

Airway

01 PROSPECTIVE STUDY OF EMERGENCY RAPID SEQUENCE INTUBATION BY ANAESTHETISTS AND NON-ANAESTHETISTS

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Aims: To identify characteristics and complication rates of rapid sequence intubations (RSI) performed outside the operating theatre by physicians working for the intensive care department (ICU) with and without previous training in a formal anaesthetic post.

Design: Prospective non-randomised study of all non-operating theatre emergency RSIs performed by ICU doctors in a busy district general hospital from August 2000 to December 2000. Three groups of RSIs were compared: those performed purely by non-anaesthetists (alone or supervised by other non-anaesthetists = non-anaesthetist group: NA); those performed purely by anaesthetists (alone or supervised by other anaesthetists = anaesthetist group: A); and those performed by non-anaesthetists but supervised by an anaesthetist (=mixed: M). The term anaesthetist was used for any doctor with at least six months experience in an anaesthetic training post prior to their ICU attachment.

Results: 152 RSIs were performed (A 38, NA 62, M 52). Overall complication rates were similar between A (42.1%), NA (43.5%), and mixed group (46.2%). The NA and mixed groups intubated a greater proportion of patients with hypoxia or respiratory failure (A 34%, NA 45.2%, M 50%), and had a greater desaturation rate (A 15.8%, NA 25.8%, M 28.8%). Anaesthetists were more likely to omit pre-oxygenation (A 2.6%, NA 0%, M 1.9%) or cricoid pressure (A 5.3%, NA 0%, M 0%), but less likely to require their supervisor to complete the intubation (A 5.3%, NA 12.9%, M 19.2%). Complication rates were lowest in patients intubated in the ED (9/53=17%) compared with the ICU (36/68=53%), the medical admissions unit (3/5=60%) and the wards (16/26=62%).

Conclusion: Physicians trained by the intensive care department without prior anaesthesia experience can safely perform RSI with a complication rate similar to those performed by anaesthetists, although the high overall complication rate reflects the severity of illness in this patient group. In our study RSIs in the ED were associated with a lower complication rate than those performed in other non-theatre settings. This study represents the preliminary analysis of an ongoing prospective emergency airway database.

01a EMERGENCY DEPARTMENT RAPID SEQUENCE INTUBATION IN HEAD INJURED PATIENTS: RETROSPECTIVE AUDIT OVER A FIVE YEAR PERIOD

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Aims: To examine the profile of intubations of head injured patients to identify quality of documentation, complication rates, grade and experience of intubating physician, and appropriateness of anaesthetic technique used.

Design: Indicator-based and descriptive audit based on retrospective casenote review of 101 patients with head injuries intubated in the emergency department and subsequently admitted to the intensive care unit from 1 January 1995 to 31 December 1999 in Portsmouth, United Kingdom.

Abstract 1 Table 1

	Total Anaesthetists		Total Non-anaesthetists		Mixed (Non-anaesthetists supervised by anaesthetists)		Total
		%		%		%	
RSIs done	38		62		52		152
Failed intubation (done by supervisor)	2	5.3	8	12.9	10	19.2	20
Pre-oxygenation omitted	1	2.6	0	0	1	1.9	2
Cricoid pressure omitted	2	5.3	0	0	0	0.0	2
Complicated intubations	16	42.1	27	43.5	24	46.2	78
Desaturation	6	15.8	16	25.8	15	28.8	37
Hypotension	8	21.1	13	21	10	19.2	31
Mean laryngoscopy grade (Cormack-Lehane)	1.42		1.5		1.52		
Hypoxia /resp failure preRSI	13	34	28	45.2	26	50	

Results: Rapid sequence intubation (RSI) was performed in 98% of cases. There was a failure to document pre-oxygenation or cricoid pressure in half the cases. The main indication for intubation was coma. Where the name of the doctor was identifiable (57%), half the intubations were done by non-anaesthetists working on the intensive care unit. Although 19% can be classed as difficult airways, the significant complication rate was low (6%). Children under 16 years comprised 23% of patients. The majority of intubations were performed by senior house officers. The audit identified important areas for teaching, such as the replacement of cervical collars with in-line manual stabilisation, and the modification of induction agent doses to avoid hypertension.

Conclusion: RSI in head injured patients can be performed in the emergency department by junior ICU medical staff without formal anaesthetic training, with low documented complication rates. A prospective study is required to confirm this. Audit identified important learning points for future ICU medical staff training.

Cardiovascular medicine

01b ROMEO: A RAPID RULE OUT STRATEGY FOR LOW RISK CHEST PAIN: SIX MONTH FOLLOW UP

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Aims: To evaluate the safety, effectiveness, and acceptability of the 'ROMEO' (Rule Out Myocardial Events on 'Obs' Ward) pathway for low risk patients with chest pain.

Methods: A prospective study was undertaken to determine outcomes for the first 100 patients to enter the pathway (from May to Oct 1999). Serum troponin levels, serial ECG recordings, exercise test result, total length of stay, and final diagnoses were reviewed.

Patients were telephoned after discharge to enquire about persisting or recurrent pain, further investigations, and satisfaction with the ROMEO pathway.

Results: 82/100 (82%) had myocardial damage excluded by serum troponin assay. 62/82 (76%) of these completed an exercise tolerance test (ETT). 57/62 (92%) ETTs were negative. 20/82 (26%) were not put forward for ETT due to mobility problems, recent ETT or if considered very low probability of cardiac pain on consultant review. 5/100 (5%) had an elevated initial troponin and 5/100 (5%) had an elevated 12 hour troponin. These patients were referred for admission under the general physicians. 7/100 (7%) were referred for other reasons (late ECG changes, continuing or worsening pain). 1 patient self discharged. Length of stay varied due to changes to arrangements for ETT. The median time for all patients over the period studied was 23 hours. All patients were discharged within an hour of a negative ETT.

Follow up results: 67/74 (91%) eligible patients were contacted by telephone. 46/67 (69%) had had no further pain, attendances or GP consultations. 6/67 (9%) had further cardiological investigation or treatment. 61/67 (91%) were satisfied with the ROMEO pathway. 60/67 (89%) were reassured by the outcome.

Conclusions: The ROMEO pathway is safe and effective and provides standardized and consistent evaluation. Inpatient stay and time to rule out cardiac damage and perform ETT are significantly quicker than previously obtained in this hospital. Patients are highly satisfied and reassured by the pathway.

02 FEASIBILITY STUDY OF A CHEST PAIN EVALUATION UNIT IN A DISTRICT GENERAL HOSPITAL

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Introduction: There is a substantial body of evidence demonstrating the cost and clinical effectiveness of chest pain evaluation units (CPEU) in the management of patients with acute chest pain deemed to be at low risk of acute myocardial infarction.¹ Most of this evidence is based on experience in the US and may not be applicable to practice in the UK. We carried out this study to determine the potential effect of a chest pain evaluation unit in our hospital.

Methods: We identified all patients admitted with a principal diagnosis of acute chest pain over a three-month period. Patients admitted through A&E and the acute medical admissions ward were included. The hospital notes of these patients were retrospectively reviewed for the following information: admission and discharge diagnosis, duration of admission and investigations performed. In addition, we extracted data to facilitate the application of the Goldman algorithm (a validated tool for stratifying chest pain patients according to risk of myocardial infarction (MI) and exclusion criteria common to many US CPEUs).

Results: 472 patients were admitted with acute chest pain over the three-month period. The clinical notes were available for 457 (97%). Details of the admission diagnoses are as follows: acute myocardial infarction - 51 patients (11%), unstable angina - 194 (43%), other diagnosis requiring admission (e.g. suspected pulmonary embolism) - 71 (15%). The remaining 141 patients (31%) were admitted with chest pain of possible cardiac origin. Of this last group, 97 (69%) were classified as being at low risk for MI according to the Goldman algorithm. When patients with complications of acute myocardial ischaemia (e.g. hypotension) were excluded, this number reduced to 92. 60 of these patients were admitted directly to the acute medical admission unit (via their GP) and 32 through A&E. Overall, 20% (95% CI 16–24%) of patients admitted to the hospital with acute chest pain would have been suitable for a CPEU. 1 patient (1%) in the low risk group had a discharge diagnosis of AMI compared with 9 (21%) of those deemed at high risk by the Goldman algorithm.

Conclusions: This study has shown that introducing a CPEU would have a modest impact on chest pain management in our hospital, managing approximately one patient per day. Most of the eligible patients were admitted through the acute medical admissions unit and the study does not support the institution of a CPEU by A&E for A&E patients. The low number of suitable A&E patients may reflect efficient functioning of the 'medical expected' system. The proportion of potentially suitable patients is lower, and that of patients with an admission diagnosis of an acute coronary syndrome higher, than that reported elsewhere in the UK². This may reflect the well documented increased prevalence of ischaemic heart disease in South Wales. Local factors affect the potential impact of chest pain evaluation units in individual hospitals and their widespread introduction may not provide the expected panacea for acute chest pain management.

1 Quin G. Chest Pain Evaluation Units. *J Accid Emerg Med* 2000;17:237–40.

2 Goodacre S, Morris F, Arnold J, et al. Is a chest pain observation unit likely to be cost saving in a British hospital? *EMJ* 2001;18:11–14.

03 COST ANALYSIS OF A CHEST PAIN OBSERVATION UNIT

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Background: Chest pain observation units (CPOUs) have developed in the United States because they are cost saving compared to routine care. We have previously estimated the cost of routine, inpatient management of low-risk patients with acute chest pain to be £356 per patient at our hospital (£458 with interventional cardiology costs included). This study aimed to reproduce a CPOU in a British hospital and the estimate the cost per patient of providing this service.

Methods: A CPOU, consisting of ST segment monitoring, serial ECG, cardiac enzymes, and exercise testing, was set up in the A&E department. Data was collected prospectively over one year. Costs were estimated using routine hospital financial data.

Results: 534 patients were assessed on the CPOU. 117 patients (21.9%) required overnight admission before assessment (estimated length of stay 12 hours). 73 patients (13.7%) were admitted after assessment (mean length of stay 91 hours). During the following six months 16 angiograms, 6 angioplasties, and 4 coronary bypass grafts were performed. The mean cost of assessment and hospital admission was £221 per patient (£323 if subsequent interventional cardiology costs were included). If it is assumed that 65% of CPOU eligible

patients would be admitted to hospital, and 35% discharged, if the CPOU were not there, the costs of CPOU and routine care will be equivalent.

Conclusions: The cost-effectiveness of CPOU care depends upon the proportion of CPOU-assessed patients who would have been discharged if the CPOU were not there. CPOU will be cheaper if this proportion is less than 35%.

04 PSYCHOLOGICAL MORBIDITY AND HEALTH-RELATED QUALITY OF LIFE OF PATIENTS ASSESSED ON A CHEST PAIN OBSERVATION UNIT

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Study objectives: To measure psychological morbidity and health related quality of life among patients attending hospital with acute chest pain; both at presentation and one month after rigorous assessment for cardiac disease.

Methods: Consecutive patients undergoing assessment on the Chest Pain Observation Unit of a large, urban emergency department, were asked to complete three questionnaires- the Short Form-36 Health Survey, the Euroqol Health Utility Questionnaire, and the Hospital Anxiety and Depression Score. The same questionnaires were completed by postal survey one month later, along with a questionnaire documenting subsequent pain and reassurance.

Results: 19% of participants were suffering moderate levels of anxiety and 12% moderate levels of depression. Health utility and all dimensions of quality of life were substantially below age-adjusted normal values. One month after assessment only the pain dimension of SF-36 had significantly improved. Most scores were unchanged, while the physical role and mental health dimensions of SF-36 had significantly deteriorated. 64% of patients had suffered further pain after discharge. Despite these findings, 40% of patients said their assessment was "completely reassuring" and a further 46% found it "quite reassuring".

Conclusion: Patients with acute, undifferentiated chest pain have substantial psychological morbidity and impairment of quality of life. Although patients claim to be reassured by Chest Pain Observation Unit assessment, we found no evidence of improvement in anxiety, depression or quality of life.

05 PRE-HOSPITAL THROMBOLYSIS: THE RATIONALE, LESSONS FROM SWEDEN AND APPLICATION TO THE UK

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Introduction: Acute myocardial infarction (AMI) is one of the leading causes of death in the United Kingdom (U.K.). Thrombolysis is a treatment that can produce a substantial improvement in outcome, and this improvement is directly related to the speed with which it is delivered. As a result of this, the recently published national service framework for coronary disease established a target "call to needle" time of 60 minutes or less. Current arrangements for the delivery of thrombolysis are unlikely to meet this target without a profound change in philosophy. "Telemedicine" (literally, medicine at a distance) can be used to facilitate pre-hospital thrombolysis by transmitting an electrocardiogram (ECG) from ambulance to hospital. In mainland Europe, and particularly in Sweden, pre-hospital thrombolysis is already a reality. The principal author therefore undertook a research visit to Sweden to study the potential applications of this technique in the UK.

Objective: To study the successful implementation of telemedically supervised, paramedic delivered thrombolysis in Sweden, and to consider ways in which a similar system could be introduced in the U.K.

Methods: In November 2000 a series of research visits were undertaken, including visits to Uppsala Hospital and dispatch centre, ambulance stations in several counties of Sweden, an international manufacturer of ambulance vehicles and Darlana County, which has one of the longest experiences of telemedicine-supported pre-hospital thrombolysis in the world. Stages in successful implementation, and potential barriers to change, were identified in order to construct a template for application to U.K. practice.

