reduce the incidence of false positive stroke codes called in the emergency department. **Key words:** EMS, stroke, thrombolysis, triage

337

Emergency Medicine in Mexico 15 years later.

Garcia-Rosas C. Mexican Board of Emergency Medicine, *Mexico*

Mexico, with the third largest population of any country in the Americas, has experienced rapid growth of emergency medicine in the past decade. In 1986, emergency medicine residency programs began in Mexico City and, in 1991, spread throughout the country when the Medical Institute of Social Services (IMSS) instituted programs at their specialty hospitals. While pre-hospital care is still rudimentary in many parts of the country and there are insufficient numbers of trained emergency physicians to staff the nation's emergency departments, the growth of the specialty is helping to improve the quality of medical care in Mexico. This poster discusses the current condition of and prospects for emergency medicine in Mexico within the context of its medical system, and outlines objectives and guidelines for future developments. **Key words:** EMS, emergency medicine, residency training program

PATIENT SAFETY TRACK

338*

Drug-related hospitalization to a large tertiary care hospital: a prospective study.

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Introduction: Several studies have estimated the incidence of drug-related hospitalization (DRH); however, few data are available for the DRH rate and characterization in Canada. Our objective was to determine the frequency, severity, preventability and classification of DRH to a large tertiary care Canadian hospital, and to evaluate patient, prescriber, drug and system factors associated with these events. **Methods:** Consecutive adult patients admitted to an internal medicine service were prospectively enrolled during a 12-week period. Hospitalization was defined as drug-related if it was directly-related to one of the eight classes defined by Hepler and Strand. The primary outcomes were reported as proportions presented as percentages with 95% confidence intervals (CI). The secondary analysis of factors associated with DRH was performed by fitting a multivariate logistic regression model. **Results:** 565 patients were enrolled with a mean age of 69.3 ± 18.8 years of which 50% were female. DRH was found to be 24.1% (95% CI 20.6–27.8%) of which 72.1% (95% CI 63.7–79.4%) were deemed preventable. Severity was classified as mild, moderate, severe or fatal in 8.1% (95% CI 4.1–14.0%), 83.8% (95% CI 76.5–89.6%), 7.4% (95% CI 3.6–13.1%) and 0.7% (95% CI 0.0–4.0%), respectively. Adverse drug reactions 35.3% (95% CI 27.3–43.9%), wrong/suboptimal drug 17.6% (95% CI 11.6–25.1%) and noncompliance 16.2% (95% CI 10.4–23.5%) were the most common classes of DRH. The most common drug classes associated with DRH included cardiovascular agents 27.5%, antibiotics 23.4%, non-steroidal anti-inflammatory drugs 13.2%, central nervous system agents 7.8%, anticoagulants 5.4% and hypoglycemic agents4.8%. Multivariate logistic regression modeling failed to identify any independent risk factors associated with DRH. **Conclusions:** Approximately one-quarter of patients in our study were admitted for a drug-related cause and over 70% were deemed preventable. Drug-related hospitalization is a significant problem that merits further research and intervention. **Key words:** drug related hospitalization (DRH); characterization of DRH.

339*

Prescription completeness and errors in the resuscitation room of a pediatric emergency department.

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Introduction: Our objective was to evaluate the impact of a designated prescription form on completeness of medications and in-

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travenous fluids orders, and on prescription errors in the resuscitation room of a pediatric emergency department. **Methods:** Retrospective chart review of patients admitted to the resuscitation room of a pediatric tertiary care hospital in March, May, and July 2003 and one year later in 2004 after implementing usage of a designated prescription form in March 2004. The completeness criteria were based on recommendations from the Institute for Safe Medication Practice and are rules in our hospital. The errors and severity were classified according to the definitions of the American Society of Hospitals Pharmacists. **Results:** Reviewing the 6 months period, 243 patients aged 7.1 (median 6) had 719 prescriptions: median 3 prescriptions/patient (range 1 to 20). The most frequent diagnoses were: trauma (n = 79), difficulty breathing (n = 57), neurological emergencies (n = 52), and poisoning (n = 16). There was no difference in the characteristics of the patients between the pre- and the post-implementation period. In the three months studied in 2003, only 14/373 (4%) prescriptions were complete and 57 (15%) errors were detected. In the three months studied in 2004, 93/346 (27%) prescriptions were complete and 23%, Δ24 (7%) errors were detected. Thus, there was an increase in completeness (8%, 95% CI 3, 13) after implementing aΔ95% CI 18, 28) and a decrease in error (designated prescription form. Errors most frequently occurred at the ordering stage. Most of the errors were harmless. However, 12 errors required intervention: 2003; additional doses (n = 9), assisted ventilation (n = 1), and fluid resuscitation (n = 1), and 2004; fluid resuscitation (n = 1). **Conclusions:** A designated prescription form was associated with a significant increase in completeness and a significant decrease in error in the resuscitation room of a pediatric emergency department. **Key words:** medication errors, pediatric prescription errors, designated prescription form

340*

Prevalence of information gaps for seniors transferred from nursing homes to the emergency department.

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Introduction: Information gaps – previously collected information that is not available to the treating physician – have implications for patient safety and system efficiency. We sought to study clinically important information gaps and the effect of a regionally standardized transfer form when the elderly are sent from nursing homes (NH) or seniors residences (SR) to the emergency department (ED). **Methods:** This health records review included a consecutive sample of patients 60 years or older transferred by ambulance from multiple NH and SR to a tertiary care ED over 6 months. Two trained observers reviewed original transfer and ED records using a structured data collection tool. Outcome measures were gaps in key indicators, gaps in descriptive detail and effect of a transfer form. We used appropriate univariate statistics. **Results:** There were 457 consecutive transfers of 384 patients; mean age 83.9 years; 70.5% female; NH 84.9%; SR 15.1%; dementia 34.1%; mean CTAS score 3.0; admitted 29.8%. Presenting complaints were trauma 21%, general/weakness 19.7%, respiratory 17.5%, GI 17.5%, neurological 14.7%. Important information gaps occurred in 85.5% (95% CI 82–88%) of cases including: Reason for transfer 12.9%; Advanced Directives 56.4%; Activity Daily Living 52.9%; Mobility 47.7%; Vital Signs 37.6%; Baseline Cognition 36.5%. Important descriptors (e.g. duration, severity, location) were frequently absent: >40% for general weakness, chest pain, abdominal pain; >80% for head injury, tetanus status. There was considerable variation amongst individual NH and SR in information gaps: Vital Signs (8.7–30.8%), Cognition (37.5–62.5%), Activity Daily Living (6.2–97.6%). A Standardized Transfer Form was used in 42.7% of transfers, and gaps occurred less often with than without the form (74.9% vs 93.5%; $p < 0.0001$). **Conclusions:** Important information gaps very frequently exist in transfers of the elderly to the ED despite the use of a Standardized Transfer Form. Future research should focus on educational and regulatory interventions for NH and SR transfers. **Key words:** Elderly; information gaps, transitions of care; standardized transfer form

341

Sedation practice in a Scottish teaching hospital A&E department

Duncan RA, Symington L, Thakore S. Department of Accident and Emergency, Ninewells Hospital, Dundee, *Scotland*

Introduction: Procedural sedation is a common practice in Emergency Departments. There are no reports in the literature describing sedation activities in a general UK Emergency Department. Sedation is known to have a significant morbidity and mortality. A prospective survey was designed to evaluate our performance according to safe sedation principles, establish the demographics of those sedated, and review the drugs used and doses given to patients in the department. Any complication was reviewed for identification of preventable causes. **Methods:** Pre-sedation checklists, peri-procedural observations and patient notes were reviewed for 101 sedations from 04/12/04 to 03/09/05. Level of sedation was measured using the American Society of Anaesthetists classification of grades of conscious depression. **Results:** Patients from 7 to 91 years of age were sedated. Dislocated shoulders and fracture-dislocated ankles accounted for more than 2/3 of the presentations. The median time from arrival to analgesia was 18 minutes. Intravenous morphine was administered to 93% (2-28mg, median 10mg, mean 11.7mg) of patients with fentanyl, ketamine and entonox also used. Midazolam (1-10mg, median 4mg, mean 4mg) was used in 85 cases. Entonox was used as sole sedative on 12 occasions but as an adjunct during 30 procedures. Intravenous ketamine was given 13 times. We report 3 separate procedure related complications. A 67 year old female became transiently hypotensive (SBP <90). A 69 year old female became hypoxic (SaO2 <92%), this resolved with repositioning the oxygen mask. Another 69 year old female was generally anaesthetised after receiving midazolam and morphine. She recovered to a consciously sedated state 5 minutes later without further intervention. **Conclusions:** Sedation can be a safe and effective procedure if appropriately trained practitioners follow the principles of safe sedation. Departmental guidelines can help to ensure that the appropriate level of assessment and observation is performed both before and during any sedation. **Key words:** procedural sedation.

342

Adolescents attending an adult emergency department: Their characteristics and self reported opinions of care provided.

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Introduction: To examine the case mix of adolescents presenting to an adult Emergency Department (ED) and to survey adolescent's views and opinions regarding ED care. **Methods:** Adolescent attendances to the ED over three months were retrospectively reviewed. During a representative study week, adolescents were requested to complete a questionnaire regarding their ED care. **Results:** 323 visits were reviewed, 215 (66.6%) were males and 108 (33.4%) females. Presentations increased at the weekend (151/323, 46.7%). Most visits were non-urgent. 34 (10.5%) were admitted to hospital. Acute injuries were most common, accounting for 155/215 (72.1%)

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of all male presentations. 12/17 (70.5%) of those with a psychosocial presenting problem registered between 9p.m.and 9a.m. 33 adolescents presented during the study period. 6 were excluded and 3 were lost to follow up. 19/24 (79.1%) rated their care as excellent or good. However 10/24 (41.7%) described the time they were waiting to be seen by a doctor as unacceptable, 9 (37.5%) wanted more privacy, and 11 (45.9%) reported a delay in receiving necessary treatment. 9 (37.5%) were spoken to about injury/illness prevention. **Conclusions:** Adolescents represent a minority group in the ED but have specific needs. The increased likelihood of psychosocial presentations at night when resources are low is a cause for concern. There is a need for increased availability of age-specific health promotion information in the ED, and for specific training of staff to deal with adolescent issues. **Key words:** adolescents; ED adolescent survey, adolescent needs in the ED.

343

Medicolegal aspects of central venous catheterization –A closed claims study.

Hyuna Bae, Sungeun Kim. Division of Emergency Medicine, Ewha Womans University, Seoul, *Korea*

Introduction: Central venous catheterization is a critical procedure for severely ill patients. It is associated with varying complications, depending on the setting and the level of clinician skill. The purpose of this study was to describe the characteristics of malpractice claims related to complications of central venous catherization and to identify cause and potential preventability of such claims. **Methods:** A retrospective study was performed by reviewing records at Lawnb and Lx CD-rom, The records on closed malpractice claims involving central venous catheterization were abstracted from the files available for analysis. They were reviewed and analyzed to determine the patient risk factors and the factors associated with a successful defense. **Results:** Nine closed claims associated with central venous catheterization were found in the malpractice data. Catheterization-related complications were: hemopneumothorax, cardiac tamponade, pseudoaneurysm, pyothorax, hematoma and disseminated intravascular coagulation; four resulted in indemnity payment. **Conclusions:** While malpractice claims involving central venous catheterization were uncommon, they resulted in a high rate and amount of indemnity payments. Particular care should be exercised in pediatric central venous catheterization. Clinicians should consider the patients underlying diseases and administer appropriate pre-treatment when indicated. Post-procedural X-ray should always be done and may be associated with improved patient outcome and decreased indemnity risk. Informed consent is also important. **Key words:** central venous catheterization; complications; closed claims analysis; preventability.

344

Accident and Emergency review clinic: A tool for safe management in emergency departments with doctors in training.

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Introduction: Accident and Emergency review clinics are used in most of the emergency departments (ED) in the United Kingdom for planned follow up of patients not requiring admission. There is currently a lack of evidence regarding the effectiveness of the review clinic despite the significant proportion of patients seen in clinics across the United Kingdom. **Methods:** We conducted a review of Accident and Emergency records of 200 patients who attended the clinic, an assessment of reasons for referral, and comparison with departmental guidelines for clinic referral. **Results:** The most common reason for referral to the clinic was patients with a diagnosis of a fracture on clinical examination with a normal x-ray, (36%). Of these, three patients (4.0%) had a fracture which was detected in the clinic. Soft tissue injuries involving joints comprised 22 % of the patients, 13% had minor fractures treated in the clinic and 19 % of patients had infected wounds or soft tissue infections. A clinical diagnosis of scaphoid fracture was the cause of review for 10% of patients of which three patients (15%) were found to have a fracture. All referrals were deemed to be appropriate. **Conclusions:** Most Emergency departments in the United Kingdom employ junior doctors for training in emergency medicine but lack adequate out of hour's senior doctor cover. The review clinic has been recommended by most consultants across the United Kingdom for such departments as a safety net for patients. We agree with this view and our study has shown that the review clinic can be used as an effective tool for reassessment in cases of diagnostic uncertainty or planned follow-up of specific cases not requiring admission. We recommend the use of review clinics in departments with doctors in training or inadequate senior grade presence as a tool for safe management and continuity of care. **Key words:** ED review clinics; referral demographics; ED safety

345*

Prescription errors in the emergency department: a troubling reality.