Results: Two-thirds of the hospitals in Sweden now have some form of pre-hospital thrombolysis. There are three available technical solutions, each with distinct advantages and disadvantages. A nation-

ally agreed and standardized training program and the fact that many ambulance paramedics are also qualified nurses has facilitated successful introduction, but Sweden's low population density is also an important factor. Audit in Darlana County indicates that the mean "call to needle" time has been reduced by 55 minutes with a concurrent reduction in complications from 50% to 25% ($p=0.018$). In-hospital mortality was also reduced from 12% to 6%, but with the small numbers involved this improvement does not achieve statistical significance ($p=0.36$).

Conclusion: If the outcome of AMI in the UK is to be improved, and National Service Framework targets met, then pre-hospital thrombolysis is a promising development worthy of serious consideration. Several technical solutions already exist, and a single bolus thrombolytic agent will be available in the near future, but the main barriers to successful implementation are related to the establishment of an effective training programme and the organisational changes that will facilitate this alteration in practice. High-quality research is urgently needed to guide the implementation of pre-hospital thrombolysis in a clinically and cost effective way.

06 MEETING NATIONAL SERVICE FRAMEWORK GOALS FOR PATIENTS PRESENTING WITH ACUTE MYOCARDIAL INFARCTION

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Introduction: The National Service Framework (NSF) for Coronary Heart Disease has established standards for the management of patients with acute myocardial infarction (AMI). All aspects of clinical audit are demonstrated in this study and show that by effecting change these standards are achievable in a busy inner-city Emergency Department.

Methods: Relevant data was collected for patients receiving thrombolysis in ED between February and December 2000. All cases were reviewed at monthly multi-disciplinary audit meetings. Regular feedback was targeted at clinical staff involved in thrombolysis.

Results: 124 patients were thrombolysed over the eleven month period. Seven were excluded because of inadequate data collection. 85 (73%) were eligible for thrombolysis on admission (suspicion of AMI with ECG evidence of ST elevation or left bundle branch block and no contraindications to immediate thrombolysis treatment). Of these, 65 (76%) had a door to needle (DTN) time of less than 30 minutes meeting NSF goals set for April 2002. Aspirin was administered to 88% of all patients admitted with a possible AMI within the targeted 60 minutes of call for help. Less than 30% of these patients had a call to door time of less than 30 minutes. 82% of eligible patients seen by ED physicians had a DTN time of less than 30 minutes in comparison to 53% of those seen by medical teams.

Conclusions: This ongoing audit has demonstrated that the April 2002 targets can be met in a busy department. The success of this intervention has been made possible by the review of current practice and the implementation of change. Measures to improve standards have been based upon the use of a critical care pathway, aiming for a door to ECG time of less than five minutes, involving senior staff in clinical decision making and regular education and feedback. The role of the ambulance service in delivering these patients to acute care facilities has been defined in the framework and as yet standards are not being met. Further work is also needed to eliminate the difference in DTN times between emergency and general physicians.

07 SOME DELAYS TO THROMBOLYSIS IN ACUTE MYOCARDIAL INFARCTION ARE ACCEPTABLE

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Background: Thrombolysis is an effective treatment for acute myocardial infarction (AMI), but its effectiveness rapidly deteriorates with the passage of time. National and regional guideline on 'door to needle times' have been developed to enable departments to reach appropriate standards. However some delays to thrombolysis are inevitable and cannot be avoided.

Objective: To identify the proportion of patients which experienced a delay in the delivery of thrombolysis in an Accident and Emergency (A&E) setting and to classify the causes as acceptable or unacceptable.

Methods: A retrospective observational study was undertaken at the department of A&E Mediciru Southern General Hospital in Glasgow over a four-year period. Patients with an AMI who were throm-

bolysed on the basis of an initial diagnostic ECG were included in the study. Any patient not thrombolysed within the recommended 30 minutes (as per the Royal College of Physicians in London) had their case-notes studied further to determine why.

Results: 155 patients were included in our study. The mean 'door to needle time' was 36 minutes and the median was 26 minutes (range: 5 to 217 minutes). The interquartile range was 20 to 44 minutes. 92 (60%) of the 155 patients were thrombolysed within 30 minutes. The 63 patients not thrombolysed within 30 minutes were further subdivided into two categories: 1) 30 to 60 minutes and 2) >60 minutes. Delays to thrombolysis were categorized as: a. ECG diagnostic difficulties, b. life threatening arrhythmias, c. relative contraindications to thrombolysis, d. hypotension, e. delay in referral to senior staff, f. other, g. no reason identified. In Group 1, 22 (50%) of 44 patients had delays thought to be due to clinically acceptable causes (categories a, b, c, d and 1) and 22 patients (50%) had unacceptable delays (categories e and g). In Group 2, 15 patients (79%) had acceptable delays and 4 patients (21%) had unacceptable delays. Overall, 26 (41.3%) of the 63 patients who had delayed initiation their thrombolysis treatment had no justifiable reason for the delay and therefore represent a "system" failure. They represent 16.8% of all those who were thrombolysed.

Conclusion: Some delays to thrombolysis in AMI are inevitable. The majority of these are clinically acceptable but approximately 40% are due to "system" failure and may be avoidable.

08 SUPRA VENTRICULAR TACHYCARDIA: THE ROLE OF A GUIDED MANAGEMENT SHEET IN IMPROVING DIAGNOSIS AND MANAGEMENT IN THE ACCIDENT AND EMERGENCY DEPARTMENT

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Objectives: To evaluate the ability of Accident and Emergency (A&E) doctors in diagnosing paroxysmal supraventricular tachycardia (PSVT) and to assess if the introduction of a guided management sheet reduces the incidence of mis-diagnosis and inappropriate use of Adenosine.

Method: A prospective study of all patients over 16 years with a presumed diagnosis of PSVT was performed over a 15-month period. Thereafter a guided management sheet was introduced and prospectively evaluated for a period of six months. Data was analysed using 95% confidence intervals.

Results: 93 episodes were identified in the first 15-month period. The final diagnosis was PSVT in 58(63%, 95%CI: 51.7-72.2), atrial fibrillation/flutter in 29(31%), ventricular tachycardia in 2(2%) and sinus tachycardia in 4(4%). 84 patients were treated with adenosine of whom 52(62%, 95%CI: 50.6-72.2) had PSVT. After the introduction of a guided management sheet 43 episodes were identified with a final diagnosis of PSVT in 37(86%, 95%CI: 72-94.1), atrial fibrillation/flutter in 5(12%) and ventricular tachycardia in 1(2%). Adenosine was given to 37 patients of whom 30(80/0, 95%CI: 64.8-92) had PSVT. No serious side effects occurred in patients given adenosine including 8 with a history of asthma.

Conclusion: The use of a guided management sheet by A&E doctors improves the accurate diagnosis of PSVT and appropriate use of Adenosine.

09 DOES COMPUTER INTERPRETATION IMPROVE ECG ANALYSIS BY ACCIDENT & EMERGENCY SENIOR HOUSE OFFICERS

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Objectives: To determine if a Computer electrocardiograph (ECG) reading system can improve ECG reporting by Senior House Officers in Accident and Emergency.

Methods: 10 Senior House Officers were asked to interpret 50 ECG's each - 25 with computer generated reports, 25 without. Their answers, and the computer generated reports, were compared to a Gold standard produced by 2 experienced clinicians. The primary outcome measure was the proportion of major errors.

Results: The computer reading system made 2 major errors (4%, 95% confidence intervals (CIs) zero to 9.6%) compared to the gold standard. Access to the computer report did not significantly reduce major errors among SHOs (46 (18.4%) with report versus 56

(22.4%) without, difference = 4.0%, 95% CIs -3.1% to +11.1%, $p=0.27$) or improve the proportion completely correct (104 (41.6%) with report versus 91 (36.4%) without, difference = 5.2%, 95% CIs -3.4% to +13.8%, $p=0.32$).

Conclusions: Senior House Officers have a high error rate when reporting ECGs, which is not significantly reduced by access to a computer generated report. Junior doctors should continue to seek expert senior help when they have to interpret a difficult ECG.

10 EPIDEMIOLOGY, TREATMENT AND OUTCOME OF ACUTE, ACIDOTIC, CARDIOGENIC PULMONARY OEDEMA PRESENTING TO ACCIDENT AND EMERGENCY

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Introduction: Acute, cardiogenic, pulmonary oedema is a familiar medical emergency presenting to Accident and Emergency (A&E) departments. In-hospital mortality rates ranging from 12–30% have been reported but there is a wide heterogeneity of treatment practices around the world.

Aims: As part of the preparation for a randomised study of non-invasive ventilation in the treatment of acute, acidotic cardiogenic pulmonary oedema (LVF) presenting to A&E, we designed this present study to a) document the epidemiology and treatment of patients presenting with acidotic LVF, and b) find out which factors in the history, presenting physiology and initial treatment predict outcome in terms of survival.

Method: We retrospectively obtained the records of all patients presenting with acute, acidotic pulmonary oedema to the two A&E departments in Leeds, between 1st November 1998 and 31st October 1999. Records were eligible for inclusion if they contained details of adults with breathlessness (RR > 22 breaths per minute), signs of acute LVF (i.e. pulmonary crepitations and an X-ray report consistent with acute pulmonary oedema) and an arterial blood pH of less than 7.35. Demographic data, details of the presenting and past medical history, presenting physiological data and treatments received in the acute phase were obtained. Data on length of hospital stay, myocardial infarction rate and survival to discharge, were obtained from in-patient records. Thirty day and one year survival data was also obtained. Logistic regression analysis was used to identify which of 34 factors (including factors in the past medical history, presenting physiology, and initial treatments) were independently associated with outcome in terms of survival.

Results: One hundred and seventy one patients (median age 77 years) made up the study population. Ninety six percent of patients received intravenous frusemide as part of their initial therapy compared to only 70% who received nitrate treatment. Fifty one percent received intravenous opiate treatment. Only 10% of patients were intubated and mechanically ventilated, whilst in 17% of cases non-invasive ventilation was used. Most patients were admitted to a standard medical or elderly care ward, only 39% going to high dependency areas (ITU, CCU or HDU). Six patients died in the A&E department and only 129 (75%) survived to hospital discharge. Just 86 patients (50%) were still alive one year later. Patients receiving nitrate therapy in the early phase were more likely to survive to hospital discharge (OR = 3.7 (95% CI 1.3–10.5)) than those who did not receive nitrates. Predictably, patients who were intubated in A&E were less likely to survive to hospital discharge (OR = 0.1 (95% CI 0.02–0.49)).

Comment: This study confirms the results of those from elsewhere that acute, cardiogenic, pulmonary oedema is a condition with a poor prognosis. Despite evidence of the superior efficacy of nitrate therapy, diuretics continue to be the most commonly used treatment. Intubation rates and the rates of use on non-invasive ventilation are low in comparison to reports from other parts of the world.

11 EMERGENCY DEPARTMENT INVESTIGATION OF DEEP VEIN THROMBOSIS

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Introduction: A structured investigation protocol comprising clinical risk stratification, near-patient SimpliRED D-Dimer assay and compression ultrasonography has been employed in our department since

March 1999 for the investigation of suspected deep vein thrombosis (DVT). We present our findings and discuss the implications for future practice.

Method: Consenting adult patients presenting with suggestive symptoms are assessed against Wells' validated criteria to determine pre-test probability of DVT. SimpliRED assay is then performed by the assessing clinician. All medical staff are trained in use of the assay. Ultrasonography is then arranged for the same or next day. Patients with high pre-test probability and positive D-dimer are admitted overnight if the scan is unavailable that day; other groups are allowed home after receiving subcutaneous clexane. Patients with positive D-dimer assay but negative initial scan attend for repeat scan one week later.

Results: We have recruited 296 patients into the cohort to date. Clinical risk stratification has led to 187 being ranked 'low' of whom 12 (4.1%) had a DVT, 94 being ranked 'moderate' of whom 23 (24.5%) had a DVT, and 15 being ranked 'high' of whom 8 (53.3%) had DVT demonstrated on ultrasound. The overall sensitivity of SimpliRED in our hands has been 63% with a negative predictive value of 92%.

Discussion: The clinical pre-test probabilities of DVT derived by Wells et al were 5% of 'low' ranked patients, 33% of 'moderate' and 85% of 'high' ranked. Our application of the clinical model confirms that structured clinical assessment of suspected DVT is valuable. Earlier studies have reported a sensitivity of SimpliRED of up to 94%. Our sensitivity was 63% and we conclude that SimpliRED assay alone cannot be considered a satisfactory exclusion test. A combination of pre-test probability estimation, D-dimer assay and duplex ultrasonography leads to a more accurate assessment. The use of such a protocol has the potential to reduce costs and facilitate early discharge.

12 FEASIBILITY OF THROMBOLYSIS IN STROKE AT THE PRESENT STATE

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Aim: The aim of this study was to assess the feasibility of thrombolysis of stroke patients in the setting of a district general hospital.

Methods: A retrospective analysis of the hospital records of patients who presented with features suggestive of stroke (confirmed by CT/MRI) to the Accident and Emergency department of St. Peter's Hospital, Chertsey, Surrey, between 01 January, 2000 and 31 March, 2000, was carried out. The following points were considered. (a) The time of presentation to Accident and Emergency department after the onset of symptoms and signs of stroke recognised by the patient, (b) Waiting time in the department to be seen by Accident and Emergency doctors and physicians, and (c) Waiting time for computerised scan. The delays with means were determined by simple mathematical calculations.