Chayer S, Poitras J. CHA Hôtel-Dieu de Lévis, Faculty of Pharmacy, Université Laval, Québec, Que., *Canada*

Introduction: Medication errors have been shown to occur frequently in hospitals with an estimated range of 10–61%. Their causes are multiple since the process of information transmission is complex and prone to errors. The incidence of prescription errors in the ED is unknown. **Methods:** The charts of 50 consecutive patients were retrospectively reviewed. To assess error frequency, we compared the list of drugs identified by the triage nurse and the initial prescription of the emergency physician (EP) to a pharmacist's medication history, this being our gold standard. An error was defined as a discrepancy between the triage note or the written prescription of the EP and the list of drugs established by the pharmacist, excluding drugs stopped for medical reasons. Errors were classified according to the National Coordinating Council for Medication Error Reporting and Prevention. **Results:** 27 of the charts were for females and 23 males. In 20 charts (40%), the triage list differed from the patient's medication. For physician prescription, the number of files with errors was 22 (44%). Of the 28 "error free" charts, 16 had benefited from a pharmacist's intervention. In 41 patients, a total of 154 errors were found; errors of omission being the most frequent (49%). Two errors required the hospitalization of the patients involved. The foremost classes of drugs associated with error were CNS (benzodiazepiness, antidepressants, and others) followed by cardiovascular (ACE inhibitors, nitrates and others), gastrointestinal, hormonal, and so on. **Conclusion:** Medication errors in our ED occurred frequently. In order to prevent them, we need to raise public and community pharmacists' awareness and insist on an updated medication list. Furthermore, the possible role of an emergency pharmacist should be explored to gather a complete medication history thereby ameliorating medication errors. **Key words:** ED medication errors; pharmacist ED involvement; ED medication adverse events

346

Domestic violence against men

Alagappan D, Ananthakrishnan G, Riyat M. Far Rye, Wollaton, Nottingham, *England*

Introduction: Domestic violence against men is a common occurrence in society but is less often identified in emergency departments (ED). Emergency practitioners should be educated in recog-

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nizing domestic violence against men and how these victims could be helped. A case of domestic violence against a man who was physically abused by his female partner and presented with multiple rib fractures at different stages of healing as a result of the abuse is discussed. **Case report:** A 46-year-old gentleman attended the ED with a history of blunt trauma to the right side of his chest allegedly from falling against a table the day prior to his attendance. A chest X-ray was performed which revealed several fractured ribs on the right side in three different stages of healing. On further questioning regarding the mechanism of the injuries, the patient reluctantly admitted being assaulted (punched and kicked) on a frequent basis by his female partner. The patient was not willing to make any complaints with the police. **Discussion:** Domestic violence against men is much more common than it is perceived to be. There were an estimated 2.5 million incidents of domestic violence acts against men in England and Wales in one year according to the recent British crime survey report. Two per cent of men (in comparison to four percent of women) were subject to domestic violence in a period of one year. Female victims are six times as likely as men to report that they were subjected to domestic violence. Statistics from a survey in Canada reveal identical rates of spousal violence for men and women. Due to the variety of presentations, there is no fracture pattern considered pathognomonic of adult abuse. Most ED staffs are unsure about the support available to male victims of domestic violence. **Conclusion:** ED physicians should be aware of domestic violence against males, and of the lower likelihood that males will report such abuse. **Key words:** domestic violence reporting, male victims, spousal abuse.

Wednesday, June 7th: Poster Presentations

CARDIOVASCULAR TRACK

347

Initial serum glucose level as a prognostic factor in the first acute myocardial infarction in the emergency department.

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Introduction: This study assessed the prognostic role of initial glucose levels in first acute myocardial infarction (AMI) patients in the emergency department (ED). **Methods:** This hospital-based retrospective cohort study recruited first AMI patients from one tertiary hospital ED between January 1, 2001, and December 31, 2003. Initial glucose levels at ED were stratified into three categories (level I: <=140, II: 140~200, III: >200 mg/dl). Logistic and Cox's regression models were applied to estimate one-month short-term and one-year long-term outcomes, respectively. **Results:** Total 198 eligible subjects (men: 159, women: 39, mean age 63.1 ± 14.2 years) were recruited into the study. The estimate of survival function for long-term prognosis among three initial glucose levels was significantly different (P=0.0002). After adjusting for sex, age, reperfusion therapy and infarct subtype, the adjusted odds ratio for short-term outcomes progressively increased with higher levels compared with level I (Level II: Odds ratio 3.87; 95% Confidence Interval [CI], 1.71 to 8.78; level III, 5.16; 95% CI, 1.97 to 13.51) and the highest initial glucose level still played an important risk factor for long-term prognosis (Hazard ratio: 3.08, 95% CI 1.59 to 5.98, p=0.001). **Conclusions:** Higher initial glucose levels in ED were an independent predictor of higher risk of short-term and long-term prognosis in patients with first AMI. Key words: acute myocardial infarction, glucose, prognosis

348*

Body surface potential mapping of ventricular fibrillation in human subjects.

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Introduction: Electrocardiogram signals obtained during ventricular fibrillation (VF) are complex, and therefore potentially rich in information. It might be possible to tailor resuscitative decisions according to inferred status of the myocardium. Attempts have been made over the years to quantify and characterize various features of VF signals, such as dominant frequencies, fractal dimensions, and scaling exponents obtained in single leads. Few attempts have been made to examine spatial features in multiple leads. We report on the first high-resolution body surface potential maps (BSPM) of VF recorded and analyzed in humans. **Methods:** A 120-lead ECG mapping system was used to record the spatiotemporal dynamics of potentials over the torso surface of 6 human subjects undergoing controlled testing of implantable defibrillators. VF was induced by burst pacing, and subsequent electrical activity was obtained for 6 to 8 seconds before the device delivered a rescue shock. **Results:** Maps reveal highly dynamic single and multiple spatial regions of positive and negative potentials that move rapidly over the body surface. Offline processing of maps allows characterization of complexity in terms of the number of equivalent dipoles, dominant frequency maps, wavelet transforms, and cross-correlations between leads. Results are interpreted with the aid of a large-scale detailed three-dimensional computer model of VF developed in our lab. **Conclusions:** Spatial signals add a new dimension to VF analysis. Preliminary results are establishing a novel quantitative foundation for defining VF complexity. Feature extraction may be possible with a smaller set of leads. **Key words:** ventricular fibrillation, mapping

349*

Clinical outcomes and patient satisfaction of an emergency department-based outpatient deep vein thrombosis treatment program: 6-year results.

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Introduction: The purpose of this study was to evaluate the efficacy, safety and patient satisfaction of an emergency department-based outpatient deep vein thrombosis (DVT) treatment program. **Methods:** A prospective cohort study was performed in patients enrolled in the VGH outpatient DVT treatment program over a 6-year period, between June 1, 1999 and May 31, 2005. Efficacy outcomes included recurrent venous thrombolembolic (VTE) events at 3- and 6-months following discharge from the program. Safety evaluation included minor and major bleeding complications as well as the development of thrombocytopenia during the acute phase of therapy. Patient satisfaction was assessed using an 18-question patient satisfaction survey which was mailed to all patients following discharge from the program. Standard descriptive statistics were generated and binomial 95% confidence intervals (CI) for proportions were calculated. **Results:** 240 patients were included in the study with a mean age (± SD) of 54.7 ± 18.2 years of which 45% were female. The mean (± SD) duration of treatment in the outpatient program was 5.7 ± 1.2 days. Of the 207 evaluable patients, 1 (0.5%, 95% CI 0.1–2.6%) patient experienced a recurrent VTE at 3 months while at 6 months 4 (1.9%, 95% CI 0.8–4.9%) patients had recurrence. No patient experienced a major bleeding complication or thrombocytopenia while 7 (2.9%, 95% CI 1.4–5.9%) patients experienced a minor bleeding complication. Overall, 97.3% of patients were comfort-

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able having their condition treated as an outpatient while 85.9% felt it was more convenient to return to hospital daily for medications and assessment than to be admitted to hospital. Overall, 98.4% of respondents were very satisfied/satisfied with the treatment received in the outpatient program and 95.1% would enroll again if future treatment was indicated. **Conclusion:** An emergency department-based outpatient DVT treatment program is safe, effective and is able to achieve a high level of patient satisfaction. **Key words:** deep venous thrombosis, outpatient treatment

350*

The 3-minute walk test: an investigation into its use as a novel clinical decision tool for patients with congestive heart failure, chronic obstructive pulmonary disease, or stable chest pain.

Pan A, Stiell IG, Clement C, Acheson J, Aaron S. Department of Emergency Medicine, University of Ottawa, Ottawa, Ont., *Canada*

Introduction: On a daily basis, emergency department (ED) physicians face decisions of whether to admit patients with congestive heart failure (CHF), chronic obstructive pulmonary disease (COPD), or stable chest pain. This study evaluated the feasibility of the 3-minute walk test (3MWT) as a clinical decision tool for these conditions and correlated its performance with adverse outcomes. **Methods:** In this prospective cohort study, we enrolled a convenience sample of 40 adult patients who presented to a tertiary care ED with CHF, COPD, or stable chest pain and who were being considered for discharge. Patients walked at their own pace on home O2 level or room air, and their dyspnea (measured on the modified Borg scale), respiratory rate, heart rate, and oxygen saturation were recorded each minute for 4 min (3 min of walking followed by 1 min of rest). Analyses included Fisher's exact, Student's t-test, and mixed repeated measures general linear model. **Results:** The study sample had these characteristics: CHF 40.0%, COPD 22.5%, stable chest pain 37.5%, mean age 69.0 years, male 60.0%, and test completion rate 85.0%. Twelve patients had one or more adverse outcomes (admitted 15.0%, myocardial infarction 2.5%, relapsed 15.0%, deceased 2.5%). Of those with adverse outcomes, 41.7% failed to complete the test compared to only 3.6% of those with good outcomes (p = 0.01). Furthermore, in all four measurements, those with adverse outcomes performed worse than those with good outcomes, and significant differences were seen in dyspnea (p = 0.04) and respiratory rate (p = 0.03) measurements. **Conclusions:** The data indicate an association between patients who had an adverse outcome and those who were unable to complete the test. The 3MWT is a non-resource-intensive and practical procedure, requiring no specialized resources, training, or equipment. Hence, it can be performed in any ED to aid with discharge decisions. Further multicentre research is required to formulate guidelines and validate trends. **Key words:** clinical decision tool, cardiovascular, prognosis

351*

Emergency department use of intravenous procainamide for patients with paroxysmal atrial fibrillation.

Clement C, Stiell IG, Symington C, Dickinson G. Department of Emergency Medicine, University of Ottawa, Ottawa, Ont., *Canada*

Introduction: There is no consensus for the optimal strategy for ED management of paroxysmal atrial fibrillation (PAF). Our objective was to examine the efficacy and safety of intravenous (IV) procainamide for PAF. **Methods:** This health records review included consecutive visits over a 6-year period to a university hospital ED for adults presenting with acute-onset PAF and who received IV procainamide. Patients were identified from the National Ambulatory Care Reporting System (NACRS) database. IV procainamide was administered as an infusion of 1 gram over 60 minutes. Data were extracted from the original clinical records by a trained observer. Outcome measurements included conversion, adverse events, and relapse. We conducted descriptive analyses with 95% CIs. **Results:** Characteristics of the 433 visits from January 1 2000 to June 30 2005 were: mean age 65.5 years (range 19–92); male 50.8%; first visit 47.3%; previous PAF 86.2%; previous IV procainamide 49.4%; presenting complaint palpitations 79.7%; mean heart rate 112.1 (range 51–200); received IV rate control prior to IV procainamide 38.3%. The successful conversion rate with IV procainamide was 59.6% (95% CI 55–64%), the mean dose given 865.3 mg (range 250–1600 mg), and the median time to conversion 55 minutes. Adverse events occurred in 39 (9.0%) cases: hypotension 7.9%; bradycardia 0.5%; AV block 0.2%; ventricular tachycardia 0.2%; Torsades des Pointes 0%; myocardial infarction 0%; congestive heart failure 0%; none required admission due to reaction to IV procainamide. 83.6% of all remaining cases were converted electrically by the ED physician for an overall conversion rate of 93.3%. 97.0% of patients were discharged home from the ED but 10.2% of patients returned to the ED with PAF within seven days. **Conclusions:** This is the largest reported study of ED PAF patients treated with IV procainamide and demonstrates that this treatment is both safe and effective. IV procainamide should be prospectively compared to other ED strategies. **Key words:** atrial fibrillation, procainamide

352

The use of cardiac markers in emergency department 6 hour chest pain evaluation (ACTION) protocol.