Results: The total number of cases was 27. Causes of stroke: Haemorrhagic = 4 (15%); Ischaemic = 20 (74%); Combined ischaemic & haemorrhagic = 3 (11%).

Conclusions: It is clear from the above results that thrombolysis in stroke patients in an Accident and Emergency department at a district general hospital level is not feasible at present.

Recommendations: a) There is a need for a greater awareness of the emergency management of stroke patients among all grades of medical and paramedical staff nationally. b) Additionally, the general public requires an education programme to recognise the signs and symptoms of stroke and to act promptly by calling the emergency services to enable medical staff to initiate appropriate urgent medical treatment.

Abstract 12 Table 1

Delay	Mean	Range
In presentation after the onset of symptoms & signs	12 hours	0–48 hours
By the A & E doctors in seeing the patient	61 minutes	0–307 mins
By the A & E doctors in referring the patient to the physicians	67 minutes	4–210 mins
By physicians in reviewing the patients	51 minutes	0–105 mins
In CT/MRI scanning/	1.7 days	0–7 days

Emergency department organisation and general aspects of emergency medicine

13 TO TRIAGE OR TREAT?

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Introduction: Triage implies a rapid assessment of patients allowing prioritisation for treatment. In many hospitals this triage time has become a mini history and examination performed by the nurse, which is then repeated by the doctor. This study was performed to explore the hypothesis that a doctor performing triage would not extend the patient time waiting for triage, but would reduce waiting times by enabling treatment and discharge to occur from triage.

Method: The study took the form of a prospective interventional study. It took place over a 2-week period in September 2000, between 0800 and 1600 hours each day. In the first week triage was performed as normal by the nursing staff. In the second week triage was performed by myself. During the second week I was able to request X-rays and dispense medication as appropriate, functions our triage nurses are currently unable to do. Data was collected using a form, computer records and hand searching notes. Data collected included Times for Patient arrival, Triage time, Time to see doctor, Time to be reviewed with X-rays, Time to discharge. Other information included final diagnosis and interventions performed at triage.

Results: 378 patients were seen in week 1 and 441 patients were seen in week 2.

The average timings are shown in the table. In the second week 210 (47.6%) of patients were discharged (following treatment) from triage, 133 X-rays were requested and 80 prescriptions were dispensed.

Abstract 13 Table 1

Average Timings (Minutes)	Week 1	Week 2
Time to triage	17.3	9.8
Time to see Doctor	119	30
Time to review by doctor	171	58
Time to discharge	157	49
Time to discharge with X-ray	194	83
Time to discharge NO X-ray	132	31

Conclusion: Doctors are able to both triage and treat patients as the first line patient contact without increasing the time to initial triage. In so doing total patient waiting times are significantly reduced.

14 SENIOR COVER AT NIGHT: IS IT REALLY WORTH IT?

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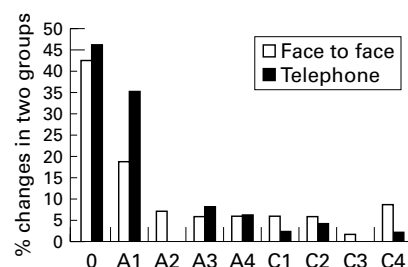
Objective: To assess the utility of senior cover provided to Accident and Emergency SHO's working between the hours of 0000 to 0800

Introduction: Emergency Medicine is a 24hr speciality but few departments are able to match the level of senior cover during the day with that at night. We provided an increased level of cover between the hours of midnight and 8.00am and the assessed its benefits.

Methods: Nighttime cover was provided to six hospitals in North West Thames, two teaching hospitals and four district general hospitals. The study was performed over October and November 2000 on three periods of five consecutive nights. An SpR was available for consultation over the telephone for 5 of the hospitals and resident in another between the hours of 0000 and 0800. Pre and Post consultation management plans for face to face and telephone consultations were assessed by three consultants for their clinical or administrative effects.

Results: 168 consultations were recorded, 44% Face to Face and 56% telephone. Levels of change of management plans were 54% and 57% respectively. No statistically significant differences were noted between the two groups but the changes in pre and post consultation were statistically significant in both clinical and administrative groups.

Conclusion: Night time cover to A & E SHO's between the hours of 0000 to 0800 needs to be provided to departments in North West Thames. It can be safely provided by an SpR remotely covering multiple sites via a telephone and fax. This cover produces not only



Abstract 14, Figure 1

administrative but also clinical improvements in patient care. Initial calculations suggest that this is a cost effective process and we recommend its use until full 24 hour senior cover can be provided.

15 THE USE OF DIAGNOSTIC ACCURACY AS A PERFORMANCE INDICATOR

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Background: It is difficult for Emergency Departments to monitor their performance in the investigation and treatment of patients who are subsequently admitted to hospital. Although the measurement of treatment times and physiological parameters whilst the patient is in the department is widely undertaken, the large number of admissions makes individual follow up impractical. Improving information about performance will allow appropriate targeting of education and resources.

Objective: To use a comparison of Emergency Department (ED) diagnosis and hospital discharge diagnosis to detect areas of poor diagnostic performance.

Method: The Information Systems Department provided a spreadsheet containing the ED and hospital discharge diagnoses for all patients admitted from the ED over a two month period. These were examined independently by two investigators (JL and CM) who each assigned every patient a score reflecting the accuracy of the ED diagnosis in relation to the final discharge diagnosis. A score of 0 was given if the ED diagnosis was judged incorrect, a score of 1 was given if the diagnoses were similar but not the same and a score of 2 was given if the diagnoses were the same. The ED notes for those scored 0 by both investigators were examined to identify deficiencies.

Results: The diagnoses of 654 patients were studied. 300 (45.9%) of these had been admitted to General Medicine, 219 (33.5%) to Trauma and Orthopaedics, 57 (8.7%) to General Surgery, 31 (4.7%) to Paediatrics and 47 (7.2%) to other specialties. 45 (6.9%) ED diagnoses were given a score of 0 by both investigators. 102 (15.6%) diagnoses achieved at least one score of 1 and 507 (77.5%) achieved at least one score of 2. On reviewing the notes of the 45 patients with discrepancies in their diagnoses it was found that 11 of these discrepancies were due to clerical errors (illegible or inaccurate coding). A further 5 were due to the discharge diagnosis relating to an event occurring whilst the patient was in hospital, rather than the reason for admission. This left 29 "true" inaccurate diagnoses. 22 (75.9%) of these patients were admitted to General Medicine, 5 (17.2%) to General Surgery and 1 (3.4%) each to Paediatrics and Gynaecology. No Trauma and Orthopaedics patients had an inaccurate ED diagnosis. The main groups of inaccurate diagnoses were arrhythmias (n=5), pulmonary embolism (n=4) and pneumonia (n=3).

Conclusions: The accuracy of diagnoses made in the department is generally good. A disproportionate number of inaccurate diagnoses are in patients with general medical complaints. Intradepartmental education will be targeted at ECG interpretation and respiratory disease.

15a A STUDY TO EVALUATE AWARENESS OF NHS DIRECT AMONGST PATIENTS ATTENDING AN ACCIDENT & EMERGENCY DEPARTMENT

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Introduction: A 24-hour telephone advice line staffed by nurses called *NHS Direct* was introduced locally in January 2000. Its aim was to provide an advice line for patients, and thus reduce demand on the emergency services. Our aims were 1) to determine awareness of *NHS Direct* amongst patients attending our department, and 2) to determine the number of patients who may have potentially been redirected.

Method: Three hundred consecutive ambulatory patients who self-referred to the A&E department, and who had not contacted *NHS Direct* were asked to complete a structured questionnaire about the telephone advice service.

Results: Two hundred and sixty-six questionnaires were completed (response rate 88%). 166 patients (62%) claimed to have no previous awareness of *NHS Direct*. Patients over 65 years of age (9/9; 100%), patients from ethnic minorities (41/59; 70%), patients from less affluent post-codes (101/129; 78%) and young men (20/28; 71%) were over-represented. Of the 100 patients who were aware of the service 36 (36%) were aware of the telephone charge, whilst 51 (51%) thought that calls were taken by doctors. 56 patients (21%) may have been potentially redirected away from our department by *NHS Direct*.

Conclusions: *NHS Direct* has failed to market its existence to those members of the community who frequently access the accident & emergency department. In order to reduce demand on the emergency services a national focused publicity campaign is required to heighten awareness of this service.

16 CYCLE HELMET USE AND ATTITUDES TO HELMET LEGISLATION IN LEICESTERSHIRE

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Introduction: World-wide there are three times as many bicycles produced each year as motor cars. Bicycle riding is associated with considerable risk, notably head injury. Cycle helmet use is not compulsory in the UK, unlike certain areas abroad (ie. Australia where it was first introduced) Our study aim was to assess parental and child attitudes to cycle helmet use and potential legislation.

Method: Three hundred consecutive children of cycle riding age (5-16) and their parents were targeted with separate structured questionnaires on attendance in the Emergency department. Children with a cycling related injury were excluded.

Results: Two hundred and forty-one adults completed the questionnaire (response rate 80%). Two hundred and twenty (91%) agreed that legislation should be introduced to make it compulsory for cycle helmets to be worn. The most commonly cited reason for parents not buying a helmet for their child was that: "The child would not wear it anyway." (57% of respondents) Of the 207 children completing the questionnaire, the most common reason given for not wearing a helmet was that it was not perceived as fashionable (63 (30%) of respondents). Comfort (48(23%)) and the fact that friends did not wear a helmet (48(23%)) were other reasons cited. In the group of children who thought cycle helmets were unfashionable, 24(39%) said they would be more likely to wear a helmet if a logo of their favourite pop star or sports team was on the helmet.

Conclusions: Most parents in this survey agreed with the introduction of cycle helmet legislation, and the use of logos of pop stars or sports personalities may increase the use of cycle helmets by children.

17 A RETROSPECTIVE STUDY TO DETERMINE THE RELATIONSHIP BETWEEN SHO DECISION TIME AND DURATION IN POST

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One of the factors which may determine 'patient flow' through an Accident and Emergency department is the 'decision time'. The decision time is defined as being the time the Doctor first saw the patient to the time that a definitive treatment or management plan was made. The aim of this study was to determine whether SHO decision times are reduced as SHOs become more experienced at practising emergency medicine during their six month attachments. The logbook of one of the SHOs was reviewed at the end of their six month attachment. Decision times were recorded chronologically on all patients seen by the SHO during this period (total number of patients seen $n = 1100$). The SHO had previously only worked as a pre-registration House Officer. Statistical analysis was performed using SPSS 9.0. For simplicity only the first 1000 patients were used in the analysis. An analysis was made between the first five hundred patients seen and the last five hundred patients seen. Frequency distribution analysis showed that both groups were not normally distributed. First 500 cases seen: right tail skew, skewness coefficient = 2.102, kurtosis coefficient = 5.041. Last 500 hundred cases seen: right tail skew, skewness coefficient = 2.696, kurtosis coefficient = 11.263. Because of the non-Normal Distribution of both groups the Wilcoxon

Signed Ranks test was used to compare the two groups. (z value = -0.203. p {2-tailed} = 0.838). Frequency distribution analysis of 100 cases seen in chronological order also demonstrated similar curve characteristics (i.e. right hand skew) due to the greater proportion of minors cases seen. The mean decision time per 100 cases seen showed an initial gradual fall for the first three 100 cases. There was however considerable variation in the decision time for the remaining seven 100 cases seen. This study suggests that decision times may not necessarily shorten as SHOs become more 'experienced' during a six month attachment.

18 OCCUPATIONAL STRESS AMONG SENIOR HOUSE OFFICERS IN ACCIDENT AND EMERGENCY MEDICINE

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Introduction: The Accident and Emergency Department (AED) provides a setting where largely inexperienced Senior House Officers are vulnerable to the effects of shift patterns, long waiting times, violent and abusive patients and not least, a lack of the relevant skills and knowledge to enable them to tackle the wide variety of clinical problems they may encounter (Heyworth JA, *et al. Arch Emerg Med* 1993;10:279-88; Williams S, *et al. BMJ* 1997;314:713-18; British Medical Association. Work-related stress among junior doctors. London: British Medical Association, 1998.)

Aims: This study documented occupational stress levels over a six month period among Senior House Officers from two AED's in the United Kingdom in conjunction with case-load, waiting times, shift patterns, senior support, and 'caseness' for general psychiatric symptoms, in order to highlight factors influencing stress at work.

Methods: Senior House Officers completed two short questionnaires on a monthly basis, one, a *work-related stress questionnaire* to document occupational stress and the other, the General Health Questionnaire-12 Item Scale measuring psychiatric well-being to standardise for life events over the six months period. Further relevant information relating to each of the AED's was recorded, including number of patients seen, waiting times, caseload, shift patterns of SHO's and senior presence on the shop floor.

Results: 25 Senior House Officers, 16 from one and 9 from the other AED completed questionnaires over six months. Male to female ratio was 1:2.1. During that period, one Department saw 36,846 new patients, and the other saw 14,975 new patients. SHO's worked an average of 63.8% unsociable hours, and 27.0% of night duty. Response rates varied between 84% and 100%. Levels of work-related stress deteriorated (mean score=1.8, to mean score=3.2), as did general psychiatric well being (mean score=2.0, to mean score=2.1). Results will be presented correlating levels of work-related stress with workload, caseload and waiting times within each AED.

Conclusions: This study has documented the change in stress levels among Senior House Officers over a six month period. These findings are useful in determining level of work satisfaction, work rates and planning training for junior doctors in the Accident and Emergency environment.