SH Lim, Anantharaman V Yo SL, Chua T, Ong MEH, Rabind C, Jacob E, Lim ST. Department of Emergency Medicine, Singapore General Hospital, *Singapore*

Introduction: Our objective was to study the sensitivity and sensitivity of the various cardiac markers in predicting adverse cardiac events (ACE) or coronary revascularization (CR) procedures. **Methods:** Patients aged 25 or more, presenting to the emergency department with chest pain suggestive of acute coronary syndrome (ACS) with a 12-lead ECG non-diagnostic for myocardial ischemia or infarction were enrolled. ECG and blood test for myoglobin, creatine kinase (CK)-MB mass and troponin T (TnT) were done at 0, 3 and 6 hrs after arrival. If the patient was not admitted after 6 hrs of negative evaluation and in the study group, he underwent a stress tetrofosmin scan. If the stress tetrofosmin scan was positive, the patient was admitted. In the control group, patients with high or moderate risk for coronary artery disease were admitted. Patients were followed up at 1 month for ACE, cardiac death, ventricular fibrillation and myocardial infarction. **Results:** 166 patients had ACE or CR at 30 days. At 0, 3 and 6 hrs after arrival, troponin is considered the best marker followed by CK-MB, myoglobin and CK. The optimal cutoff values of TnT or CK-MB for predicting 1 month ACE or CR were 0.02 ug/L and 6 ug/L respectively. 20.5% of patients with positive TnT but negative CK-MB had ACE within 1 month compared with only 0.6% of those with negative TnT but positive CK-MB. **Conclusions** TnT is the most important marker to predict ACE. The additional of CK-MB to TnT did not improve diagnostic accuracy. **Key words:** cardiac enzymes, prognosis

353

Disease-related differences in young and very young adults with acute myocardial infarction

Ng CJ, Yung KJ, Hsu CY, Yan DC, Chen JC, Chu PH. Division of Emergency Medicine

Introduction: Our purpose was to assess clinical differences between gender and age subgroups in young acute myocardial infarction (AMI) patients. **Methods:** We retrospectively studied 178 pa-

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tients younger than 41 years old (mean age, 36 ± 4 years) who had AMI admitted between 1992 and 2002. We compared clinical presentation, treatments, and outcomes of patients divided into 2 age subgroups, young (35-40 years) and very young (<35 years), and into different genders. **Results:** The very young patients showed statistically significant differences from the young patients, including more obesity (p=0.02), higher cardiac troponin I (p=0.03), and higher low density lipoprotein cholesterol (LDL) (p=0.025). Females had a higher Killip classification (p=0.006) despite fewer histories of smoking and drinking (p<0.0001), and lower hemoglobin levels (p=0.001). Heart failure tended to be more frequent in very young patients and sudden death tended to be more frequent in females. **Conclusions:** Young patients with coronary disease may exhibit differences in risk factors, in clinical and stenotic coronary severities, in treatments, and in prognosis that depend on age and gender. **Key words:** myocardial infarction, age, gender

354*

Development and validation of a simple prediction rule to exclude pulmonary embolism.

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Introduction: Safe and rapid bedside exclusion of pulmonary embolism (PE) could improve access to diagnostic imaging and save healthcare resources. We sought to develop a simple and applicable clinical prediction rule (CPR) to safely exclude PE. **Methods:** Predictor variables were collected prospectively in consecutive patients referred for V/Q scan to rule out PE. Statistically significant variables were identified by univariate analysis (Phase I). The inter-observer reliability for each significant variable was prospectively measured in an independent cohort of suspected PE patients (Phase II). Significant predictors demonstrating good inter-observer reliability were used to derive CPRs using multivariate analysis (Phase III). The CPR demonstrating the best sensitivity and specificity was then validated retrospectively (Phase IV) using the PLUSPENS study dataset (Wells et al., Ann Int Med Dec 1998). **Results:** In Phase I (n = 260), 22 predictor variables were found to be significantly different ($p < 0.20$) for patients with PE compared to those without disease. In Phase II (n = 60), 13/22 variables demonstrated good inter-observer reliability (kappa >0.50). In Phase III, a simple CPR was derived which excluded 26.1% of patients with suspected PE with 100% sensitivity (95% CI 91.6–100%), and 100% NPV (95% CI 91.4–100%). The CPR excluded PE if all of the following predictors were absent: 1) a positive D-dimer, 2) heart rate >110, 3) leg pain or swelling, 4) previous PE or DVT, 5) recent surgery. In Phase IV (n = 1239), the clinical decision rule demonstrated a sensitivity of 95.3% (95% CI 91.7–97.8%), a NPV of 97.8% (95% CI 96.0–99.0%) and safely excluded PE in 35% of suspected PE patients. **Conclusions:** This simple and easily applicable clinical prediction rule safely excludes PE in 35% of suspected patients. **Key words:** pulmonary embolism, clinical prediction rule

355

Epidemiology of acute cardiogenic pulmonary oedema in a Hong Kong emergency department.

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Introduction: Acute cardiogenic pulmonary edema (ACPO) is an increasingly common cause of morbidity and mortality, mostly in the elderly. ACPO imposes increasing costs on health services worldwide. The aims of this study were to determine the epidemiology of ACPO in patients presenting to a Hong Kong emergency department (ED), to describe treatment patterns, and to identify any predictors of patient mortality. **Methods:** Retrospective case note review in university teaching hospital. Cases were identified by reviewing computerized ED attendance records and diagnoses in the resuscitation room log books. Descriptive statistics and univariate analysis were performed. **Results:** The study period was from September 2004 to April 2005. 140 patients were identified. Mean age was 75 years (range 34-92), male:female ratio 3:2. Mean values (range) for presenting physiology included: pulse 103/minute (36-108); BP 169/88mmHg (77-274/20-162) and respiratory rate 31 (12-88) breaths per minute. 40% were triage category 1 with the remainder triaged equally between categories 2 and 3. Past medical history included ACPO (12.1%), diabetes (45.7%), COPD (9.3%), IHD (47.1%), hypertension (72.1%) and CHF (40.7%). 47% were acidotic on admission (pH<7.35) and 41% were hypercapnic (PaCO2>5.5kPa). Treatment included sublingual nitrates (n=2), IV nitrates (n=91, 65%, mean initial dose 7mg/hr), IV frusemide (n=92, 66%, mean 50mg) and IV morphine (n=24, 17%, mean 0.5mg). Ventilatory interventions included NIV (n=21: 15 CPAP, 6 BIPAP) and intubation (n=27). 41 patients were admitted to ICU. Survival to hospital discharge was 96% and median length of stay was 8 days. 31% of survivors were readmitted to Hong Kong hospitals within 3 months of discharge. No treatment regimen, individual drugs or premorbid condition were found to be predictors of survival. **Conclusions:** ACPO is a commonly encountered ED diagnosis. ED drug management is suboptimal in that only two thirds of patients were given nitrates, although use of opioids was low. Prediction of survival was not possible for this group. **Key words:** acute pulmonary edema, epidemiology, treatment

356

ED ACS Patient Outcomes: Analysis of Follow-up and Resource Utilization

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Introduction: The Asheville VA Medical Center (AVAMC ED) will conduct an ongoing retroactive review of all patients presenting with symptoms of ACS. A retroactive chart review is currently being performed as part of the ED Quality Improvement Program. A major issue of the AVAMC ED is patients presenting multiple times to the ED with ACS symptoms due to not being followed up appropriately, e.g., cardiology consult, nuclear stress test, cardiac catherization, 2-D echo, etc. The goal is to determine the effectiveness of the ED in identifying high-risk and low-risk ACS patients and to make appropriate consults at the earliest possible opportunity and o decrease the number of repeat visits to the ED for ACS symptoms as well as to prevent patients from having a myocardial infarction (MI). **Methods:** The ED is currently reviewing all patients, as a Quality Improvement Program, who present to the ED and meet the following criteria: complaint of chest pain, ECG performed and a troponin level drawn. The following will be analyzed: number of repeat visits to the ED within six (6) months, symptoms at repeat ED visits, ECG and troponin values, and compliance for follow-up appointments, tests and procedures. **Results:** Data, including graphs, will demonstrate the pitfalls of improper follow-up of ACS patients presenting to the ED. **Conclusions:** We anticipate that patients appropriately followed after presenting to the AVAMC ED with ACS symptoms will require less ED and Medical Center resources, and patients will have improved mortality and morbidity. This information will be shared with all other ED's within the Department of Veterans Affairs, the largest health care system internationally. **Key words:** acute coronary syndromes, quality, emergency department

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357*

Determinant of cardiac arrest survival in a single urban/rural EMS system: an eight year study.

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Introduction: Our purpose was to evaluate the determinants of out of hospital cardiac arrest survival in a large single EMS system, that includes rural and urban areas. Several studies of urban EMS systems have identified bystander CPR and early defibrillation as the major determinants of survival from cardiac arrest. (need to put in references here) We sought to validate these findings in a large EMS system that uses a single set of medical protocols and responds to cardiac arrests in urban and rural areas. **Methods:** Demographic, clinical and response characteristics for patients who survived to hospital discharge were compared to those of non-survivors by means of chi2 and t test statistics. Multivariate stepwise logistic regression analysis was performed to assess the predictors of survival. Odds ratios and 95% confidence intervals were calculated for factors independently that were associated with survival to hospital discharge. **Results:** All data will be reported using the Utstein style of reporting and definitions. Over the study period, the total number of sudden out of hospital sudden deaths, confirmed cardiac arrests with resuscitation attempted and the number where cardiac etiology was the cause were 8,177, 4,957 and 4,291 respectively. Demographic information on this population will be provided. Survival rates related to the clinical and response characteristics will be presented, along with the associated odds ratios and clinical significance for age, gender, witnessed arrest, bystander CPR, arrest in a public place and presenting arrhythmia will be presented. **Conclusion:** In a system that includes urban and rural areas, the major determinants of survival from cardiac arrest will be presented. **Key words:** emergency medical services, cardiac arrest, prognosis

358*

Emergency department physician ECG interpretation accuracy: a prospective cohort study.

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Introduction: Emergency Department (ED) interpretation of 12 lead electrocardiograms (ECG) is essential for patient treatment and disposition. Studies have found a high rate of ECG misinterpretation by ED physicians, but only a small percentage of these result in adverse patient outcomes. No published data reports the accuracy of ECG interpretation in Canadian EDs. **Methods:** We prospectively evaluated the accuracy of ED ECG interpretation compared to cardiologist interpretation from March to August 2004 at St. Joseph's Healthcare in Hamilton, Canada. All ECGs performed on adult (age greater than 17) ED patients were eligible for inclusion. ED physicians recorded interpretations onto either an open-ended or closed-ended data collection form. Blinded cardiologist interpretations were abstracted from medical records. ED and cardiologist interpretations were independently compared and graded by 2 authors as: 1. Equivalent or clinically insignificant error, 2. Errors of possible clinical significance, or 3. Errors of probable clinical significance. Medical records of grade 3 cases were reviewed to determine patient outcomes. ED physician level of training and data collection form were examined as secondary outcomes. Primary outcome results are presented as frequency of error. Secondary outcomes were assessed with multivariate logistic regression, and are reported as odds ratios with 95% confidence intervals. **Results:** 709 cases were collected. 524 cases were grade 1 (73.9%), 151 cases were grade 2 (21.3%) and 34 were grade 3 (4.8%). Review of grade 3 cases found only one adverse patient outcome. Accuracy of ED interpretation correlated inversely with level of training. The odds of ED residents making grade 2 or 3 errors was significantly lower than ED staff (OR 0.63, CI 0.44–0.89, $p = 0.01$). The closed-ended data form did not improve ED interpretation (OR 0.92, CI 0.64–1.33, $p = 0.67$). **Conclusions:** Despite a high rate of disagreement between ED physician and cardiologist ECG interpretations, effects on patient outcome are minimal. **Key words:** ECG interpretation, outcomes

359

Acute coronary syndrome: an emergency department perspective.

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Introduction: Management of acute coronary events in the Emergency Department (ED) remains a challenge and mortality rate is still high. **Methods:** A retrospective cohort study was done. 44 patients who died of acute coronary syndrome were studied for predictors of mortality. Patients were categorized into ST segment elevation myocardial infarction (thrombolysed) (Group A), ST segment elevation myocardial infarction (non-thrombolysed) (Group B), and non-ST segment elevation myocardial infarction (Group C). **Results:** 34 patients out of 44 were evaluated. 70.6 % were male and 29.4 % female with a mean age of 60.2 ± 11.85yrs. The mean duration of chest pain was 854.30 min (Gp A + Gp B) and 1973.12 min (GpC) respectively. 29.4 % arrived within 6 hrs and 20.6 % within 12 hrs of chest pain. Hypertension was associated in 42.3% of Gp A + Gp.B and 25% of Gp C, smoking in 50 % of Gp A + B and Gp C, Type 2 diabetes in 46.15 % of Gp.A + B and 50 % in GpC and past history of coronary event in (37.5%, 26.9%) of Gp(C, A+ B). 61.5% of Gp A and B were stratified into Killip class 3 & 4. Wide complex tachycardia was present in 30.8% (Gp.A + Gp.B).73.1% of patients were classified into anterior wall myocardial infarction. 50% were thrombolysed with mean door to needle time of 85.46 min. 46.15 % of the patient's were thrombolysed within 1st hour of reaching the ED. Mean duration of survival was Gp.A (574.9min), Gp.B (645.5min) and Gp.C (803.75) min. **Conclusions** Common risk factors were related strongly and door to thrombolysis time was more than one hour in 50%. We conclude that there is a need to shorten the delay of definitive care in the Emergency Department. **Key words:** myocardial infarction, mortality

360

Patient characteristics with increased door to needle time and mortality in patients presenting with STEMI in a Saudi Arabian hospital.

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Introduction: Prolonged door-to-needle time has been shown to increase mortality and morbidity. The objective was to study the patient characteristics that may delay door-to-needle times for patients with ST-segment elevation myocardial infarction (STEMI) in Saudi Arabia. **Methods:** This retrospective observational study was conducted over a two year period (2001-2003), at a 750-bed tertiary care teaching hospital with an annual ED census of over 180,000. Baseline characteristics of patients diagnosed in the ED to have STEMI were documented along with door-to-needle time and in-hospital mortality. Data was abstracted by two independent assistants. Data was analyzed using exact non-parametric methods along with linear and logistic regression. **Results:** The 292 patients enrolled had the following characteristics: Mean age 53±13 years, 85% male, 25% diabetics, 36% hypertensives, 35% cigarette smokers, 33% arrived by ambulance, 85% presented with chest pain while 15% presented with epi-

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gastric pain and 88% received thrombolytics while 12% received primary angioplasty. The in-hospital mortality was 4%. Median duration of symptoms was 120 minutes for males, and 225 minutes for females ($p<0.01$). The mean door-to-needle time was 59±58 minutes. Factors associated with increased door to needle time were female gender (+37 min; $p<0.05$), presenting with epigatric pain (+51 min; $p<0.05$), arrival by car (+22.5 min; $p<0.05$) and when thrombolytics were given by a cardiologist vs. an emergency physician (+27 min; $p<0.05$). Factors associated with in-hospital mortality were prior myocardial infarct (OR= 9.7; 95%CI 1.5 - 64), longer door-to-needle time (OR=1.1; 95%CI 1.0 – 1.2), non-Saudi nationality (OR=13; 95%CI 2 - 89) and a trend towards female gender (OR= 5; 95%CI 0.8 - 31). **Conclusions:** A smaller proportion of females present to the ED with STEMI and they have longer duration of symptoms and longer door-to-needle times. It is important to understand how different cultures interact with the health care system to optimize therapy for those in need. **Key words:** myocardial infarction, treatment

361

Porto-pulmonary venous anastomosis in portal hypertension: animated portographic observation.

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Introduction: Purposes of the presentation are to show animated transhepatic portography of porto-pulmonary venous anastomosis (PPVA), and to emphasize on its significance as a potential channel causing arterial migration of sclerosing materials used for emergent sclerotherapy of esophageal varices. PPVA is one of the hepatofugal collaterals produced in portal hypertension, quite unique in forming an extracardiac right-to-left shunt. Nomenclature of PPVA is derived from the report published in 1953 by Shoenmacker and Bieten, who described the results of post-mortem barium injection into the portal venous system. **Methods:** The author first reported portographic blood flow patterns of PPVA in the patients with esophageal varices, by repeatedly observing animated transhepatic portography, and additionally confirmed an extracardiac right-to-left shunt by using contrast echoecardiography. **Results:** Motion pictures demonstrate blood flow patterns consistent with PPVA in 12 out of 47 patients (25.5%) with esophageal varices studied, including 9 of left-sided (19.1%) and 3 of right-sided PPVA (6.4%). Radiological features are a sudden spurt of contrast medium from a venous collateral located near the hilus of the lung, and counterclockwise movement of the flux of contrast medium at the left lung hilus or straight line movement of contrast medium directing the apex in the right lung hilus, which was rapidly diluted; this was synchronized with the cardiac beat. A four-chamber view echoecardiography demonstrates clouds of echoes in left atrium after injecting 5% dextrose solution into the coronary gastric vein, in 5 out of 15 patients studied (33.3%). **Conclusions:** A review of the literature on sclerotherapy of esophageal varices found a couple of reports referring to migration of sclerosing materials possibly via PPVA, resulting in complication of cerebral or systemic arterial embolism. Animated portography of PPVA shown here helps you appreciate that intra-variceal esophageal sclerotherapy is absolutely contraindicated. **Key words:** esophageal varices, sclerotherapy

362*

Reperfusion time delays incurred by patients with ST-elevation myocardial infarction in Quebec hospitals: results from the AMI-Quebec registry.

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Introduction: Current guidelines emphasize timely reperfusion therapy in patients with ST-elevation myocardial infarction (STEMI). Recent studies showed that recommended reperfusion time delays are achieved in a minority of patients. There have been no studies examining reperfusion time delays in Quebec which is unique because of its large number of catheterization centers per capita and its environmental characteristics. We sought to describe the reperfusion time delays incurred by real world patients with STEMI in Quebec. **Methods:** The AMI-Quebec registry was compiled via retrospective chart review of consecutive STEMI patients during 2003. Seventeen Quebec hospitals participated (10 tertiary, 7 community). We excluded patients who presented >12 hours after symptom onset and patients who did not receive reperfusion therapy. **Results:** We included 1,189 patients (mean age 61 ± 13 years, 26% females). The majority of patients presented to community hospitals (61.5%) and the remainder presented to tertiary hospitals (38.5%). The median symptom-to-door time was 95 min. The median door-to-needle time was 32 min and <30 min in 49.0% of patients. In patients who presented to tertiary hospitals with on-site percutaneous coronary intervention (PCI), the median door-to-balloon time was 110 min and <90 min in 35.7% of patients. In patients who presented to community hospitals and required transfer for PCI, the median door-to-balloon time was 141 min and <90 min in 8.0% of patients. Transfer for PCI consisted of 35 min for the ambulance to arrive at the community hospital and 40 min for the inter-hospital transport. Overall, the median symptom-to-reperfusion time was 192 min. **Conclusions:** In patients with STEMI presenting to Quebec hospitals, time delays for reperfusion are substantial. Patients who require transfer for PCI are least likely to receive timely reperfusion therapy. Measures such as streamlined STEMI protocols, prehospital fibrinolysis, and facilitated PCI should be explored to shorten reperfusion time delays. **Key words:** myocardial infarction, reperfusion therapies

363

Cerebral Thrombolysis in a small hospital

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Introduction: Thrombolysis has been shown to have positive effects in controlled trials for acute cerebral infarct. In the UK the treatment is now undergoing a safety and efficacy study based on the SITS International Stroke Registry. **Methods:** : Scarborough is a small District General Hospital of 350 acute beds. The ED treats 38000 new patients per year. Within this service a limited acute stroke service was set up to pilot the use of cerebral thrombolysis for suitable patients defined using the SITS-MOST study protocols. **Results:**: Over the course of 18 months, 24 patients were treated with thrombolysis with a 51% overall improvement. **Conclusions:** This presentation describes the logistics required to allow timely thrombolysis in a small hospital, and the characteristics and outcomes for the first 24 patients. **Key words:** cerebral infarct, thrombolysis

364

Ruptured abdominal aortic aneurysm masquerading as right hip pain- an unusual presentation

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Introduction: Ruptured abdominal aortic aneurysms (RAAA) are well known to mimic a variety of acute surgical conditions and misdiagnosis is often fatal. **Methods:** We report a case of a 73 year old man with a ruptured abdominal aortic aneurysm presenting with acute right hip pain. **Results:** A literature search revealed one report of ruptured abdominal aortic aneurysm presenting with buttock pain and another of a ruptured internal iliac aneurysm as acute hip pain. Unruptured abdominal aortic aneurysms are also a recognised cause

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of chronic hip pain. **Conclusions:** This is the first case report of a ruptured abdominal aortic aneurysm presenting as acute hip pain without any associated collapse. This atypical presentation emphasizes the importance of increased awareness among emergency physicians and early intervention in RAAA. **Key words:** abdominal aortic aneurysm, case report

365
Cardiac death in a UK emergency department
Volans AP. *UK*

Introduction: Cardiac death is common in the ED. **Methods:** We performed an audit of post-mortems performed on patients dying in our ED. **Results:** 54% of deaths were ascribed to cardiac causes. Of these Cardiac cases 61% were associated with pathological markers of infarct or the presence of thrombus. 39% had no evidence of infarct or thrombus found in the cardiac circulation. These patients did have cardiac fibrosis or atheroma. The infarct group were younger, more likely to be male, more likely to have a witnessed collapse but were less likely to have been offered early bystander CPR. **Conclusions:** The clinical details of these two groups will be presented and the likely aetiology of the sudden death discussed. **Key words:** cardiac death, etiology

366*
Investigation and management of patients with transient ischemic attack in a Canadian emergency department.
Harris DR, Grafstein E, Stenstrom R, Cheung C, Innes G. Department of Emergency Medicine, University of British Columbia, Vancouver, BC, *Canada*

Introduction: Evidence-based management of patients with transient ischemic attack (TIA) in the emergency department (ED) is necessary in secondary prevention of stroke. We hypothesize that significant variability exists among emergency physicians (EPs) in management of ED patients with TIA. **Methods:** We undertook a retrospective study utilizing the New Emergency Resource Database (NERD), the administrative database at St. Paul's Hospital, a tertiary care, urban academic hospital in Vancouver, British Columbia. Patients with the primary discharge diagnosis of TIA using ICD-9CM codes (435.9) were analyzed, from January 2003 to December 2004. Investigations were determined from Sunrise Clinical Manager (SCM), the computerized order entry program at St. Paul's Hospital. **Results:** 149 patients were analyzed. Median age was 69 years and 58.4% were male. 93.2% had a Canadian Emergency Department Triage and Acuity Scale (CTAS) level of I–III. The three most common triage categories were: "Weakness / Query CVA Minor Deficit" (34.2%); "Weakness / CVA + Major Deficit" (12.1%), and; "Sensory Loss / Numbness" (10.7%). Of investigations ordered by EPs: 78.5% (117) had an electrocardiogram; 70.0% (104) had a computed tomography (CT) scan of the head; 14.8% (22) had a carotid doppler, and; 7.4% (11) had an echocardiogram. 37 patients (24.8%) were referred to neurology in the ED and 23 (15.4%) were admitted to hospital. Those patients discharged from the ED had a median ED length of stay (LOS) of 3.9 hours. Median ED LOS was longer in patients who had CT scan (2.7 vs. 4.3 hours, $p = 0.0004$), were referred to neurology (3.7 vs. 4.6 hours, $p = 0.03$), or were admitted (3.7 vs. 7.2 hours, $p = 0.0013$). Of patients discharged from the ED, 4 (2.7%) returned to the same institution within 30 days, 3 (2.0%) with a diagnosis of stroke. **Conclusions:** The investigation and management of patients with TIA in the ED varies widely. Research into newer diagnostic techniques, clinical care pathways, and specialized follow up clinics may show enhanced provision of care to this patient population. **Key words:** transient ischemic attack, management

367
Development of clinical quality of care indicators for acute coronary syndrome in the emergency department and current performance analysis in two northern Taiwan hospitals.
Fan CM, Chung KP, Ma MH, Chen WJ. Department of Emergency Medicine, Far Eastern Memorial Hospital, Taipei, *Taiwan*

Introduction: The issue of quality of health care is a topic of current concern. Early diagnosis and timely treatment of patients of acute coronary syndrome(ACS) is always a challenge in the emergency department(ED). In this pilot study we hoped to develop clinical quality of care indicators for ACS in ED in Taiwan and analyzed the current performance in two northern Taiwan hospitals. **Methods:** In the first stage, we developed summaries for each of the potential indicators modified from evidence-based clinical guidelines for ACS, and a multidisciplinary expert panel rated them by used of two rounds of Delphi technique for 5 dimensions of quality, including validity of evidence, feasibility, impact on outcomes, room for improvement, and controllability. In the secondary stage, we retrospectively measured the performances of these indicators in two EDs in northern Taiwan from Oct 2004 to Mar 2005 by chart abstraction. **Results:** Seven indicators, 2 evaluated indicators and 5 therapeutic indicators, met the all 5 dimensions, and those were rate of complete electrocardiogram within 10 minutes of presentation, cardiac marker follow-up more than 6 hours, clopidogrel use if allergy to aspirin, β-blocker at arrival, clopidogrel use for non-ST elevation myocardial infarction(NSTEMI) patients, glycoptotein IIb/IIIa inhibitor on NSTEMI patients with emergent percutaneous coronary intervention(PCI), and PCI within 90 minutes. The performances of these indicators in the two objective EDs were 45.51/44.34%, 72.34/56.76%, 100/0%, 3.91/5.61%, 60.78%/32.08%, 28.75/0%, and 20.83/38.89% respectively. **Conclusions:** This is the first set of quality indicators for ACS in the ED in Taiwan. Comparing with previous studies, almost all indicator sets emphasized the early administration of Aspirin and β-blockers and timely PCI. Clopidogrel and Glycoprotein IIb/IIIa inhibitor administration rate were the newly developed indicators in our study. Both of the study EDs should improve the performance of evaluated indicators and β-blocker administration rate. **Key words:** acute coronary syndrome, management