19 PATIENTS ATTENDING AN A&E DEPARTMENT AFTER RECENT SURGERY

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Patients attend Accident and Emergency departments with a variety of problems relating to recent surgery. Management is sometimes difficult because of lack of information about the operation or its expected postoperative course. This is especially the case when the operation was carried out at another hospital. Many patients with minor problems are treated by the Accident and Emergency team without reference to the surgeons who performed the operation. The size of the problem is unclear. A prospective survey of all patients attending the A&E department following recent surgery was carried out. A total of 100 patients attended on 105 occasions over a three-month period. Only 60% of the attendees had had their surgery at Kingston Hospital. 12% of patients first sought advice from a General Practitioner. All specialties were represented. The main complaints were pain, bleeding, and concern about infection. In 17% of cases, reassurance was the only treatment required. A further 10% required change of dressings or plaster casts. 42% of the patients were referred to one of the specialist teams and overall, 33% with more serious complications were admitted to hospital for further treatment.

A proportion of postoperative attendances might be avoided by better advice to patients and prescription of appropriate analgesics. We suggest that the routine provision of a written discharge letter to the patient and the availability of early out-patient appointments would be helpful for patients and A&E departments. A system of feedback for the surgeons would address risk management issues.

20 HAND-OVER TIME AND X-RAYS MISMATCHES IN A DISTRICT GENERAL HOSPITAL A&E DEPARTMENT

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Introduction: There is a need to move from individual blame towards identifying the deficiencies in the systems in the A&E Departments. Errors are more frequent if the system in place is not properly thought out and smooth and if there is not a risk assessment. Different systems for detecting X-Ray mismatches are implemented in different departments, so data and results are difficult to compare. But despite the difficulties recollection of data and identification of weaknesses should be an on-going process at a local level. Different types of pitfalls in the system were identified in our data: - Rush to leave at the end of the shift or to start fresh without the old patients from the previous shift. - Communication failure. - Supervision failure. - The same person does not do clinical examination and X-Rays reading. - Failure to implement an adequate and pliable checking system.

Methods: Review of X-Ray reports and comparison with A&E notes. Register of false-negatives regardless of the importance that the doctor involved gave to the pitfall. Hand-over times are defined as 9 AM and 9 PM. The patients considered were in the Department before that time and left the Department after that time. Percentage rates were calculated for the two groups.

Results: 1485 records were studied. 9 major clinical incidents (0.7 %) changing the treatment dramatically. No hand-over time 4.5 % rate of false negative. Hand-over time 6.3 %. AM 5.5 %. PM 9.6 %.

Discussion: The need to implement systems of control at the hand-over time was clear. In small departments the differences in the levels of staffing at different times of the day may be quite different during the day and the input from more senior colleagues quite different. In our case the skills mix and the grade of seniority and experience may play a very important role and these results have produced a difference in the way that the hand-over time is perceived. An overlap of the staff on duty at the time has been initiated. The other advantage of these types of studies is the emphasis on how things work rather than an individual guilt. We think that an increased openness may make easier to identify errors.

21 'WALK-OUT' PATIENTS FROM ACCIDENT AND EMERGENCY DEPARTMENTS

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Objectives: To estimate the rate at which patients walk out ('walk-outs') of an NHS accident and emergency department (A&E) without receiving treatment and the reasons for leaving. To then compare this group of patients to those that stayed and received treatment ('stays'). They were compared with regards to patient characteristics and clinical outcomes.

Methods: Patients who walked out of the A&E department of a teaching hospital over a four week period without waiting to receive treatment were identified on a daily basis. A corresponding number of patients (1 in 20 systematic sampling) over the same period who stayed for treatment were chosen for comparison. A standardised telephone or postal questionnaire was performed 7 to 14 days after presentation. The GP receptionists of the non-responders were contacted to ascertain any deaths or hospitalisations. The main outcome measures were: walkout rates, patient characteristics (demography, triage categories, acuteness and nature of the complaints, time and mode of arrival), clinical outcome 7—14 days after presentation and reasons for leaving without receiving treatment.

Results: The number of 'walk-outs' was 304; 300 'stays' were sampled from total of 6015 patients for comparison. The walkout rate was 5.05% and none of these patients were in triage categories 1 or 2. The reply rate was 'walk-outs' 233/304 vs. 'stays' 292/300 (77% vs. 97%). The 'walk-outs' tend to be young adults but no gender difference, they tend to have a lower triage category, complaints more likely

related to trauma and they tend to wait longer even when the triage categories were the same. Similar ratio arrived by ambulance (29% vs. 27%). 76% of these group fall within our core patients as defined by the British Association for A&E Medicine (BAEM) document "The Way Ahead 1998". The same ratio felt better after 7-14 days (81.54% vs. 80.82%) with no mortality in the 'walk-outs'. 55% 'walk-outs' vs. 70% 'stays' had further treatment excluding self-medication. The main reason given for leaving was long waiting times (89.27%).

Conclusion: 76% of our 'walk-outs' attended the department appropriately and the main reason cited for leaving was long waiting times. Our staffing equivalent levels being below those recommended by BAEM might account for the waiting times. The walkout rate follows the North American trend where the emergency departments of public hospitals consistently have rates above 2% compared to rates <2% for the private hospitals. The main reason cited is the lower funding levels of the public hospitals. Despite all the efforts over several decades, an increasing number of patients continue to seek treatment at A&E departments when acutely ill irrespective of the cause of the illness. It would seem reasonable to suggest that the national government should give as much emphasis to A&E medicine (and emergency admissions) as is being given to primary care and elective hospital waiting lists.

22 UNPLANNED RE-ATTENDANCE IS UNAFFECTED BY LACK OF DEPARTMENTAL FOLLOW-UP CLINICS

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Introduction: Most UK Emergency Departments operate follow-up clinics run by senior staff for review of minor complaints. The John Radcliffe Emergency Department has actively decided not to provide such a follow-up system. It is important to establish whether re-attendance is increased as a result. If not, this has resource implications for the department.

Objectives: To confirm that re-attendance is independent of follow-up clinics. Our secondary aim was to identify the causes and demography of re-attendance.

Method: The notes of all patients who attended the department on an unplanned second occasion with the same condition within six weeks of their original consultation were reviewed. An Excel database was compiled containing demographics, presenting complaints (classified according to ICD-9) and outcomes of re-attenders over an eight month period.

Results: Of 40732 patients seen in the study period, 232 (0.6%) were classified as re-attenders. The largest group was single males aged 16-30. The commonest reason for re-attendance was persistent pain (38%). Of the re-attenders 38% required further specialist input, a third of whom were admitted.

Conclusion: Re-attendance rate was comparable to that obtained in previous studies from departments which run follow-up clinics, suggesting that in this department the absence of follow-up clinics is not detrimental to patient care.

23 THE IMPACT OF A NEWLY OPENED PRISON ON AN ACCIDENT & EMERGENCY DEPARTMENT

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Aim: To determine the impact of a newly opened prison on an Accident and Emergency department (A&E).

Method: A new category B maximum security prison opened in April 1999, the first privately run prison in Scotland and the third largest in capacity. All prisoners referred to the A&E department for treatment were identified prospectively during the first year following the opening of the prison.

Results: 103 prisoners attended during the one year period. Ages ranged from 18 - 64 years with a mean age of 29.4 years. 38 prisoners were admitted to the hospital. Further review at out-patient clinics was arranged for 14 prisoners. One prisoner died. The remaining prisoners were returned to the prison for further management by the prison medical and nursing team. The time of referral, aetiology of presentations, diagnosis and management are all discussed.

Conclusion: The opening of the prison provided only a slight increase in the workload of the A&E department. However, a significant proportion of prisoners were admitted to the hospital highlighting specific problems of managing people restrained and in custody. The majority of cases can be safely referred back to the prison health-care team for further management.

24 A STUDY OF PATIENTS ATTENDING AN A&E IN POLICE CUSTODY

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Objective: To study patients in police custody presenting to A&E, with respect to the rate of presentation, the problems and the ways in which they were managed.

Methods: All patients in police custody who were brought into two neighbouring A&E departments (65,000 new attendances) during a six month period were studied prospectively. The two departments received patients from two custody centres within a defined geographical area. Data were recorded using a standardised proforma.

Results: Eighty-four patients (72 males) with an age range 15-59 years presented on 87 separate occasions to A&E. 16% of these had been seen by a police surgeon, 71% of these had a referral letter. 62% of attendees had consumed alcohol and 10% appeared to have consumed street drugs on the day of presentation. The most common reasons for presentation were minor wounds, overdoses and deliberate self-harm. Eight patients (9%) received no investigation or treatment in A&E of these only one had been seen by a police surgeon. 39% of the attendees were discharged back to custody, 16% were admitted to hospital and 15% self-discharged from A&E. Only two patients appeared to have been discharged "inappropriately".

Conclusions: Approximately four patients a week attended the two A&E departments during the study period, a relatively low rate of presentation. These patients can be difficult to manage and have a high rate of refusal of treatment. A significant proportion of patients had no form of treatment or investigation and they would have been accompanied by at least two police officers during their attendance. These results suggest that many of these could have been treated at the custody centre, sparing police time.

25 AUDIT OF OBSERVATIONS ON PATIENTS ADMITTED FROM THE EMERGENCY DEPARTMENT

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Background: There is growing evidence that critically ill patients are inadequately identified on hospital wards. Critical events are often preceded by periods with abnormal physiological parameters. Patients admitted through the Emergency Department (ED) may wait several hours for an in-patient bed. There appear to be no guidelines as to how frequently ED patients should undergo standard observations.

Aim: To determine the current frequency and nature of observations on those patients subsequently admitted from the ED of Southampton General hospital.

Methods: Emergency Department records were prospectively collected over a four week period. The timing and values of recorded observations were collected. The values were scored using an early warning score recently introduced at the hospital. Patients discharged to a general ward were followed up on the Patient Administration System.

Results: 739 patients were admitted during the study period. 87% had some observations within 15 minutes of arrival. 49% had each of temperature, pulse, respiratory rate and blood pressure recorded. 5% had each of these plus a Glasgow coma Score. 34% had repeat observations whilst waiting for admission (mean time in department 223 minutes). Respiratory rate was the most frequently abnormal value, with only 18% within the normal range. 97% of patients were admitted to the general wards. In 1.8% of these there was an end-point of death, intensive care or respiratory support within 48 hours of admission.

Conclusion: Patient observations are currently done in a rather sporadic pattern in this ED and standards need to be set. Repeat observations cost nursing time, and are difficult to prioritize in a busy environment. However, patients who deteriorate must be identified early so that they can be admitted to appropriately resourced areas. Further work is needed to determine which are the most useful predictive values, and whether increasing frequency of observation improves outcome.

26 THE END OF THE CARDIAC ARREST CALL? THE MEDICAL EMERGENCY TEAM: A LITERATURE REVIEW

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Expert panels have suggested that some in-hospital deaths are preventable. Unexpected deaths are traditionally thought to result from a sudden, unpredictable catastrophe. In the hospital setting, this

usually means a cardiac arrest call. However, there is a growing amount of evidence that cardiac arrests are often preceded by several hours of clinical deterioration, thus may be anticipated and prevented. Reports have also been published suggesting that critically ill patients are poorly managed on the general wards. Some centres have attempted to improve the management of this group of patients by introducing a 'Medical Emergency Team'. The concept is gaining wide popularity. A literature review was carried out to find the evidence for this intervention improving outcome. There is a limited amount of published literature. The studies use differing models and call-out criteria; none conclusively show benefit. Intuitively, increased care should improve outcome. However, it is possible that the Medical Emergency Team concept may result in high levels of care for patients who will inevitably die or have a poor quality of life. Further studies are needed to determine the benefits of such a team, and how it can be used most efficiently to target those patients likely to benefit from higher levels of care.

27 WHAT LEVEL OF PERFORMANCE DO EMERGENCY PHYSICIANS EXPECT FROM CLINICAL DECISION RULES (CDRS)

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CDRs are one device that attempts to reduce the number of negative diagnostic tests undertaken by providing guidance as to who does not need to be tested. We wished to investigate the false negative rate clinicians are prepared to accept for such rules.

Method: We derived the following clinical decision rule: Those patients attending the Emergency Department, who may have taken an overdose - do not need to undergo blood tests for Paracetamol, providing they are alert, understand English, are greater than 16 years old, have no learning difficulties and deny taking Paracetamol. This rule was based on 150 consecutive patients who presented to the Southampton General ED and denied taking Paracetamol. None required specific treatment with the antidote. The 95% confidence intervals for a false negative result for this rule is 0 - 2%. In other words up to 2% of patients may need treatment. By varying the false negative rate (from 2% to 1% to 0.1%) in 3 clinical scenarios, we explored what false negative rate clinicians would be prepared to accept.

Results: 47 doctors completed the written clinical scenario questionnaire. 9 (19%) would accept a false negative rate of 2%. 16 (35%) would accept a 1% false negative rate. 39 (83%) would accept a 0.1% false negative rate. 8 (17%) would not accept any of these levels.

Conclusion: Clinicians were looking for a high performance from this clinical decision rule. Only 35% would accept a 1% false negative rate. For studies to confirm that a clinical decision rule had a false negative rate of less than 1%, would require a large sample (20,000 patients). Investigators considering developing clinical decision rules need to take this into account.

Miscellaneous

28 FEEDBACK STUDY OF EMERGENCY MEDICINE TRAINING USING A MEDICAL SIMULATOR

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Background: Over a 1 year period Specialist Registrars in Emergency Medicine in the Southwest Region have attended 5 training days based around a high level medical simulator at the Bristol Medical Simulation Centre. The training days include simulated scenarios and interactive workshops. The individual scenarios and use of the simulator is continually evolving based on feedback after each session.

Objective: To assess the effectiveness of the Bristol Medical Simulator as an Emergency Medicine training tool.

Method: An evaluation questionnaire was completed by all trainees in the Northern part of the region who had attended simulator training days. The questionnaire was designed to gauge opinion on the course content, pre-course work requirement, scenario realism and performance feedback.

Results: Feedback has been positive with trainees finding simulator training beneficial. Pre-course preparation, with adequate notice of topics to be covered, was thought to be important. The realism of the mannequin and monitoring systems were assessed as good, but there were concerns over the audibility of certain breath sounds. It was felt to be important to hold workshop discussions in conjunction with the scenarios. The trainees also suggested that simulator training could be used as an assessment tool.

29 PRESENTING WITH A FIRST SEIZURE: HOW MIGHT WE IMPROVE CARE?

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Aim: To examine the information given to patients at the time of a first seizure.

Method: As part of an audit of early management of seizures in South East England questionnaires were sent to all consultants in Accident and Emergency Medicine in the old South Thames Region. We requested copies of any information leaflets given to patients after their first seizure. All departments who did not reply were contacted by telephone.

Results: We wrote to 26 departments and received replies from 23. Only three departments had information sheets for patients and a further six had included the aftercare of seizures on their treatment protocol. Overall six mentioned driving, of which four gave the legal driving requirements. None included the DVLA number. Follow-up arrangements were addressed in 8 of the 9 departments, seizure precipitants in 2, first aid in 3 and when to call an ambulance in 2. Of the two departments that gave any self-help group information one gave the number for the British Epilepsy Association, the other suggested a bracelet.

Conclusions: In most instances where information was provided there was some room for improvement. There are two parts to this: medical and legal. From a medico-legal perspective the omission of DVLA regulations leaves A&E SHOs at risk of litigation and this is easily avoidable. Patients are often confused after seizures and unable to take in or retain new information. After telling a patient about their condition written information should be given and we append an information sheet which might prove useful.

30 SUDDEN AND SEVERE, FIRST OR WORST, OR REGIONAL CONSENSUS GUIDELINES? - CLINICAL REFERRAL FILTERS FOR PATIENTS WITH SUSPECTED SUBARACHNOID HAEMORRHAGE

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Introduction: The diagnostic pitfalls of subarachnoid haemorrhage (SAH) are well documented. A high index of clinical suspicion is recommended when patients describe unusually severe or sudden headache. The implications of applying such referral criteria to patients who seek emergency care for headache has not been adequately addressed.

Objectives: To determine the change in referral pattern and investigation that would occur if regional consensus guidelines for the diagnosis and investigation of SAH were adopted. To compare the regional consensus guidelines with the referral criteria of 'first or worst' and 'sudden and severe' headache.

Method: Data was collected prospectively in four A&E departments from 4th October 1999 to 31st March 2000. All patients 17 years and over with a chief complaint of headache were eligible. Patients presenting immediately after assault or those unable to give informed consent were excluded. In-patient notes were reviewed. SAH was excluded if the patient had a normal CT scan and lumbar puncture at presentation, or had no record of SAH at three month general practitioner follow-up. The pattern of referral and investigation resulting from the application of referral criteria was compared with current practice.

Results: One hundred and thirty eight patients (approximately 30% of eligible patients) were recruited. Recruited and non-recruited patients did not differ by age, sex, triage category or discharge category. Follow-up data was available for 128 patients (93%). Eight patients (6%) had SAH, one of whom had delayed diagnosis. Thirty-seven patients (27%) described sudden and severe headache, including seven patients with SAH. 'First or worst' headache identified 120 patients (87%), including all those with SAH. The additional clinical features highlighted in the regional guidelines did not improve upon the 'sudden and severe' criteria. The guidelines identified 36 patients

(26%) at high risk of SAH; seven had SAH. Adoption of the regional guidelines would double the admission rate (rate of increase 2.5 (2.2,2.8)) and treble the number of investigations (3.3 (3.0,3.7)). The comparable increase for 'first or worst' headache is 3.2 (2.9,3.4) and 4.6 (4.3,5.0); for 'sudden and severe' headache 1.7 (1.3-2.1) and 1.9 (1.4-2.4).

Conclusion: Referral criteria advocated in the literature are not being used by all doctors. In this study, their diagnostic strategies have proven as sensitive, but more specific for the diagnosis of SAH, than the 'sudden and severe' criteria. Only the 'first or worst' criterion detected all cases of SAH. Adoption of this criterion would result in a substantial increase in the number of investigations. Future research should focus on evaluating the cost-effectiveness of adopting referral criteria for the identification of patients at high risk of SAH.

31 THE EMERGENCY USE OF PROTHROMBIN COMPLEX

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Background: The presentation of a middle aged gentleman to the Accident & Emergency department with a subdural haematoma, deteriorating neurological findings, on warfarin therapy and known to have a raised International Normalised Ratio (I.N.R.)

Objective: How best to rapidly correct the I.N.R. before transfer to a neurological unit?

Design: Case presentation.

Intervention: The administration of Beriplex, a prothrombin Complex comprising of vitamin K dependent coagulation factors (II, VII, IX, X) plus protein C which are derived exclusively from plasma donation.

Outcome: Rapid correction of the I.N.R value, prompt surgical intervention to remove the subdural haematoma, good post operative patient recovery and minimal stay in hospital (discharged after six days).

Discussion: The use of prothrombin complex compared with conventional therapy of Fresh Frozen Plasma (FFP). A short literature review.

Conclusion: Prothrombin complex appears to be an efficient agent to reverse abnormal coagulation. In this case it proved extremely beneficial.

32 WAITING FOR GODOT? DELAYS IN EMERGENCY PSYCHIATRIC ADMISSIONS

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Introduction: Some Accident and Emergency (A&E) department processes are measured against performance standards. However, there are no local standards for decision making for patients in need of psychiatric admission via A&E. There was a perception amongst A&E staff that psychiatric patients were experiencing excessive delays when compared with non-psychiatric patients.

Aim: To document the times involved in the assessment and admission of patients presenting to A&E with acute psychiatric problems.

Design: Prospective collection of data from 13 October to 24 December 1999 of consecutive patients with a psychiatric problem presenting to A&E. A&E staff completed a standard form, comprising of demographic information and key time dependent variables.

Setting: St Thomas' Hospital A&E department, an inner city teaching hospital.

Results: 205 episodes were recorded, of which 36 were informal and 17 mental health act (MHA) admissions. Data collected included both demographic and operational information. A psychiatric liaison nurse saw 85% of patients within one hour. 85% of patients referred to the duty psychiatrist were seen within 3 hours. The average total time in the department for a MHA was 22 hours. On average the duty social worker took 6 hours to attend the department from time of contact. Informal admissions spent on average 7 hours in the department, including taking an average of 2 hours for a bed to be identified. Transport for formal admissions took on average 3 hours 45 minutes to arrive.

Discussion: Immediate changes in local practise were implemented, based on communication to all professionals involved on the accumulative affective of what appear to be minor delays. A report of our findings was presented to regional directors of the psychiatric service, who had not previously had this data available to them. A working party was convened and issued a report that comprises various proposals for change at regional level. The survey is being

repeated at my current hospital. The next step is to collect a larger sample of MHA data to try and effect change in the process of formal admission via all A&E departments. This survey illustrates the potential impact of health service research on service development, and the educational value to the emergency medicine trainee as a research and management experience.

33 THE MANAGEMENT OF UTI IN A&E

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Introduction: As individuals there is considerable variation in the way we manage UTI in our department. There is general debate about which approach is the most cost effective, most clinically effective, gives most patient satisfaction and causes least adverse effects.¹ We performed an audit in our own unit and sent a questionnaire to other Scottish A&E Departments to obtain their views on how UTI should be diagnosed and treated.

Method: A search of the A&E database using the diagnostic label of "urine" "urinary" or "infection" identified the relevant cases. The bacteriology laboratory provided reports on all urine samples sent during the study period that spanned the first 9 months of 1999. A questionnaire, addressed to the heads of other A&E units, asked how much of an issue they considered UTI management to be, and what antibiotics they would recommend. It also attempted to identify on what evidence they felt the diagnosis should be made and antibiotics prescribed.

Results: 144 patients were treated for UTI, 98 females and 46 males. 115 MSSU and 5 CSU requests were made and 25 (20.8%) returned positive growths. Antibiotics were prescribed in 60/144 (41.6%) of patients, with trimethoprim chosen in 43 cases. Urinalysis was performed on 119 samples with a Clinitek 50 analyser. A positive analysis detected leucocytes or nitrites and a negative one detected blood or protein, or was clear. 19/65 of the samples with a positive urinalysis returned a growth on culture. We sent 40 samples with a negative urinalysis for culture and three had positive growths. This gave us a sensitivity of 86.6% and a specificity of 12.0%. 16 out of 27 (59%) units returned our questionnaire. 1 had a protocol for managing UTI and only 3 believed it to be an issue in their department. 7 had prescribing guidelines and 13 stated that their preferred empirical treatment would be trimethoprim, although only 1 would prescribe it for 3 days. There was a general lack of consensus on how infection should be diagnosed and managed. For example 6 consultants agreed/strongly agreed that infection could be diagnosed on signs and symptoms, whilst 10 disagreed/strongly disagreed with this. 9 agreed/strongly agreed that antibiotics should be prescribed after infection is confirmed by culture whilst 7 disagreed/strongly disagreed with this practice.

Conclusions: Although not a classic A&E condition, UTI will continue to be seen in our departments. Doctors have different approaches to managing these patients and deciding whether diagnosis should be based on symptoms, urinalysis or culture results. This leads to inconsistencies in investigation and prescribing patterns. Nitrite and leucocyte dipstick testing has a sensitivity of 95% and a negative predictive value of 96% for detecting infection and can reduce laboratory culture by a third.² A local protocol could standardise our practice, rationalise our prescribing and reduce unnecessary laboratory requests.

1 Williams D. Urinary tract infection: emerging insights into appropriate management. *Postgrad Med* 1996;99:189-204.

2 Flanagan P, Stout R, Davies E, et al. Evaluation of four screening tests for bacteriuria in elderly people. *Lancet* 1989;1117-19.

34 MANAGEMENT OF RENAL COLIC IN THE UK

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Objective: Establish current practice in the investigation and management of pain in acute renal colic in accident and emergency departments (A&E) in the UK.

Methods: A&E departments in the UK were stratified into four groups based on departmental size, namely <30,000; 30,000 to 50,000; 50,000 to 80,000 and >80,000 new patients each year. In each group, one third of departments were randomly selected leading to a total sample size of 106. A structured questionnaire regarding the routine investigation and management of pain in acute renal colic was administered.

Results: All questionnaires were returned. The number of radiological investigations routinely performed was associated with

department size ($p=0.003$), with none performed by 57.1% of the smallest departments (<30,000 new patients per year) with a minimum of one in at least 82.8% of units in the other categories. There was a tendency for the largest departments (>80,000 new patients per year) to use fewer films for intravenous urography ($p=0.083$), with an average of one film compared to three in each of the other three categories. Radiological investigations were not routinely performed by 47.6% of those units with urology services located outside the hospital compared to 14.1% of those with urology services inside ($p=0.001$). Non-steroidal anti-inflammatory drugs were used for pain relief in 85.8% of departments. The principal route for diclofenac was intra-muscular in 64.2%, and rectal in 16.0% of departments; only one department used oral diclofenac. Intra-venous ketorolac was used by 4.7% of departments. Parenteral opiates were the first choice analgesic for 20.8% of departments and second choice in 19.8% of departments.

Conclusions: A&E departments in the UK differ greatly in their management of acute renal colic. We suggest a protocol for the management of renal colic that could be adopted as standard practice in the UK.

Proposed Protocol for the management of renal colic in A&E

1. History suggestive of renal colic
2. Clinical examination to exclude alternative diagnosis
3. Analgesia-Rectal diclofenac or IV Ketorolac
4. Urinalysis-to check for haematuria
5. Radiological investigation-
 - a) IVU (single film at 20 min) or USS
 - b) Helical CT (if available).
6. Urinary tract obstruction -Discuss further management with Urologists
7. No Urinary tract obstruction-Consider other diagnoses.
8. Consider Opiate if still in pain

35 HOW DO WE DIAGNOSE CONSTIPATION IN THE ACCIDENT AND EMERGENCY DEPARTMENT?

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Background: The diagnosis of constipation should be based upon clinical findings and not abdominal radiography. We reviewed patients diagnosed with constipation in our department to determine how the diagnosis was made.

Methods: All cases of constipation diagnosed in our department from April 1999 to March 2000 were reviewed. Details of history, examination findings, x-ray, treatment, disposal and follow up were recorded.

Results: 142 cases were identified and 133 case notes were retrieved. A history of altered bowel habit was present in only 32% of patients. A documented PR was carried out in 89 (66.9%). Abdominal x-ray was carried out in 73 patients (54.9%), of whom 60 had constipation or faecal loading reported by A&E doctors. In only 32 (53%) of these x-rays was the finding of faecal loading confirmed by radiology review. Most patients were discharged and treated with laxatives or suppositories.

Conclusions: The diagnosis of constipation in our department is frequently based upon x-ray findings that are not confirmed by radiology review. Many of these patients have no recorded change in bowel habit and no evidence of faecal loading on rectal examination. Use of laxatives or suppositories in such cases is likely to be inappropriate.