368
SOP for acute ischemic stroke - an initiative from India.
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Introduction: Establishing a SOP for early management of patients with acute ischemic stroke presenting to the Emergency Department and evaluating the benefit of early reperfusion in patients with "Acute Ischemic Stroke". **Methods:** Patients who presented with suspected stroke in all centers within the first 24 hrs, between the period of October 2003 and May 2004 were included. Patients who presented outside 24 hrs with suspected or established stroke were excluded. Patients were divided into four groups; tPA group, Urokinase group, Integrillin group and conventional management group. Within all groups initial, 24 hrs, and discharge NIH scale were compared. **Results:** In the t-PA group the target cut off value for NIH score drop was minimum by 4 points and target Maximum drop was score less than 3. The cut off value was achieved in 9 / 10 patients (90%) and maximum drop was achieved in 7/10 patients (70 %).In the Urokinase group the target cut off value for NIH score drop was minimum by 4 points and target Maximum drop was score less than 3. The cut off value was achieved in 4 / 4 patients (100%) and maximum drop was achieved in ¾ patients (75 %). Although the Integrillin group had initial NIH in the range of 2–5 there was a reduc-

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tion of NIH in the range of 0-1 after 24 hrs and there was no recurrence of a major episode later. In the conventional management group the target cut off value for NIH score drop was minimum by 4 points and target Maximum drop was score less than 3. The cut off value was achieved in 6 / 22 patients (27%) and the maximum drop was not achieved in any patient. There were insignificant changes in on discharge NIH compared to 24hrs NIH in all groups. **Conclusion:** In conclusion our small stroke study has shown significant and comparable favorable outcomes with the use of various reperfusion agents. **Key words:** acute ischemic stroke, therapy

EDUCATION TRACK

369*

Medical simulation in allied health education.

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Introduction: Simulation-based medical education (SBME) is gaining accceptance in many areas of clinical education, offering experiential opportunities for novice clinicians learning invasive skills in a climate of decreasing clinical exposure. With increasing competition for meaningful clinical learning opportunities, many disciplines are seeking alternatives to 'patient-based' learning. One such discipline is that of Paramedicine, which has seen dramatic expansion in scope of practice in the past decade. **Methods:** This study is designed to assess the thoughts, feelings, and opinions of learners, faculty, and administrators on integrating SBME with the Critical Care Paramedic (CCP) curriculum. The 'Exploratory Phase' of the project consists of a learner and a faculty focus group. Recommendations from these sessions will determine the 'Clinical Intervention Phase', integrating SBME with the delivery of the CCP program. Simultaneously, interviews with a Clinical Department Head, a Medical Director, and an employer of CCPs will occur. The 'Information Synthesis & Reflection Phase', will reconvene the two focus groups. In the 'Results & Recommendations Phase', data will be analyzed and interpreted. **Results:** The study asks: "Can SBME be integrated with advanced clinical curricula?"; "What are the unique advantages and disadvantages of SBME over traditional approaches to clinical education?"; "Does the use of SBME affect patient safety?"; "What are the perceived opportunities and barriers for integrating SBME?"; "How does expusure to SBME affect clinical knowledge and skill acquisition?"; and "What criteria should be applied to the implementation of SBME?". **Conclusions:** The study assesses learner and faculty perceptions of the affect that SBME has on the acquisition of knowledge and skill. It also integrates the administrators' perceptions of the opportunities and barriers for integrating SBME , and recommends criteria for future programmatic integration. **Key words:** medical simulation

370*

Effectiveness of a novel pneumothorax skills program for EM residents.

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Introduction: While pneumothorax management is a vital skill in Emergency Medicine, there are no validated chest tube insertion teaching methods in the literature. We designed and evaluated a novel pneumothorax skills program for Emergency Medicine residents that included use of a chest tube mannequin. **Methods:** We conducted a single-site outcomes survey of EM residents participating in a novel pneumothorax skills program. The course of lectures, videotapes, demonstrations, practice using a chest tube mannequin, performance feedback and written review material focused on insertion of a chest tube, pigtail catheter and needle thoracostomy. After informed consent, participants completed a post pre-post survey of 11 questions using a 5-point framed Likert-type scale. Primary outcome measures included previous procedural experience as well as before and after comparisons of self-reported confidence and technical proficiency. Descriptive statistics compared matched before and after scores and paired comparison t-tests determined significance. **Results:** 13 residents completed the course (3 final year CCFP(EM), 10 FRCP(EM) year 1–4 residents). Overall program satisfaction was high (mean 4.7). Residents reported moderate prior exposure to chest tubes (3.9) and limited prior exposure to pigtail catheters (2.3). Initial confidence ratings were 3.1 for chest tubes and 1.9 for pigtail catheters. Confidence increased by 1.4 ($p < 0.001$) for chest tubes and by 2.4 ($p < 0.001$) for pigtail catheters post-training. Initial self-reported technical proficiency scores were 3.2 for chest tubes and 2.1 for pigtail catheters. There were gains of 1.2 ($p < 0.001$) for chest tubes, and 2.1 ($p < 0.001$) for pigtail catheters after the program. **Conclusions:** This pneumothorax skills program appears effective in improving the confidence and technical skills of Emergency Medicine residents. Use of a simulation mannequin augments residents' opportunities to practice critical skills and may enhance patient care and safety. **Key words:** chest tube, education

371*

Evaluation of a new mandatory third-year clerkship in emergency medicine

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Introduction: Medical students at our university experienced the first year of the new mandatory Emergency Medicine Clerkship rotation in 2003. This study assesses the effectiveness of each component of the rotation in achieving preset learning objectives. **Methods:** All medical students involved in the Emergency Medicine Clerkship rotation at a tertiary care hospital between July 2003 and June 2004 were invited to complete a written survey anonymously. Students were presented with a series of paired teaching strategies and circled the more valuable learning experiences. Descriptive statistics delineated their preferences. The survey also included open-ended questions; responses were coded to identify recurrent themes. Rotation components assessed include: clinical ED shifts, Advanced Cardiac Life Support, procedural labs, casting, tutorials, preceptor-assisted learning (student presents a topic) and supervised clinical teaching sessions (protected time for 3–5 students and one clinician). **Results:** Of 125 students, 95 (76.0%) responded. 1208 paired comparisons were performed. Percentage of respondents that preferred each teaching format: 26% preferred Advanced Cardiac Life Support, 21% clinical shifts, 18% supervised clinical shifts, 5% procedural labs, 11% tutorials, and 10% preceptor-assisted learning. Major themes from students' responses to open-ended questions were that: 1) the Emergency Medicine rotation was the best in clerkship 2) a longer rotation was desired, and 3) the ED provides an outstanding venue to hone history and physical exam skills. **Conclusions:** While individual learners indicated preferences for specific rotation components, it is the overall experience with multiple learning methods that allows all students to be successful in achieving their goals. This work may serve as a template for program directors seeking to develop a similar curriculum. This study makes a compelling case for making Emergency Medicine a core element of clerkship at every medical school. **Key words:** medical students, education

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372*

Emergency medicine residents' and physicians' attitudes towards a mentor-observer program: a novel approach to CanMEDs competencies.

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Introduction: In July 2002 the University of Alberta incorporated a Mentor-Observer (MO) program into the FRCP(C) Emergency Medicine (EM) residency curriculum to promote teaching and assessment of CanMEDS roles not addressed by other means. Each resident was paired with 2 Emergency Physician staff mentors (EPs) to directly observe them on clinical shifts. A survey was developed to assess the attitudes of residents and EPs towards the MO program. **Methods:** Using Dilman's methodology, confidential mail surveys were sent to all residents and EPs who participated between 7/2003 and 7/2004. A 7 point Likert scale was used (1 = strongly disagree, 7 = strongly agree). Responses were categorized; a score of 5 or higher was considered agreement. **Results:** Surveys were returned by 18/18 residents and 25/27 EPs (93%). All residents had at least 1 MO session. Only 68% of EPs participated in a MO session. The majority of residents (78%) / EPs (73%) enjoyed the MO sessions and felt they were a valuable learning experience (78% residents / 82% EPs). 72% residents felt they are rarely observed assessing / treating patients except during MO sessions. Average EPs time commitment was 6.4hours. Financial concerns did not limit any EPs participation and only 32% felt they should be financially compensated. Both residents (72%) and EPs (58%) felt it was difficult to arrange MO sessions. 67% of residents felt that performance anxiety changed their normal behavior. Residents (83%) and EPs (82%) felt that MO sessions should be a mandatory part of the residency curriculum. 92% of EPs were willing to be mentors again. **Conclusions:** Mentor-Observer sessions were an enjoyable and valuable learning experience for both residents and EPs. EM residents are rarely directly observed on clinical shifts. Despite scheduling difficulties and performance anxiety most participants felt MO sessions should be a mandatory part of the EM curriculum. Qualitative feedback from this survey will be used to guide further revisions to the MO program. **Key words:** resident evaluation, CanMEDs

373

Patient handover process in the emergency department - the Swiss proposal.

Sieber RS, Biewald W, Degani R, Klemmer U, Tobias P, Weimann T. Emergency Department, Ospedale Regionale di Lugano, *Switzerland*

Introduction: The chain of survival is an accepted concept for the coordination of the prehospital and hospital care. Existing literature does not consider a standard procedure for the patient handover process between EMS personal and the team of the ED. Neither do ACLS nor do ATLS consider this critical phase as part of their concept of care. A lack of a structure leads often to a gap in the care with misunderstandings and mistakes that cause often a temporary loss of the effectiveness. We herein propose a uniform standard for this process in the Emergency department aimed to improve these well-known problems and result in better care. **Methods:** A working party was created with members of EMS personal, ED nurses and doctors as well as a representative of HEMS. A new process was designed based on their daily work experience and locally existing concepts. **Results:** With meetings and e-mail discussions an initial version was presented to interested groups of personal and opinion leaders in the field of EMS and ED. Schools of EMS personal and ED nursing were contacted for critical review. These feedbacks were considered in the final version, which was approved by the Swiss society of emergency and rescue medicine. The resulting flowchart can be adapted to local conditions considering the different circumstances in our national health care system. The approved protocol is now recommended to be part of professional education of EMS and ED personal and may be adapted and integrated to local guidelines. **Conclusions:** A national standard has been established. We are convinced that a unification of different ways of handover processes will help to narrow the gap between the ending EMS care and initiating ED care. The adoptions of a national standard still needs more professional and political lobbying. We suggest that a similar concept should be a part of ATLS and ACLS care. Nevertheless, studies are needed to evaluate the impact on care and for further improvement to this proposed standard. **Key words:** patient handover, emergency medical services

374

The role of bedside teaching on cricothyrotomy practice at emergency department (ED) education/teaching.

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Introduction: Cricothyrotomy is a complex care procedure that is part of the core training for emergency medicine (EM). Young staff members must learn this technique during their residency training period. However, the gap between training and practice still exists. **Methods:** Three hospitals are compared. The ED of a regional hospital was visited as a control site and the skill of cricothyrotomy was evaluated through demonstration. Comparatively, a second teaching hospital had a train-the-trainer model, where a senior clinician received cricothyrotomy training approximately 10 years previously and held several emergency trauma training courses (ETTC) with staff to disseminate this technique. A decay period (3 years) following the departure of the peer educator was also examined. **Results:** At the regional hospital, staff admitted that they had never performed the procedure in the ED (usually they sent the patient to the operating theatre). With vigorous teaching and bedside demonstration, 10 out of a total of 11 emergency staff in the train-the-trainer model hospital could perform this procedure independently. In the decay period, this dropped to 1 out of 8 staff who could perform this procedure independently. **Conclusions:** Staff skills in complex procedures (e.g., cricothyrotomy, fasciotomy, pericardiocentesis, ECMO, tPA, tec) can be improved with a peer educator and resources; however, decay appears rapid when these dedicated resources are removed. Staff turnover make this educational endeavour important for the provision of high quality airway management. **Key words:** cricothyrotomy, medical education

375

Streaming educational conferences to improve resident learning and safety.