36 COMPARATIVE PROSPECTIVE STUDY OF FOREIGN BODY REMOVAL FROM EXTERNAL AUDITORY CANALS OF CADAVERS WITH STANDARD INSTRUMENTATION OR CYANOACRYLATE GLUE

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Objectives: Foreign bodies of the external auditory canal are a relatively common problem in Accident and Emergency Departments. Attempts at removal with standard instrumentation can lead to significant ear injury. Recent case reports of using cyanoacrylate impregnated cotton buds suggest this is less traumatic and well tolerated by patients. No studies on this method have been performed. The objectives of this study were to identify whether there were significant differences in success rate, duration and injury caused by extracting beads from the external auditory canals of adult cadaveric ears using two different methods.

Methods: In this study the success rate, time taken and injury rate were assessed for removal of impacted spherical foreign bodies in the

external auditory canals of cadavers using both a blunt right angle hook and cotton buds impregnated with cyanoacrylate glue.

Results: Both methods had a statistically similar success rate (2 tailed binomial test $p=0.5$) and no injury was identified. In addition the median extraction time for a right angle hook was 6 seconds and 42 seconds for cyanoacrylate.

Conclusions: The authors feel that cyanoacrylate impregnated cotton buds are as effective at removing impacted foreign bodies as a right angle hook but the process takes longer. It is believed that patients could tolerate this longer time as the cyanoacrylate method is in theory less traumatic.

37 KNOWLEDGE OF SECTION 136, THE MENTAL HEALTH ACT 1983, AMONG A&E DOCTORS, SENIOR NURSES AND THE POLICE

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Objective: Section 136 of the Mental Health Act 1983 empowers the police to detain those suspected of being mentally ill in public places and convey them to a place of safety. As A&E departments are often used as a place of safety, it is important for A&E staff to understand section 136. We therefore undertook this study to compare the level of knowledge of section 136 between A&E doctors, senior nurses and the police.

Method: Doctors and senior nurses in all a&e departments in the yorkshire region were asked to complete multiple choice tick-box type questionnaires, as were police from the humberside police force. The questionnaire was also reviewed by mind, the mental health charity.

Results: 179 completed questionnaires were returned, which consisted of 16 consultants, 14 SpR's, 24 SHO's, 33 senior nurses, and 92 police officers. Deficiencies in knowledge were identified in many areas. 6.25% of consultants, 35.7% of SpR's, 16.7% of SHO's, 33.3% of nurses and 10.9% of police officers failed to recognise that the person has to appear to be suffering from a mental disorder to be placed on a section 136. 40.2% of police did not know that section 136 is a police power compared to 23% of A&E staff. 43.75% of consultants, 57.1% of SpR's, 45.8% of SHO's, 66.7% of nurses and 14.1% of police incorrectly thought that a person could be placed on a section 136 in their own home. There continues to be a debate regarding what constitutes a place of safety, 43.75% of consultants and 50% of SpR's did not consider A&E departments to be a place of safety but 93.75% of consultants and 100% of SpR's considered a police station to be one. The knowledge of who is normally required to assess a patient detained on a section 136 was poor. A&E staff correctly answered that patients must normally be assessed by an approved social worker (50.6%) and by a consultant psychiatrist (71.6%) compared with the police (64.1% and 27.2% respectively).

The following proportions of each group thought that patients could be transferred on a section 136, consultants (43.75%), SpR's (64.3%), SHO's (50%), nurses (45.6%) and 29.3% of police. Regarding patients brought to an A&E department under section 136, 75% of consultants felt that the police must stay with the patient until appropriate assessment takes place compared with 43.5% of police. 71.7% of police stated that they should stay when the safety of the patient or staff so require. 68.5% of police either did not know or incorrectly thought that an official section 136 form exists in the Humberside area. Only 37.5% of consultants, 7.1% of SpR's, 6.1% of nurses and 22.8% stated that they had received any formal training in this area. None of the 24 SHO's had received any training.

Conclusion: The knowledge amongst A&E staff and the police of this difficult and complex piece of mental health legislation is poor and requires addressing through formal education and training. Failure to agree and implement cohesive local policies will not serve to redress the deficiencies in knowledge. Not only does this study reflect the levels of knowledge within the groups, it may also reflect the different perceptions of each group as to what their role and duties are within section 136 of the Mental Health Act 1983.

38 MINOR INJURIES TELEMEDICINE: THE EXPERIMENTAL DETERMINATION OF AN OPTIMISED TECHNICAL STANDARD

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Objectives: To determine an optimised, non-proprietary technical standard for imaging in minor injuries telemedicine. Also, to

determine the effect of image resolution, compression and visual display medium on the accuracy of A&E telediagnosis.

Methodology: A test set of X-rays and clinical images was captured in digital format and converted, through a series of standardised manipulations, to produce a wide range of output files varying in resolution, compression and colour depth. The time required to perform these manipulations, and to transmit a selection of files using two methods, was recorded. A representative selection of images were viewed by an expert panel comprising six consultants and six specialist registrars in A&E in order to determine the effect of resolution, compression, display modality and colour depth on perceived image quality and diagnostic performance (using a scoring system and receiver operating characteristic (ROC) methodology). The original X-rays and conventional photographs were used as controls, with measures taken to assess and counteract any possible order effect. A gold standard interpretation of each image was obtained from the opinion of several independent consultants and clinical review of each patient. All viewings were standardised, and the members of the expert panel were blinded to the image capture and compression techniques, as well as to the image resolution. Intra- and inter-observer variability were both assessed.

Results: Image file size declined with reductions in resolution and increases in compression, as expected. Over ISDN the transfer rate was approximately 10kB per second per channel. For both X-rays and still images it was determined that at least 250,000 pixels are required for accurate interpretation. At 500,000 pixels the images were rated and interpreted equally to controls, but below 250,000 pixels a rapid and detrimental decline in image quality and performance was observed. A JPG compression level of up to 50 was found to be appropriate and effective for both X-rays and still images, but beyond this threshold rapid image degradation occurred. For still images GIF transformation, rendering 8 bit colour images, was able to significantly reduce total image size without effecting (and possibly even enhancing) image interpretation. A large (e.g. 19") high quality computer monitor was shown to be clearly superior to a conventional television of the same size or larger.

Conclusion: Our standard therefore comprises images containing at least 250,000 pixels (e.g. an image resolution of 563x438 pixels), compressed at up to JPG 50 (or GIF for colour images) and displayed on a high-resolution computer monitor. The average file size of such images is 16.69 kB for digital images and 8.91 kB for X-rays, facilitating rapid real-time transfer over ISDN, or even an analogue modem.

Paediatrics

39 COMPARISON OF ORAL AND INTRAVENOUS MORPHINE FOLLOWING ACUTE INJURY IN CHILDREN

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Objectives: To examine the speed of onset and effectiveness of pain relief between oral and intravenous morphine in acutely injured children.

Methods: An observational study of children aged three to thirteen years with closed forearm fractures was performed in three Accident and Emergency Departments. The study gathered information on age, gender, body weight, time of arrival, dose, route and time of morphine administration. Pain assessment using a Faces scale was documented on arrival and repeated at 10, 30 and 60 minutes after morphine was given.

Results: 47 children were studied. 25 were given intravenous morphine, 22 were given oral morphine. There was no statistically significant difference in age, body weight or time until morphine was administered. The change in median pain scores was analysed using the Mann Whitney U test. This showed that there was a statistically significant reduction in pain score in the intravenous group compared to the oral group between arrival and 10 minutes after giving morphine and between arrival and 60 minutes after giving morphine.

Conclusion: Intravenous morphine appears to be giving more rapid onset and more prolonged pain relief than oral morphine for children with acute injuries. We recommend that in Accident and Emergency Departments where staff are experienced in paediatric cannulation, morphine should be given via the intravenous route in acutely injured children. However we do not advocate inexperienced staff attempting multiple venepunctures in a child resulting in increased anxiety.

40 ANALGESIC TREATMENT OF FRACTURES IN PAEDIATRIC ACCIDENT & EMERGENCY: A RETROSPECTIVE STUDY OF ASSESSMENT OF PAIN, DELIVERY AND EFFECTIVENESS OF ANALGESIA

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Objective: To determine how effective we are at assessing, and accurately treating pain due to fractures in children in accordance with BAEM guidelines.

Methods: A retrospective audit using REMASS. All children with a diagnosis of a fracture (entered into the computer), were retrospectively selected by the computer. This was done for two, one-week periods, (01.07.00.—08.07.00. and 01.09.00.—08.09.00.) These dates represented periods before and after the implementation of new A+E card that had a separate area to record the pain score. Once the cards had been selected, they were analysed for presence of pain score, type of analgesia used, and time taken to administer the analgesic agent. We could then compare the results from the two groups and also compare our regimen to the BAEM guidelines for treating analgesia in children.

Setting: The Paediatric A+E department of University Hospital Lewisham.

Subjects: Children (0—16 yrs) diagnosed with a fracture and entered as such onto the REMASS system.

Results: A total of 36 subjects were selected by the computer; 20 subjects for the week in July (group A), and 16 for the week in September (group B). Prior to the new A+E card, pain scores were only documented in 45% (9/20) of cases, but this rose to 94% (15/16) with the inclusion of a new area to document pain score in the A+E card. Analgesics were administered in only 55% (11/20) of cases of group A compared to 81% (13/16), of group B. There was poor correlation with the BAEM guidelines for treatment of paediatric pain, demonstrated by the median pain scores for each analgesic agent used. I.e. Paracetamol alone = 4, Ibuprofen alone = 5, Paracetamol & Ibuprofen combined = 6, and morphine (IV or PO) = 8. The median time taken to administer any analgesic agent was 15 minutes, but there appeared to be no correlation with the pain score it was treating, and there was an inverse relationship with potency of agent used, with Paracetamol alone having a median time to administer of 10 minutes, Paracetamol and Ibuprofen taking 17.5 minutes, and Morphine (IV or PO) taking 18 minutes.

Conclusions: This audit has demonstrated the benefit of a specific area to document pain scores in the A+E notes. Increasing the documentation of the need for analgesia appears to increase the likelihood of treatment. However, once the need for analgesia is documented, this audit shows that pain appears to be under treated in accordance with the BAEM guidelines.

41 ANTIBIOTIC PROPHYLAXIS IN PAEDIATRIC THERMAL BURNS

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Background: The recommendation from the Mid-Trent Regional Burns Unit is that all children presenting with burns should be prescribed a three day course of prophylactic antibiotics to prevent the potentially fatal complication of Toxic Shock Syndrome.

Type of study: A retrospective audit.

Objectives: To audit the prescribing of prophylactic antibiotics to children presenting to the A&E department with thermal burns. The Burns Unit recommendations were used as the Gold Standard.

Setting: The Accident & Emergency Department of a busy District General Hospital.

Methodology: The notes of all children (0–12 years) presenting with thermal burns over a 12 month period were reviewed. Each patient had a proforma completed, by the author, that recorded whether antibiotics were prescribed. Any complications from the burn injury were also noted. Based on the results recommendations were made and implemented. A re-audit completed the audit loop and assessed the effectiveness of the recommendations. The re-audit period was over 6 months.

Results: 195 children were included in the initial 12-month audit. 54 (27%) children received antibiotic prophylaxis. During the re-audit period 97 children presented and 72 (74%) received antibiotics. The re-audit demonstrated a significant change in practice. None of the patients studied over the 18 months developed Toxic Shock Syndrome.

Conclusions: The use of audit and the implementation of resulting recommendations led to a significant improvement in clinical

practice. The audit has led to our questioning the evidence base behind the Burns Unit recommendation of antibiotic prophylaxis for all paediatric burns. We are conducting a national study to look at current UK Accident & Emergency practice regarding antibiotic prophylaxis in paediatric thermal burns.

42 PRESENTATION OF CHILDREN LESS THAN TWO YEARS TO ACCIDENT AND EMERGENCY WITH BURNS/SCALDS AND LIKELIHOOD OF CHILD PROTECTION REGISTRATION

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Rationale: Burns and scalds are common among inquisitive toddlers, and injury patterns may lead to consideration of child protection issues. Hitherto, it was not known what proportion of children under two years that present to Accident and Emergency (A&E) with a burn or scald will be placed on the child protection register in subsequent years.

Objective: To determine the likelihood of subsequent child protection registration among children who present to A&E aged less than two years with a burn or scald.

Literature review: No previous study has addressed this issue. References exist linking particular patterns of burns and scalds to child abuse, but quantification of this is lacking.

Methods: A case-control study was undertaken. The Sheffield Children's Hospital A&E database was examined, and identified those children aged less than two years presenting in 1996 with a burn or scald. These children were matched for controls presenting with an injury of another kind. Matches were made for age, sex and postcode of residence. All names were then checked against the child protection register, identifying past or present registrations.

Results: 176 children aged less than two presented to A&E at Sheffield Children's Hospital with a burn or scald in 1996. Three study children had been placed on the child protection register on checking at the end of 1999. One of the controls had been registered. The difference between these groups is not significant ($\chi^2=0.25$).

Conclusion: Many features of a child's attendance to A&E may rightly lead to consideration of child protection issues, but taken in isolation, our study shows no evidence of increased likelihood of subsequent child protection registration among very young children presenting with burns or scalds. A difference may exist, but the numbers required to achieve statistical power in an A&E population are very large. It must be remembered that child protection registration is not the same as abuse, but provides the only easily accessible and reliable marker.