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Introduction: The purpose of this poster presentation is to share our approach to enhancing resident and staff education and safety through the deployment of web based streaming educational conferences. **Methods:** Weekly educational conferences are a cornerstone of resident education. Recent changes in the regulation of work hours have made the compulsory attendance at these conferences difficult. In addition, fatigue from being post call or overnight shift may make learning at these conferences less than optimal. The advent of streaming media technology has emerged to fill this gap. The Section of Emergency Medicine at the University of Wisconsin now records all educational conferences and converts

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the lectures into streaming video media that may be securely accessed by logging into our web site. Files may be streamed on demand or downloaded to a PDA for later viewing. Credit for conference attendance is earned by successfully completing a post test with five questions that are specific to the lecture. Conference credit for residents or continuing medical education credit (CME) for faculty is granted if three out of five questions are answered correctly. A certificate containing the users score, topic and questions are stored on the server database. Residents and staff are therefore not pressured into conference attendance when doing so may compromise their safety in traveling home after an overnight shift. **Conclusions:** Since knowledge retention is not ideal when one is fatigued, viewing the archived conference when a resident is well rested may increase learning. Resident education can be enhanced leaving no excuse for missing a conference on-line. **Key words:** on-line education, internet

376

Pre- and post-course examinations in an international emergency medicine educational intervention

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Introduction: The Tuscan Emergency Medicine Initiative is a comprehensive international collaboration designed to create a lasting emergency medicine training and credentialing process in Tuscany, Italy. The first phase of the project, Train the Trainers, was a 9-month course involving clinical rotations, didactic lectures and workshops. The participants were practicing physicians who worked in EDs throughout the region. Our goal was to create of a cadre of teachers who could train other physicians and future residents in the complete body of emergency medicine knowledge. **Methods:** The course was offered in two separate years. An oral exam consisting of four clinical case discussions was administered by an American delegation with considerable examiner experience. Four oral case topics were tested and measured on a 40-point scale. Additionally, a 75-question multiple choice exam was given in Italian. These exams were administered as a post-test to the first year's class and as a pre-test to the second year's class. **Results:** 62 physicians completed the pre-test and 24 completed the post-test. The characteristics and training backgrounds of the two groups were similar, as were the 9-month training programs. Scores in cardiology improved slightly (33.1 vs 34.6 points, p=0.60) as did scores in trauma (31.4 vs 33.8 points, p=0.21). There was significant improvement in pediatrics (17.8 vs 37.3 points, p<0.001) and neurology (24.8 vs 34.5 points, p<0.001). Scores on the multiple-choice exam improved significantly (38.7 vs 46.2 points, p<0.001). **Conclusions:** Comparison of identical pre- and post-tests in course participants who came from similar backgrounds and took a similar course showed significant improvement in the areas in which we concentrated their training. We believe that gaps in their emergency medicine knowledge base have been markedly reduced as a result of this course. **Key words:** international emergency medicine, education

377*

High-fidelity in-training examinations in emergency medicine are more stressful yet are associated with improved exam performance.

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Introduction: Performance of advanced cognitive skills is influenced by level of perceived stress. Residency programs vary in the fidelity and formality of their in-training examinations. Little is known about how examination conditions affect scores on in-training examinations. Objectives were o measure the stress felt by residents during high- and low-fidelity in-training examinations to determine the effect of this stress on examination performance. **Methods:** 28 visual stimuli questions were pilot tested on residents in two Royal College of Physicians and Surgeons of Canada (RCPSC) emergency medicine (EM) residency programs. Two exams matched for difficulty and length were then administered at two week intervals to residents in two additional RCPSC EM programs. One exam was administered under stress-inducing conditions (high-fidelity) and the other under low stress conditions (low-fidelity). Perceived stress was measured at baseline using the State and Trait Anxiety Index and before an after each iteration of the examination. Exams were scored by a third party blinded to the examination condition. **Results:** Residents reported higher anxiety in the high stress condition (41.2 ± 1.9 vs. 36.0 ± 2.1). Examination scores were higher in the high stress condition (68.3 ± 2.3% vs. 63.6 ± 2.1%). Mean exam scores in each of the PGY3 through PGY5 years did not differ based on stress condition. **Conclusions:** Residents in general do perceive higher stress in high vs. low fidelity examination conditions. Junior and senior residents exhibited similar perceptions of stress. Residents appear motivated by this stress, achieving higher scores in the high-fidelity format. **Key words:** resident evaluation

378

Accuracy of searching for emergency medicine articles in Cochrane.

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Background: Socrates in the EMJ has highlighted some important areas in emergency medicine where high quality systematic reviews have been undertaken in the Cochrane collaboration. Carley has highlighted that Socrates has however frequently been using outdated versions of the reviews because of the publication delay time. This project looks at how an accurate database of Cochrane reviews relevant to emergency care has been created. **Methods:** The Cochrane library was searched for all articles of relevance to emergency care. Several methods of searching were used, from a simple search on the word emergency, to a complex search strategy and searching manually. The gold standard search was a manual search by an information scientist sifting for potential relevance followed by review by an emergency medicine specialist. **Results:** Up to issue 2, 2005 of the Cochrane collaboration, 224 articles considered relevant to emergency care have been identified by manual searching and posted on the National Library for Health's emergency care specialist library. The complex search (which revealed 1052 completed reviews) detected 182 articles of these articles (sensitivity = 76%). A simple search using the term "emergency" retrieved 360 reviews of which 89 were relevant. Socrates found 61, but was performed on issue 4, 2001 when there were a total of 1750 protocols. There are currently 4113 reviews in the latest edition of Cochrane. **Conclusions:** Manual searching appears to be the only method of detecting a complete set of articles relevant to emergency care from the Cochrane Library. Criteria for determining relevance to emergency care are highly variable. The immediate availability and searching of the new releases enables NLH to have more up to date information than printed journals. New releases are now easily scanned manually and should provide a very sensitive way of detecting new systematic reviews relevant to emergency care. The database of Cochrane reviews relevant to emergency medicine is available at www.library.nhs.uk/emergency **Key words:** systematic reviews, literature searching

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379

Use of human patient simulators in the pre-hospital environment for multi-disciplinary training.

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Introduction: Personnel involved in the delivery of healthcare need to be trained in a variety of clinical skills and be able to demonstrate and adapt them to new clinical situations with a high degree of competence. Due to clinical governance and risk management it is unethical to practice on patients. Simulators enable such practice without exposing patients to risk, and can prove a valuable means for situational learning. Here we describe training in the pre-hospital arena using human patient simulators in vehicular entrapment scenarios to allow emergency service personnel to work and practice as a team. **Methods:** Two emergency teams from Royal Preston Hospital, Lancashire, UK were called to respond to two unrelated incidents of entrapment in vehicles with significant damage. Patient simulators were employed in each vehicle to take the place of a trapped driver. The pattern of patient injury was different in each vehicle. Both teams responded to the situations in real time. **Results:** The situational training environment provided a means to exercise individual and team skills within a scenario where targets for performance could be set. Both patients were successfully extricated and reached hospital for ongoing care within these targets. The results of this exercise were qualitatively assessed by debriefing all personnel involved. This assessment showed a considerable learning benefit for all participants. **Conclusions:** All personnel involved provided positive feedback on the benefit of the simulated learning environment. Further work should involve designing objective performance measures to quantify the learning value of the simulator in the pre-hospital environment. **Key words:** patient simulation, emergency medical services

380

Hands-on vehicle extrication experience enhances emergency medicine residents' understanding of prehospital care.

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Introduction: Emergency Medicine residents rely on the ability of prehospital care providers to recount details of vehicular incidents. Direct personal experience at a 'scene' is designed to help residents better understand: mechanism of injury, personal safety at the crash scene, vehicle extrication equipment and methods, and difficulties associated with patient extrication and as a result to be better able to communicate with on-the-scene personnel. A survey of Osteopathic and Allopathic Emergency Medicine programs revealed that only 21 % of responding Emergency Medicine Residency directors reported having direct hands- on vehicle extrication programs. **Methods:** In conjunction with a local volunteer fire department, first year residents perform actual hands-on vehicle extrication using hand and pneumatic tools to remove a live 'victim' from a vehicle. Instructional components include review of safety issues regarding the use of tools and devices; scene safety; personnel safety; as well as an overview of vehicle anatomy. **Results:** During the first year of the program, the resident class was divided between two different local fire departments. This proved not to be adequate, as one of the departments would allow observation only. This was deemed not an acceptable experience. Currently, a single fire company is used, with the educational program provided to two separate groups of five residents to assure an appropriate experience. **Conclusions:** Residents completing the program (now in its sixth successful year) report new and significant understandings of factors related to safe vehicle extrication as well as implications for medical treatment in the ED. Likewise, firefighters and paramedics report that during subsequent patient transports they feel substantially more comfortable relaying information, requesting orders and obtaining follow-up from the residents who have completed the program. **Key words:** emergency medical services, residency training

381*

Improving corneal tissue donation rates in an academic emergency department through physician education and reinforcement.

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Introduction: Despite increased demand for corneal donation, there is a recognized shortage of corneal donors. The purpose of this study was to determine whether a simple educational intervention and ongoing reinforcement of Emergency Physicians (EPs) could improve rates of corneal tissue retrieval in an academic emergency department (ED). **Methods:** In the pre-intervention phase, retrospective data was collected for all department deaths during the one-year period Sep. 01, 2000 to Aug. 31 2001, specifically whether donation was considered, the reasons for any exemption and whether consent was given. The intervention phase consisted of: (1) a single "grand-rounds" session on corneal donation (2) providing social workers to assist the EPs with stressed families (3) a quarterly "feedback letter" to all EPs reporting the latest approach and consent rates and encouraging EPs to request corneal donations. Data was then collected prospectively for the next year, Oct. 01, 2001 to Sept. 31, 2002. Following this, the "feedback letters" were discontinued and post-intervention data was collected prospectively for another year. **Results:** The pre-intervention rate of request was 26/91 (28.6%) with 11 (12.1%) donating. During the intervention phase, there was a significant increase in the numbers of families approached (43/72 [59.7%]) and donations (19/72 [26.4%]) This translated to absolute increases of 31.2% ($p < 0.001$, 95% CI 13.7–48.6) and 14.3% ($p < 0.05$, 95% CI 0.7–27.9) respectively. The educational intervention had a large effect size on numbers of patients asked for donation (Cohen's d = 0.65) and a moderate effect on numbers of corneas donated (Cohen's d = 0.36). However, with cessation of the reinforcement letters, rates of request (17/56 [30.4%]) and donations (6/56 [10.7%]) dropped to baseline. **Conclusions:** Our study suggests that corneal tissue donation rates can be dramatically improved with physician education and ongoing reinforcement. **Key words:** organ donation, education

382*

A multifaceted workshop for improving productivity and workflow efficiency skills in emergency medicine trainees.

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Introduction: ED crowding is a major challenge to the practice of EM yet training in improving throughput by enhanced productivity and workflow efficiency (flow skills) is rarely taught outside of the clinical context in residency training programs. The objective of this study was to determine if a 3-hour workshop designed to improve flow skills is perceived as having a useful impact on future practice. **Methods:** A faculty led workshop was developed focusing on four key areas of ED flow skills. Specific station objectives were designed to achieve: a. more concise charting, b. enhanced communication skills (signover and interacting with consultants), c. efficient management of minor care resources and d. efficient management of stretcher area resources. Groups of 7–10 participants rotated between

these 30-minute stations engaging in hands-on exercises related to each theme. Anonymous evaluations were completed by participants at the end of the workshop. Quantitative data was analyzed using descriptive statistics and qualitative feedback was summarized. **Results:** 100% of 31 participants (22 residents and 9 staff) completed the surveys. Among resident participants the mean PGY year was 2.3 (range 1–5) while mean years in practice for staff was 6.1 (range 2.5–15). Only 42% (12/31) reported that flow skills had been previously well-taught in their training or professional development. Workshop stations reported to be either helpful or definitively helpful included those related to charting (80%; 25/31), communication (84%; 26/31), minor care (80%; 25/32) and stretcher area care (97%; 30/31). Most participants 71% (22/31) reported the workshop experience overall to be definitely useful. 18 participants (58%) felt that more time was required for each station. **Conclusions:** A flow skills workshop designed to impart specific strategies for improving efficiency in the areas of communication, charting, and the utilization of minor care and stretcher area resources is perceived positively by participants. **Key words:** residency training, ED efficiency

383*

A nurse training program improves the identification of potentially septic patients in the emergency department.

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Introduction: The early identification and treatment of patients with severe sepsis in the emergency department (ED) improves outcomes. Nurses are the front-line workers who have first contact with septic patients, and should have an integral role in the early identification of these patients. The objective of this study was to compare the rate of correct identification of actual ED patients with potential sepsis before and after a brief education session surrounding sepsis. **Methods:** This study was conducted in an urban, tertiary care ED (65,000 visits/year). Over a 2 week period in January 2005, 15 trained triage nurses were asked to categorize consecutive ED patients as "potentially septic" or not. 2–4 weeks later, all ED nurses (including the triage nurses) underwent a 4 hour training session on sepsis and the identification of septic patients. In March 2005, the initial process of patient categorization (potentially septic or not) was repeated with the same triage nurses. Adjudication for accuracy of responses was based on 1 ICU and 2 ED physicians reviewing the medical record. "Potentially septic" was defined as 2 or more SIRS criteria (of those criteria that were identifiable at triage: temp >38 degrees C; <36 degrees C; HR >90; RR >20) and presumed/possible infection. **Results:** 15 nurses assessed a total of 272 patients preceding the education session, and 198 patients after. Sensitivity for potentially septic patients was 75% (95% CI 69.9–80.1%) before and 92.3% (95% CI 88.6–96%) after the education session. Specificity was 91.1% and 90.1%, respectively. A repeated measures non-parametric ANOVA demonstrated significant training effect ($p < 0.01$) and no significant differences between individual nurses ($p = 0.86$) **Conclusions:** A 4-hour educational session on sepsis significantly improved triage nurses sensitivity for identifying potentially septic patients. **Key words:** sepsis, triage, education

384*

The British Columbia Emergency Department Physician Workforce Study: education needs assessment for British Columbia emergency physicians.

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Introduction: An education needs assessment is required for appropriate planning of emergency medicine (EM) education. **Methods:** This was a cross-sectional survey in two parts: Part 1 was a telephone survey of all Emergency Department (ED) heads in ED in BC; Part 2 was a mail survey to all physicians who work in an ED in BC, either part-time or full-time. ED heads were asked about current education activities in their departments. Individual physicians were asked about their perceived needs for CPD. All mail surveys were coded and anonymous. **Results:** 87 of 101 (86.1%) ED heads completed Part 1 of the survey. 418/929 (45.0%) physicians completed Part 2. 66/87 (75.8%) of ED heads stated that their group provided most of their own education or research support. 32/87 (36.8%) received some educational support from their Health Region; 22/87 (25.3%) from a University source; 19/87 (21.8%) from their hospital. 72/87 (82.8%) felt that a University Department of Emergency Medicine would help with educational activities and support. ED heads felt that the following educational modalities would be most beneficial: speaker workshops (91%); written materials (78.1%); web-based learning (63.2%) and video conferencing (60.4%). In Part 2, 194/416 (46.5%) individual physicians expressed interest in extra EM training. 133/194 (68.5%) were interested in training of less than 2 weeks; 52/194 (26.8%) wanted extra training of 2–4 weeks duration. Physicians who were not EM-specialty trained were more likely to desire extra training (Chi-square = 59.9, $p = 0.001$). **Conclusions:** A significant proportion of physicians in BC wish to pursue further training in emergency medicine. The majority of ED leaders believed that most benefit is gained from having speaker presentations or writing material distributed although there is interest in web-based learning and video conferencing. Developers and providers of CPD need to take this information into consideration to best tailor their education activities to identified needs. **Key words:** continuing education

385

A critical review of recent developments in paramedic education in Australia.

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Introduction: This paper aims to highlight the recent key developments in Australian Paramedic education. **Methods:** Review of key documentation and follow-up phone consultations with leaders of Australian paramedic education centres. **Results:** The highlights of recent trends include: the formation of the Australian Paramedic Education Committee, a sub committee of the Council of Ambulance Authorities; theIntroduction of external accreditation of paramedic education programs in Australia, from 2006; pre employment paramedic degrees introduced in six Australian universities; evolution of university graduate programs for paramedics at the Intensive Care Paramedic, Educator, and Supervisor/Manager levels; increasing availability of masters programs, and an increasing number of paramedics studying at doctoral level; and increasing development of infrastructure for research to underpin paramedic education programs and the continued evolution of evidence based prehospital care. In parallel with these developments, there are a number of challenges which are being faced and explored including: transition of paramedic education from the technical education sector to the university sector, from being an industrial based to becoming professionally based, and, from undergraduate to graduate education; a search for appropriate education models and pedagogy; the availability and role of clinical placements in paramedic education; integrating with community based emergency health services; and thecontinued evolution of prehospital care as a discipline and of paramedics as health professionals. **Conclusions:** Substantial changes are in progress in paramedic education in Australia, which parallel the education directions

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taken by other health professions over the past 20 years. Evaluation of these current changes will hopefully seek to explore their benefits to patient outcomes, and illuminate ongoing quality improvement in paramedic education. These changes may well be in advance of the evolution of paramedic education in other countries. **Key words:** emergency medical services, education

386

Education in prehospital advanced life support — a thematic approach!

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Introduction: Pre-hospital Advanced Life Support (ALS) has its roots in a number of sentinel publications in the mid-1960s. Over the past 40 years, there has been an expansion in the definitions, scope of practice, settings and systems in which pre-hospital ALS is provided. The contextual debates have, until recently, overshadowed the evolution of conceptual frameworks to develop the necessary education programs. This paper asks, "is there light at the end of the tunnel?" **Methods:** Review of major international reports on paramedic education and a literature review. **Results:** Recent international publications propose a conceptual base for pre-hospital ALS education programs that are comprehensive and systematic. However, they are nationalistic in approach, and appear to lack a sustainable theoretical underpinning. A number of health care disciplines have recently evolved a thematic approach to education, including themes such as: Professionalism and personal development; Population health and illness in society; Service delivery in an integrated health system; Science, knowledge and evidence; and the discipline specific Clinical theme, underpinned by the basic, clinical and social sciences. These themes were used to underpin the development of one university-based, undergraduate degree program for Paramedics, which will be described. **Conclusions:** Major changes in primary health care in western countries have forced a re-examination of the provision of emergency care with an emerging emphasis on "Community-Based Emergency Health" (CBEH) in a primary health care and public health context. This requires pre-hospital ALS to re-examine its traditional education programs and consider not so much an introspective "scope of practice" clinical model, but rather a "scope of context" systems model, that reflects contemporary community-based health care delivery. The thematic approach to paramedic education can be achieved. Its evaluation will tell us if "the light is on at the end of the tunnel." **Key words:** emergency medical services, education

387*

Use of an online learning environment to support best practice in rural and urban emergency departments in Nova Scotia.

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Introduction: Knowledge is a critical element in the delivery of quality care in emergency departments (EDs). However, access to, and integration of, timely, relevant, and evidence-based information at the point of care is challenging for practitioners in a busy ED. The multitude of interruptions and the unpredictable nature of patient flow contribute to a less than optimal environment for learning at the point of care. As well, the volume and organization of scientific knowledge does not lend itself to just-in-time access to address practice issues that arise. Disparities are also apparent among practitioners in rural practice settings versus those in acute, tertiary care facilities. Information technology provides an alternative to the traditional face-to-face interactions ameliorating such issues as practice location, relevance, and accessibility. **Methods:** This multisite pretest/postest study involved delivery of web based learning modules over a period of 18 months to a convenience sample of emergency practitioners from 9 rural and 2 urban EDs in Nova Scotia. All content modules followed a standardized format. Exposure to module content was preceded by a pretest and followed by a posttest. **Results:** A total of 207 multidisciplinary practitioners participated in the study. An online needs assessment resulted in development of 12 content modules. Practitioners from rural centers represented over half (54%) of the total participants in the online environment. Eighty percent (n = 166) of participants were nurses and 14.9% (n = 31) were physicians. Participation rate in the modules varied with Pediatric Trauma (n = 78), Management of Poisons (n = 53), Diabetic Emergencies (n =38) and Immunizations (n = 30) attracting the most participation. Scores from pretest/post test resulted in a significant increase ($p < 0.05$). **Conclusions:** Information technologies present additional options for rural and urban ED practitioners to access and share relevant practice knowledge at a time and pace that is convenient in their practice context. **Key words:** on-line education

388*

Participation and interest in research in emergency departments (EDs) in British Columbia. The British Columbia Emergency Department Physician Workforce Survey.

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Introduction: Emergency medicine (EM) research is typically carried out in large, university-affiliated teaching hospitals. Barriers to conducting EM research in other settings include perceived lack of interest as well as infrastructure issues. The BC Emergency Department Physician Workforce Survey sought to describe the amount of time emergency physicians spend engaged in teaching and research, the proportion of EDs that are involved in research and which have an interest in research. **Methods:** This was a cross-sectional survey in two parts: Part 1 was a telephone survey of all ED chiefs; Part 2 was a mail survey to all physicians who work in an ED in BC, either part-time or full-time. In Part 1, ED chiefs were asked if they currently participated in research studies and if their department would be interested in participating in research, given the opportunity. EDs were identified from the BC College of Physicians and Surgeons hospital directory. An ED was defined as any publicly-funded facility that accepts and treats patients on an emergent basis. Standard survey methodology was followed. Part 2 of the survey asked physicians how much time they spent per week involved in teaching and research. **Results:** 87/101 (86.1%) ED heads completed Part 1 of the survey. 418/929 (45.0%) physicians completed Part 2 of the survey. 21/88 (23.8%) of EDs were involved with research. 18/21 of these sites had residents versus 3/21 that did not (Chi square = 8.1; $p = 0.004$). 15 sites involved in research had >14,000 visits per year versus 6 research sites with <4,000/year (Chi square = 5.1; $p = 0.02$). 52/66 (78.8%) sites not currently involved in research were interested in becoming involved. **Conclusion:** EDs involved in research tend be larger, and are more likely to have residents. However, 78% of sites not participating in research were interested in doing do. **Key words:** research, resident education

389

Interactive basic sciences for emergency medicine : the EMERG workshop.

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Introduction: There is renewed and significant interest in the key role of the applied basic sciences during clinical postgraduate training in Emergency Medicine. Core knowledge requirements, and

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models of effective learning, are challenges to be faced in the context of relentless service pressures, both in the UK and internationally, alongside restricted working hours and shortened training pathways. **Methods:** With these issues in mind, the UK Faculty of Accident & Emergency Medicine Educational Research Group (EMERG) presents an interactive workshop which will take participants through a series of virtual patient consultations. In each, the assessment and management are frozen at key points to allow debate of the core basic sciences implicated in that patient. Key aspects of anatomy, physiology and pharmacology pivotal to the consultation are highlighted and developed. The virtual consultations are then brought to a close and the sessions summarised. The format provides for an enjoyable and effective way of appreciating and learning relevant core basic sciences for Emergency Medicine. **Results:** The changing face of applied basic science: Studies from the UK, mainland Europe and Canada have formalised the concerns raised anecdotally by many: undergraduate reforms to both the content & style of medical teaching have de-emphasised the importance of basic science in the curriculum.. Problem-based learning and curricular integration at medical school have replaced many traditional opportunities for basic science knowledge acquisition, yet postgraduate examinations and autonomous clinical practice in the Emergency Department still demand a thorough knowledge of key basic science. There are very limited opportunities to learn the material in service-based clinical medicine. The EMERG group is systematically deriving required knowledge content and finding effective teaching styles to acquire it. This workshop illustrates our progress and shows how basic sciences can be learned in the workplace. **Conclusions:** Knowledge and application of the core basic sciences is an international fundamental to safe clinical practice in the E.D. Integration of this learning into postgraduate training is troublesome yet essential. Our workshop will equip participants with an appreciation of the importance of the basics in every clinical encounter and moreover to provide useful hints, tips and ideas on effective learning and teaching styles to help resolve the tensions of service delivery and knowledge acquisition. **Key words:** medical education

390

Structured trainee assessment in the Emergency Department: CEX, PATS and DOPS.

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Introduction: The implementation of the Modernising Medical Careers UK Foundation Programme involves a programme of structured clinical trainee assessments during time spent in the Emergency Department. The quality and quantity of assessment required for each trainee mandates careful planning. Pilot sites for Foundation Training in UK Emergency Medicine were established in 2004 prior to national implementation. We report our experiences as one such site and suggest practical ways in which others may plan integration of Foundation Training into their Departments.**Methods:** In August 2004 we introduced four Foundation Year 2 trainees into the Emergency Department workforce. Placements were for a period of 4 months. Generic teaching was provided on a weekly basis throughout the year alongside specialty teaching with the other Senior House Officers. Protected sessions were set aside for structured clinical assessments based upon the requirements of the Foundation Programme. **Results:** Our Foundation Year 2 trainees have been well-motivated and keen to learn within the context of a novel programme of professional development. We have not perceived deficiencies in standards of knowledge or care based upon a 4 month rather than 6 month placement in the ED. There is a significant impact upon service delivery at Consultant level stemming from the need to assess four trainees in several domains of learning within four months. We have realigned job plans to allow for this. **Conclusions:** The introduction of Foundation trainees is exciting and stimulating. They are well-motivated but this implies that their teaching and assessment needs are met. Assessment burdens are heavy and this mandates refreshed job plans and protected time. We have developed our recommendations as a package suited to workshop discussion or oral presentation and believe them to act as a key tool for others. **Key words:** medical education

GERIATRICS TRACK

391

Digoxin toxicity in the emergency department.