43 STATUS EPILEPTICUS IN CHILDREN: WHAT'S WRONG WITH DIAZEPAM?

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Objectives: To study the effectiveness of Diazepam and risk of respiratory depression when it is used as first line treatment for children with convulsive status epilepticus (duration of 30 minutes or more).

Method: A two year retrospective study was performed of all children attending the Accident and Emergency department of the Leicester Royal Infirmary with convulsive status epilepticus. At the time the department followed the protocol of the Advanced Paediatric Life Support group, requiring Diazepam to be administered twice prior to commencing other anticonvulsants.

Results: There were 43 episodes of status epilepticus in 36 children over the study period. 8 episodes were excluded from the study; one child required intubation on arrival, in 5 episodes the protocol was not followed and in 2 insufficient information was available. The first dose of Diazepam was given PR in 17 and IV in 18 episodes with 19 responding. The second dose of Diazepam was given PR in 4 children (as vascular access not obtained) and IV in 11 with 8 responding. In total, therefore, 27 of the 35 episodes responded to Diazepam as first line treatment (77%) with PR dose range of 0.08–0.44mg/kg (median 0.25mg/kg) and IV dose range of 0.09–0.55mg/kg (median 0.25mg/kg). Two children developed respiratory distress (6%), one requiring intubation and one requiring a brief period of bag-mask-valve ventilation.

Conclusion: In children with status epilepticus diazepam remains an effective first line anticonvulsant. In this group of patients the number developing respiratory distress was much less than previously reported.

44 DOES THE DEGREE OF FEVER IN CHILDREN INFLUENCE THE DECISION TO ADMIT?

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Background: Febrile children commonly present to A&E. The relationship between the degree of fever and the presence of serious bacterial illness has been investigated in the past but no predictive value has ever been demonstrated between these two variables. We performed an observational prospective cohort study to investigate whether the recorded temperature on arrival in A&E differed in children subsequently admitted to hospital compared with those children who were discharged.

Method: All patients under the age of 5 years presenting to our A&E department over a two month period with a temperature of 37.5°C or above were included in the study. Patients referred to the paediatricians directly and those in whom a temperature recording was not thought relevant to their presenting complaint were excluded. Data was collected using a proforma and by subsequent case-note analysis.

Results: 148 patients were included in the study. No significant difference was found between the study groups with respect to age (months). The mean temperature (°C) in children who were admitted was significantly higher than that of children discharged directly from the A&E ($p < 0.05$).

Conclusion: We conclude that the recorded temperature on arrival in febrile children does differ in those children who are admitted and those discharged. Possible reasons for this difference are discussed. The use of temperature on arrival in any admission protocol for febrile children presenting to A&E is also discussed.

45 DEVELOPING AN OBJECTIVE AND VALIDATED BRONCHIOLITIS SCORE TO PREDICT ITU ADMISSION

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Rationale: Infants with bronchiolitis present a considerable challenge of management in terms of both clinical assessment and treatment, and safe disposal at times of winter epidemics. Those children who require ITU care may have clinical features that are subtle and developing a clinical score as a decision support tool has important applicability.

Objective: To identify those clinical features in infants with bronchiolitis that predict ITU admission and develop an objective score based on these and other commonly assessed features.

Literature review: Although clinical scores have formed part of the assessments of many clinical studies of infants with bronchiolitis, these scores have been created somewhat arbitrarily, based on consensus clinical practice, and rarely to predict outcome alone. No previous study has addressed the question of whether it is possible to construct a score to predict ITU admission.

Methods: Data were collected prospectively on all infants presenting with symptoms and signs suggestive of bronchiolitis to Accident and Emergency and the General Practitioner Referral Unit at Sheffield Children's Hospital, which is the sole provider of emergency services for children in Sheffield. The period of study was confined from 1.10.98 until 31.3.99, corresponding to the seasonal peak in incidence of bronchiolitis. Clinical features that were components of previous scores were recorded. Discrimination between clinical characteristics of infants admitted to ITU and those not, was undertaken statistically using odds ratios.

Results: 199 children with bronchiolitis were included in the study. The mean age was 5 months (range 0 to 21). 10 children were admitted to ITU. Presence or prior history of apnoeas was significantly associated with admission to ITU: OR 19.9 (95% CI 4.4, 89.5). Respiratory rate was also significantly related to ITU admission: OR 8.8 (95% CI 1.1, 71.8), using median as cut point. No other variable was significantly related to ITU admission, but as only 10 cases were admitted, other clinical features may prove to be important. Variables relating to recession were negatively associated with ITU admission (although this was not statistically significant).

Conclusion: Two clinical variables in infants with bronchiolitis were significantly associated with admission to ITU: apnoeas and respiratory rate. Other variables may be significant, but our sample is too small to identify a difference. Work to validate an appropriately weighted clinical score is currently in progress.

46 MAJOR TRAUMA IN THE 0-19 AGE GROUP: SHEFFIELD 1995-99. A PRELIMINARY REPORT

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Introduction: Sheffield is the fourth largest city in the UK with a population of approximately 500 000, of whom 135 000 are between the ages of 0-19 year. Data for all patients presenting to the A&E departments of the Sheffield hospitals between 01/01/1995 and 31/12/1999 who fulfilled the MTOS criteria for major trauma were collected and entered onto a database. Data for those between the ages of 0-19 years were analysed to determine the epidemiology and outcome for major trauma in this age group.

Results: A total of 503 eligible children and young adults presented over the five year period. The male:female ratio was 2.3:1. Mean age (range) at presentation was 10.5 years (0-19) for girls and 12.0 years (0-19) for boys. The mean annual age specific incidence of major trauma was in the 0-4 age group 57/100 000, 5-9 age group 55/100 000, 10-14 age group 80/100 000 and 15-19 age group 116/100 000. The median ISS was 9 for all groups with ranges for the 0-4 age group 0f 1-75, 5-9 age group 2-75, 10-14 age group 4-56 and 15-19 age group 4-74. The mortality for the 0-4 age group was 10.5%, 5-9 age group 7.7%, 10-14 age group 4.0% and 15-19 age group 8.5%. The observed (expected) survival in the 0-4 age group was 77 (76.4), 5-9 age group 84 (84), 10-14 age group 121 (118.5) and 15-19 age group 183 (179.7). In terms of quality of management, three patients were initially sent home and subsequently re-admitted, one of whom died from an intracranial bleed. One patient admitted with a head injury and intoxication had a delayed CT scan, was treated conservatively and survived. Four patients had missed injuries, one of whom died.

Summary: Major trauma is uncommon in children and young adults, although it is still the commonest cause of death in the 1-19 age group. The highest incidence in our study occurred in the 15-19 age group. Our outcomes compare favourably with National norms, but adverse outcome still occur due to deficiencies in management. Further analysis is in hand to determine factors associated with poor outcome and sub-optimal management.

47 SPIRAL TIBIAL FRACTURES IN CHILDREN LESS THAN FIVE YEARS: CHILD PROTECTION QUESTIONS AND REGISTRATION IN LATER YEARS

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Rationale: Spiral tibial fractures in young children are common, and concerns of child protection issues among these children have been raised in the past, most commonly by those unfamiliar with the regular assessment of paediatric trauma that presents to Accident and Emergency (A&E). Although the true incidence of abuse is unlikely ever to be established for these children, we attempt to provide some measurement and perspective.

Literature review: One study in North America has investigated this issue before: in a series of 50 children with spiral tibial fractures, no concerns of child protection were found. No other data exist to confirm or refute this finding. Standard paediatric texts refer to child protection issues in connection with long bone fractures, but make no exceptions for spiral tibial fractures.

Objectives: To determine the incidence of spiral fractures of the tibia in children less than five years presenting to A&E at the Sheffield Children's Hospital, and to determine patterns of presentation that alert clinicians to the possibility of abuse. In addition, to determine how many subsequently become registered on the child protection register.

Methods: We identified all children less than five years who sustained a spiral tibial fracture and presented to A&E from 1.1.93 until 31.12.97, using the Sheffield Children's Hospital X-ray and A&E databases. Databases were crosschecked to maximise data capture. A&E attendance notes were obtained for each episode and note made of child protection issues recorded including: presentation delay, social circumstances, parental age, appropriateness of dress, rapport and other examination evidence of abuse. Children with spiral tibial fractures were then matched with control children who presented with injuries other than tibial fractures. Matches were made for age, sex and postcode of residence. All names were checked against the child protection register in January 2001, and past or present registration was recorded.

Results: In the five-year period of study, 75 children with spiral tibial fractures were identified. Mean age at presentation was 2.3 years

(SD +/-1.0), 45 were male and 30 female. Mean follow up period was 6.9 years (SD +/-1.5). None of the children suffering spiral tibial fractures had been placed on the child protection register. One of the controls had been registered. Nine (12%) children with spiral tibial fractures presented after a delay of more than six hours (up to five days later). All parents or guardians were able to give a history of trauma to account for the injuries. In the main, injuries occurred after a fall, often with twisting forces. Very few records were made of social circumstances, rapport, dress or appropriateness of parental response.

Discussion: Our study provides the largest series of spiral tibial fractures in under fives. Child protection registration is uncommon in this group, even after prolonged follow up. The numbers of such children are too few to conclude that child protection registration is no more frequent than controls, but taken in isolation, spiral tibial fractures need not raise especial child protection concerns. A prospective study is planned to achieve more complete recording of child protection questions in these children.

48 ROPE SWING INJURIES IN CHILDREN

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Rationale: Injury prevention among children has a high profile in the present government's health manifesto. Our perception was that rope or "Tarzan" swing injuries are a common cause of potentially avoidable morbidity in children. We therefore set out to record injuries sustained in this way. No study has previously described the pattern of rope swing injuries in Accident and Emergency (A&E).

Objective: To describe the injuries sustained by children following rope swing accidents attending A&E during the spring and summer.

Methods: Data were collected prospectively on all children (up to sixteen years) attending A&E at Sheffield Children's Hospital and Rotherham General Hospital from March until September. Information was collected by the same observer and all injuries were recorded, irrespective of how trivial they may have been.

Results: 35 children presented to A&E with injuries sustained from a fall from a rope swing. 18 presented to Sheffield Children's Hospital and 17 to Rotherham General Hospital. 27 (77%) were boys and 8 (23%) were girls. The mean age of the injured children was 10.1 years (SD +/- 2.3 years). 4 children were multiply injured. 25 children sustained fractures that ranged from an open fracture of a proximal phalanx, to displaced Salter-Harris IV fractures of both ankles. 9 children required operative treatment of their fractures. 4 children sustained lacerations requiring suturing and 5 sustained head injuries necessitating inpatient observation, either because of vomiting or prolonged loss of consciousness. Two children required general anaesthesia for facial wound debridement by plastic or maxillofacial surgeons. One child fell forty feet into a river and needed treatment for hypothermia in addition to her injuries. Finally, one child suffered fractures to four ribs and a pneumothorax for which an intercostal drain was sited.

Discussion: Rope or "Tarzan" swing injuries among children are common. Our study has shown that the injuries sustained are frequently far from trivial, often need inpatient treatment, and in several cases operative intervention. Our perception that the morbidity caused by these swings is substantial has been borne out by this study. Rope swings are often hastily erected, frequently overhang water and children using them may not have a responsible adult present. In fact, a 21-year-old male also sustained multiple injuries from a rope swing accident during the period of study. We believe that common sense, a public information campaign and additional supervision of children would reduce injuries caused by rope swings.

49 CYCLE HELMET USE AND ATTITUDES TO HELMET LEGISLATION IN LEICESTERSHIRE

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Introduction: World-wide there are three times as many bicycles produced each year as motor cars. Bicycle riding is associated with considerable risk, notably head injury. Cycle helmet use is not compulsory in the UK, unlike certain areas abroad (ie. Australia where it was first introduced). Our study aim was to assess parental and child attitudes to cycle helmet use and potential legislation.

Method: Three hundred consecutive children of cycle riding age(5-16) and their parents were targeted with separate structured

questionnaires on attendance in the Emergency department. Children with a cycling related injury were excluded.

Results: Two hundred and forty-one adults completed the questionnaire (response rate 80%). Two hundred and twenty (91%) agreed that legislation should be introduced to make it compulsory for cycle helmets to be worn. The most commonly cited reason for parents not buying a helmet for their child was that: "The child would not wear it anyway."(57% of respondents) Of the 207 children completing the questionnaire, the most common reason given for not wearing a helmet was that it was not perceived as fashionable(63 (30%) of respondents). Comfort(48(23%)) and the fact that friends did not wear a helmet (48(23%)) were other reasons cited. In the group of children who thought cycle helmets were unfashionable, 24(39%) said they would be more likely to wear a helmet if a logo of their favourite pop star or sports team was on the helmet.

Conclusions: Most parents in this survey agreed with the introduction of cycle helmet legislation, and the use of logos of pop stars or sports personalities may increase the use of cycle helmets by children.

50 THE RELIABILITY OF ULTRASOUND GUIDED ASPIRATION IN THE ASSESSMENT OF NON-TRAUMATIC PAEDIATRIC HIP PAIN

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Introduction: Ultrasound examination with aspiration and microscopy has been widely described as a reliable method of distinguishing between reactive effusions and infective effusions of the hip joint. We reviewed the sensitivity and specificity of ultrasound guided hip aspiration and microscopy in distinguishing between septic arthritis and transient synovitis.

Methods: We identified 40 consecutive children with atraumatic hip pain who underwent ultrasound examination of their hips. If an effusion is identified the current practice in our department is for the effusion to be aspirated using topical anaesthesia. The aspirate undergoes microscopy with gram staining. We analysed the temperature, inflammatory markers (CRP and ESR), white cell count, the results of the aspirate microscopy, xray and growth on culture with respect to the final diagnosis.