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Introduction: In general practice, digoxin is prescribed for controlling heart failure in patients with atrial fibrillation or atrial flutter. Deterioration of renal function may occur during heart failure treatment and it may cause digoxin overdose. This study was to screen patients at risk of digoxin toxicity while interviewing emergency department (ED) patients with non-specific complaints. **Methods:** There are about 86,400 ED visits per year at our hospital. We included all ED patients who had digoxin level determination in the past year (Dec 2004 to Dec 2005). The normal range for digoxin is from 0.5 to 2.0 ng/ml. All drug level determinations were done in our emergency-laboratory unit. We also collected patients' renal function, potassium level, co-morbidity and prognosis. Pediatric patients were excluded from this study. **Results:** There were 11 cases of absolute digoxin overdose (level higher than 3 ng/ml). Digoxin levels were from 3.09 to 4.93 ng/ml. The chief complaints of these patients were: “Palpitation for days”, “falling down due to dizziness”, “poor appetite and nausea and vomiting for a week”. Renal function range (Creatinine) was from 0.7 to3.6 mg/dl. Potassium level range was from 2.9 to 5.7 mg/dl. Nine patients survived to discharge and one case expired. This patient suffered from a fall and digoxin overdose (3.03ng/ml) with drug related coagulopathy. INR was 2.64 (anticoagulation treatment for aortic stenosis post valve replacement),. The tragic result was brain death due to traumatic SDH with brain stem compression. **Conclusions:** Many ED patients present with non-specific complaints. . You should pay more attention to digoxin drug levels in older patients with renal function deterioration who complain about malaise or GI upset, especially if he/she has a history of arrhythmia. After admission, supportive care and clinical follow up, these patients can usually be smoothly discharged without major sequelae. **Key words:** digoxin toxicity, clinical presentation

392

Reuscitation outcomes and clinical characteristics of non-traumatic out-of-hospital geriatric cardiac arrest.

Kim H, Kim SH, Lee KH, Hwang SO.

Introduction: This study was to investigate the resuscitation outcomes and the clinical characteristics of geriatric non-traumatic out-of-hospital cardiac arrest by analyzing data from a single institution's registry. **Methods:** We conducted a retrospective study of 804 patients who came to the emergency department with non-traumatic out-of-hospital cardiac arrest during the period 1991-2002. Only patients over 18 years of age were included. Clinical characteristics, variables associated with cardiac arrest, and data during resuscitation were obtained from our cardiac arrest database. Patients were divided into two age groups: less than 65 years of age (non-geriatric group, n=530), and over 65 years of age (geriatric group, n=274). **Results:** The proportion of cardiac etiology was higher with the geriatric group than with the

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non-geriatric group (48% vs 39%, $\chi 2$=0.013). A lower incidence of ventricular arrhythmia was observed in the geriatric group (8% vs 13%, $\chi 2$=0.037). The arrest time, the CPR time, the witnessed arrest, the epinephrine doses, and total defibrillation energy were not different between two groups. Spontaneous circulation was restored in 127 (46%) patients in the geriatric group and in 255 (48%) patients in the non-geriatric group ($\chi 2$=0.382). The patients discharged alive numbered were 33 (6%) in the non-geriatric group and 10 (4%) in the geriatric group ($\chi 2$=0.138). **Conclusions:** Cardiac etiology was predominant in geriatric cardiac arrest and a lower incidence of ventricular arrhythmia was observed. An older age (over 65 years) did not affect the resuscitation outcome. **Key words:** cardiac arrest, geriatrics

LABORATORY TRACK

393

Evaluation of the sensitivity and specificity of a bedside troponin T assay compared with a laboratory gold standard in an Australian emergency department.

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Introduction: Troponin T and troponin I are sensitive markers of myocardial infarction and elevated levels are associated with increased short term mortality. Bedside test machines have been developed as an alternative to central laboratory testing. One such test, the Cardiac Reader, is currently in use in Australian emergency departments, particularly in regional areas where there is no 24hr laboratory pathology service. The aims of this study were to evaluate the sensitivity and specificity of a bedside troponin assay (Cardiac Reader, Roche) compared with a laboratory gold standard (ACS:180, Bayer) under clinical operating conditions in an emergency department. **Methods:** This was a prospective, blinded, validation study of diagnostic accuracy. Blood samples were taken from consecutive patients presenting to a busy metropolitan emergency department with symptoms of shortness of breath or chest pain suspected of being due to cardiac ischaemia. Each sample was tested on both the bedside and laboratory assay and the results presented in a two by two table. The outcome measures were sensitivity, specificity, positive and negative predictive values. Confidence intervals were calculated for each result. **Results:** 369 blood samples from 347 patients were analysed. There were 312 negative and 57 positive results for elevated troponin using the gold standard laboratory test. 6 patients had falsely negative results using the bedside test. The sensitivity for the bedside test was 89.5% (78.5%-95.0%) and specificity was 96.5% (94.6%-98.4%). Negative and positive predictive were 98.0% (96.6%-99.5%) and 82.3% (78.4%-86.2%) respectively. **Conclusions:** The sensitivity of the Cardiac Reader in this study is too low for the test to be confidently used by clinicians to rule out myocardial infarction in emergency departments. There needs to be more research to validate the test under operating conditions if the machine is to be used where there is no 24 hour laboratory assay service. **Key words:** cardiac enzymes, bedside testing

RURAL AND REMOTE TRACK

394*

Oligoanlagesia in isolated lower limb injuries in a rural emergency department.

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Introduction: Multiple studies over many years have demonstrated that pain is poorly managed in the Emergency Department (ED). This phenomenon is referred to in the medical literature as "oligoanalgesia". However, little is known if oligoanalgesia is also true in rural ED. National Research Corporation (NRC) data from 2003 for a rural hospital in southwestern Ontario showed patients were satisfied with the amount of pain medicine received in the ED. A study was designed to replicate a previous study investigating the differential use of analgesia in isolated lower limb injuries to quantify if pain is better addressed in this rural ED. **Methods:** A retrospective chart review of isolated lower extremity injuries for which xrays of the foot and/or ankle were obtained in 2003. Demographics of the ED patients with lower extremity injuries were quantified. Also, whether or not patients received analgesia in the ED, how long it took to get the medication, whetherpatients received analgesia upon discharge, what type of analgesia was provided and ir it required a prescription. **Results:** A total of 228 charts were reviewed with exclusion criteria being met in 39 of the charts. This left a total cohort of 189 charts with 35 having fractures identified (18.5%). Patients with fractures were almost four times more likely to receive analgesia in the ED (46% vs 13%). Over half the patients in both groups received analgesia upon discharge from the ED. However, 73% of the people in the fracture group received analgesia requiring a prescription versus only 46% in the non-fracture group. Narcotics were used more often in the fracture group than in the non- fracture group (26% vs 6%). **Conclusion:** Oligoanalgesia observed in urban EDs does not seem to be a big a problem in this rural ED with patients presenting with a lower limb injury requiring an xray. Further studies should be done to see if other painful conditions are addressed as well and if so why. **Key words:** rural emergency medicine, analgesia

395*

Training emergency medicine doctors for rural and regional Australia: Can we learn from the Canadians?

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Introduction: Like Canada, Australia has a relatively small population dispersed over an enormous area. Both countries have difficulty in recruiting health professionals to rural and regional areas. Like colleagues in other specialties, most emergency medicine specialists choose to practice in large metropolitan hospitals. Most of the presentations to emergency departments in rural and regional areas of Australia are dealt with by 'non-specialist' doctors. There is limited data on clinical outcomes in smaller emergency departments. Apart from general practice training, there is little formal training available for doctors working in these areas. There is no equivalent to the Canadian CCFP-EM qualification. **Methods:** This study reviewed advertisements for emergency medicine doctors, consulted with multiple stakeholders, and undertook a detailed survey of 230 doctors working in 57 rural and regional emergency departments across Australia. **Results:** There is no consistent approach to levels of training and education required by potential employers. There are widely differing views on how rural emergency medicine services should be organized, resourced and staffed. The rural and regional emergency medicine workforce is increasingly overseas trained and lacking in relevant postgraduate education or formal continuing medical education. Many of the respondents have significant additional clinical and administrative responsibilities besides emergency medicine. Most report multiple dissatisfactions with their current position - principal reasons being work load, working hours, staff shortages and lack of education. Many have come to their current job from a similar rural position. Most are planning to move to a different hos-

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pital or clinical area. **Conclusions:** The rural and regional workforce generally feels undervalued, under trained and lacking a career structure. There is need in Australia to offer a specific postgraduate Diploma or Certificate in Emergency Medicine aimed at doctors practicing outside major city hospitals. **Key words:** rural emergency medicine, residency training

396

A rural emergency medical retrieval service - patient data & outcomes.

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Introduction: In October 2004 we established a helicopter based rural Emergency Medical Retrieval Service to support rural and remote communities within our healthboard area. Our service provides consultant led care for critically ill and injured patients within remote and rural healthcare facilities. Consultant emergency physicians and anaesthetists/intensivists from two hospitals in Paisley and Glasgow staff the service. We cover an area of 7900km2 with twenty-six inhabited islands and seven GP run community hospitals. This service is unique within the United Kingdom. **Methods:** Data is collected prospectively for each patient on a unique data capture sheet recording aircraft used, times of calls, patient physiology, procedures, diagnosis, complications and disposition. We wish to present data from medical retrieval missions carried out over the first eighteen months of our service (October 2004 – April 2006). **Results:** We will have a series of approximately 60 patients with a high level of acuity. Approximately 60% of our patients require ventilation. 40% require a procedure other than ventilation (eg chest drain, external pacing). 50% of patients require invasive monitoring. 40% of patients require drugs without normal paramedic protocols excluding anaesthetic drugs and opiates (eg phenytoin, GTN). We wish to report on the demographics of patients, transport used, activation and transport times. We also wish to report on patient physiology, medical conditions and interventions performed. We also wish to report on induction drugs used, patient physiology and complication rates associated with RSI. We also wish to report on patient destination, triage rationale and outcome using TRISS methodology and APACHE II and SAPS II scores. **Conclusions:** Preliminary data from the first 12 months suggests a need for this service and a non-significant trend towards improved outcomes. We anticipate this will have reached statistical significance by April 2006. **Key words:** emergency medical services, rural emergency medicine

397

Development of e-ambulance service in Taiwan

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Introduction: The focal research point of this project was to build up a prototypic e-ambulance system, which possessed the ability to receive/send distance and many way messages in real time. **Methods:** The hardware system included a portable patient monitor, web cam, PC microphone, GPS receiver, WCDMA PC card, and a NB (notebook PC). The NB was used as an information collection and transmission controller, connected to the internet by way of WCDMA. All of the information collected was sent to a control center through the internet. Any authorized user, such as a staff of public health or fire control organization, could link to the home page of the control center to get this information. **Results:** To verify the performance of this project, a site in Jianshih area of Hsinchu County was chosen as a practice place to perform the e-ambulance exercise. The subject matters of this exercise included image transmission, physiological parameters transmission, GPS positioning, and the performance of on-line medical direction with the help of a web meeting. The process of the exercise was smooth; it showed that some tasks, such as online medical direction and defibrillation, could be performed by an EMT on the ambulance. **Conclusions** The outcome of this research showed that the application of this system was not only useful in remote districts, it also could be applied to patient referral services, pre-hospital online medical direction and emergency medical stations. Accompanying the popularization and improvement of WCDMA services, the system function will simultaneously mature. However, it is still in the development phase this year In the future, how to standardize and popularize the system is important. **Key words:** Ambulance, Patient Monitor, WCDMA(Wideband Code Division Multiple Access), GPS(Global Position System)

398

Assessment of basic trauma care facilities in public health infrastructure of a developing country.

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Introduction: The purpose of this survey was to evaluate the skills and knowledge of health care providers at different levels of public health care systems and identify areas with potential for significant improvements in treating trauma patients with reference to the WHO essential trauma care guidelines for developing countries. **Methods:** This survey was done by an Emergency Medicine resident and a hospital administration trainee under the guidance of a Senior Emergency Physician of a tertiary care hospital. 19 primary ,8 secondary and 2 tertiary care centers in the public health sector were included in this study. The data was collected by facility visit, direct interviews and pre-set questionnaires. **Results:** The following analysis of the data collected describes the percentage of the knowledge and skills possessed by the health care provider versus the essential equipment available at the facility.. Knowledge & Skills vs Essential Equipment & Supplies: Primary Health Care Centre: Airway 52% 74%; Breathing 40% 68%; Circulation 60% 76%; Secondary Health Centre; Airway 45% 84%; Breathing 45% 82%; Circulation 52% 78%; Tertiary Health Centre: Airway 64% 76%; Breathing 50% 100%; Circulation 78% 91%. **Conclusions:**Doctors in all facilities lacked training in trauma care. Although most of the equipment is present it was not properly utilized, because of lack of manpower and lack of training. Though an integral part of trauma care, rehabilitation was highly neglected at all levels. There was lack of communication and inter facility transportation services, and valuable time was lost in initiation of treatment for trauma. **Key words:** trauma care, rural emergency medicine

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