Results: The final diagnosis in 34 of the patients was transient synovitis, there were 2 patients with septic arthritis (both with positive cultures for staphylococcus aureus) the remaining 4 patients had Perthe's, slipped upper femoral epiphyses (SUFE) and presumed soft tissue injury. On ultrasound examination 25 children had hip effusions identified of which 20 had successful aspirations. There were 3 unsuccessful aspirations (13% of attempted aspirations). No organisms were identified on initial microscopy of any of the aspirates. Both children with a final diagnosis of septic arthritis underwent ultrasound guided aspirations and in neither case were organisms identified. The negative predictive value of microscopy in identification of septic arthritis was 90%. C reactive protein (CRP) was measured in 38 patients (95%), range 1 to 250mg/l. The positive predictive value of CRP (value greater than 8) in the detection of septic arthritis was 16% and the negative predictive value 97%. White cell count (WCC) was measured on presentation in 39 patients (97%) with a range of 5,400 to 20,000 cells per cubic millimeter. The positive predictive value of WCC (value greater than 12,000) in the detection of septic arthritis was 30% and the negative predictive value 97%. The erythrocyte sedimentation rate (ESR) was measured in 21 patients (52%), range 0 to 57mm/h. The positive predictive value of ESR (value greater than 10) in identification of septic arthritis was 16% and the negative predictive value 100%. Temperature was measured in 35 patients (87%), range 35.7 to 38.1 degrees Celsius. The positive predictive value of pyrexia (value greater than 37.5) in the identification of septic arthritis was 14% and the negative predictive value 96%. Plain radiography was undertaken on presentation in 23 patients. Xray on initial presentation was normal in all cases except one which demonstrated an effusion.

Discussion: We conclude that routine aspiration and microscopy is unreliable in ruling out of septic arthritis. Aspiration of hip effusions produced false negatives which could have led to substantial delays in diagnosis of septic arthritis if relied on solely. As suggested by previous authors a combination of inflammatory markers (CRP and ESR), WCC and temperature plus ultrasound of the hips could have accurately identified both cases of septic arthritis. Routine xray examination is unhelpful at first presentation in those children not at risk of a SUFE (under 8 years).

51 THE CHILD PROTECTION REGISTER: A TOOL IN THE AED?

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Aims: To determine whether the confidential nature of the Child Protection Register (CPR) impairs ability to recognise Non-Accidental Injury (NAI) in children presenting to the Accident & Emergency Department (AED).

Objectives: To determine the number, reason for and frequency of AED attendance by children on the CPR. To determine whether lack of knowledge of CPR status results in an adverse outcome by comparison with standard indicators of NAI.

Methods: Access to the CPR was obtained as part of the United Hospitals Trust Child Protection Panel's monitoring programme. Records of each child on the CPR attending the AEDs of the United Hospitals Trust between June 1994 and May 2000 were reviewed.

Results: Over the 6 years 191 children were on the CPR. Of these 79 (41%) attended AEDs on 206 separate occasions. Frequency of attendance ranged from 1 to 18, with a mean of 2.6, mode of 1 and median of 6. Of the 167 (81%) self-referrals 19 (48.5%) were admitted, 26 (13%) were GP referrals of which 5 (19.2%) were admitted, 11 (5%) were '999' calls (3 or 27.3% admitted) and 2 (1%) were direct referrals from school (1 or 50% admitted). Most presentations involved trauma; upper limb trauma (21%), lower limb trauma (14%) and head injury (8%). Almost all cases of trauma were adjudged to be consistent with the history and NAI was not suspected. Common childhood illnesses accounted for the remainder of presentations. Only 6 children were identified as being on the CPR at the time of presentation, concerns were raised in 2 other cases and concerns should have been raised in 3 (4%) other children. These cases will be discussed. Social Services were alerted on 5 other occasions.

Conclusion: The confidential nature of the CPR does not impair ability to recognise NAI. Most children on the CPR attend the AED for innocent minor accidents or common childhood ailments that would not cause concern when compared with standard indicators of abuse. Social Workers as a source of Child Health Surveillance are under-utilised. No adverse outcomes resulting from the confidential nature of the CPR were noted.

52 PLANNING PAEDIATRIC CARE IN A GENERAL EMERGENCY DEPARTMENT

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Aim: To analyse the paediatric workload of a District General Hospital Accident and Emergency Department to predict the potential needs of a paediatric unit created within the department.

Method: A retrospective study of computerised records for all children (aged 0–16) in a one year period (April 1999 - March 2000). Demographic data was studied in conjunction with details of presenting complaint, treatment, primary diagnosis, and outcome. Information obtained was analysed by triage category and by diagnosis. This identified a number of areas of clinical interest, which were then analysed further.

Results: 11,556 children attended over one year. (Total annual attendance for the department was approximately 55,000.). There was a marked predominance of male children of all ages (6813 M: 4743 F), particularly for injuries that were sports-related or traumatic. Commonest age of attendance was 1 year old—1023 children (8.8%). Breakdown by National Triage Categories showed Category 1 (48 patients), Category 2 (403), Category 3 (2468), Category 4 (8546), Category 5 (91). Specific areas identified for further analysis included: Head injuries (1437); Accidental (95) & Deliberate (50) overdoses; Convulsions (128); Burns & Scalds (177); Animal Bites (70, including 58 dog-bites); ENT problems (including 82 nasal foreign bodies and 60 aural foreign bodies); Road Traffic Accidents (195); Children not waiting for review (1158).

Conclusions: The majority of children attended for non-traumatic reasons. Training of staff should emphasise the recognition of the sick child and the initial management of all such patients. This study identified several areas on which staff training has subsequently been focussed. Identifying specific mechanisms of injury (e.g. burns) assists appropriate targeting of injury prevention advice. 10% of children attending the department did not wait for medical assessment or treatment. This may relate to prolonged waiting times, inappropriate patient use of the service, or the need for a review of triaging practices.

53 ANALYSIS OF A&E ATTENDANCE LEVELS FOLLOWING CENTRALISATION OF PAEDIATRIC A&E SERVICES IN SHEFFIELD

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Background: Sheffield is the fourth largest City in the UK, with a population of 500,000, 100,000 of whom are children. In April 1997 A&E services were rationalised. All adult A&E services were concentrated on the Northern General site, some five miles to the north of the city centre. Paediatric services were concentrated on the Children's Hospital site, approximately one mile from the city centre. Approximately 18 months after the transfer was completed the Health Authority undertook an analysis of A&E attendance levels by PostCode before and after the transfer to determine A&E usage. Their methodology was however flawed because it failed to standardise attendance levels for all relevant factors. In particular the use of patient groupings by postcode could potentially lead to a confounding effect because two factors influencing A&E attendance levels can be derived from the postcode, namely the distance from the A&E department (calculated from the Ordnance Survey grid reference of the enumeration district (ED) containing that postcode and the grid reference of the hospital) and the socio-economic status of the individuals living in the enumeration district containing that post code.

Methodology: We therefore undertook a study to determine the effect of centralisation of paediatric A&E services on attendance levels, standardising for age, sex, distance from the A&E department attended and socio-economic status (using the Townsend Index calculated from Census data for the enumerator district for a given post code). Data for all children (0–17 years) were downloaded from the A&E databases for the periods September 1995 to September 1996 and September 1997 to September 1998. The software used to do the mapping and analysis (ArcView GIS) can map out demographic data by ED as well as perform statistical analysis.

Results: Attendance rates at A&E were lower in the period 1997/8 than in the period 1995/6. Attendance rates for males fell across all Townsend deprivation quartiles with the highest falls recorded for the two most deprived quartiles. The shift is not so marked in the case of females although the highest fall is recorded in the most deprived quartile. Statistically significant falls in attendance rates are most often found in EDs that after 1997 were more than a mile further away from the closest A&E unit than they were prior to 1997. This finding is particularly marked in the case of those EDs that are close to the Northern General hospital. It is particularly marked in those EDs that are in the lowest Townsend deprivation quartile. Given that many of the EDs near the Northern General have high deprivation scores there is evidence that there has been a significant decline in attendance at A&E units by children (0–17) living in the deprived areas close to the Northern General. These appear to be the subpopulations whose behaviour has been most affected by the closure.

Conclusion: The centralisation of paediatric A&E services in Sheffield has led to a decrease in attendance levels. This decrease has been most marked in the more socio-economic deprived sections of the population and those most distant from the Children's Hospital. Whether this reduction in attendance levels has had any significant impact on the health of this group of children is unknown.

Physiotherapy and sports injuries

54 AUDIT OF THE EFFECT OF A PHYSIOTHERAPY PRACTITIONER ON SOFT TISSUE KNEE INJURY MANAGEMENT IN AN ACCIDENT AND EMERGENCY DEPARTMENT

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Objective: To assess the effect of a physiotherapist with extended scope of practice in the management of acute soft tissue knee injuries in an Accident and Emergency (A&E) Department.

Introduction: Acute knee injuries presenting to A&E are common. The knee is the most commonly injured joint in the high-risk sports of soccer and rugby.¹ Acute knee injury is the

Abstract 54 Table 1 Disposal from A&E before and after introduction of A&E Physiotherapy Practitioner

	1998	1999
Referrals to physiotherapist	28	104
Admissions	7	2
Referrals to Trauma Clinic	39	18
Discharged from A&E no follow up or follow up if necessary	275	255
Total	349	379

commonest cause of permanent disability following a sports injury. Over recent years, there have been attempts to streamline acute knee injury management and the number of physiotherapists working in extended roles has expanded considerably. This study describes the effect of introduction of a dedicated A&E Physiotherapy Practitioner (AEP) in the management of acute knee injuries.

Methods: The A&E established an Acute Knee Screening Service (AKS) in 1998. A senior Chartered and experienced physiotherapist was appointed to run the AKS after additional training. Local guidelines and protocols were developed in conjunction with trauma knee surgeons, radiologists, physiotherapists and A&E physicians. The AEP performs clinical examination, requests radiological investigations including MRI scans, makes provisional diagnoses and instigates appropriate patient management. We present the effect of this service over a 3-month period compared with similar period one year prior to the introduction of the service. 100 consecutive patients managed by the service were assessed.

Results: The initial diagnosis of patients with acute knee injuries referred to the service showed meniscal injuries (38%), cruciate ligament injuries (18%), fractures (2%), patello-femoral joint injuries (10%), and others (32%). 95% of patients referred to acute knee service were seen within one week. Medical time was saved in both A&E and the trauma clinic. 60% of patients were treated and discharged from the service without further medical review. Of 39% (39) that were referred to trauma clinic 49% (19) had MRI scans requested by the physiotherapist. 88% of these scans showed significant pathology: 9ACL, 1PCL and the rest Menisci injuries.

Conclusions: A physiotherapy practitioner working with extended role is a valuable addition to an A&E department. The AKSS improves the quality of care of acute knee injuries, saves medical time, and achieves government objective of partnership and co-operation in NHS.

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55 THE ROLE OF AN EMERGENCY DEPARTMENT PHYSIOTHERAPY CLINIC

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Introduction: Soft tissue injuries account for a large proportion of patients attending the Emergency Department. There are considerable delays in providing physiotherapy in this way as the demands on the service are high. Thus, provision of emergency physiotherapy in the acute phase is often impossible. As an alternative a senior physiotherapist can be employed in the Emergency Department seeing patients referred following their first attendance in the Emergency Department or from the Emergency Department Review Clinic.

Aims: To investigate the clinical and cost effectiveness of an Emergency Department Physiotherapy Service.

Design: A questionnaire based study of all patients attending the Emergency Department Physiotherapy Clinic during a three month period between November 2000 and January 2001.

Subjects: a) All patients attending the Emergency Department Physiotherapy clinic between November 2000 and January 2001. b) A group of age, sex and presenting condition-matched patients attending the Physiotherapy Department following referral from the Emergency Department.

Outcome measures: The length of time between the initial presentation to the Emergency Department and the first physiotherapy attendance. The SF36 Health Survey is being sent to all the patients 10 weeks after their physiotherapy attendance. The patients attending the Emergency Department Physiotherapy Clinic completed a patient satisfaction survey.

Results: The length of time between initial presentation to the Emergency Department and physiotherapy attendance is lower for all groups of patients who attended the Emergency Department Physiotherapy Clinic. On average for knee injuries this was 7 days, for

ankle injuries this was 9 days and for shoulder injuries. The SF36 outcome is awaited. More than 95% of the patients were satisfied with the Emergency Department Clinic.

Conclusions: Our study indicates that the use of the Emergency Department Physiotherapy Clinic can improve the speed of receiving physiotherapy attendance for all presenting conditions. The cost of a Senior I Physiotherapist working for 3 hours in the Emergency Department is £2,250.00 per annum and this is thus a cost effective method of providing a useful service.

56 A SURVEY OF SPORTS INJURIES ATTENDING AN ACCIDENT & EMERGENCY DEPARTMENT

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Aim: To assess the frequency, type of injury, sport involved and management of sports injuries in patients attending an Accident & Emergency (A&E) department.

Method: All patients, aged 16 years and over, presenting with an injury related to sport, were studied prospectively over a period of three months.

Results: 273 patients attended the A&E department with a sports injury during the study period. This represented 2.3% of the departments overall workload. Males (89%) were injured more frequently than females (11%). Injury rates in both males and females peaked in the 16-20 age category. Football was the most common sport implicated in injuries (65%). Rugby (6.6%), Basketball (3.3%) and Badminton (2.5%) were the next most frequently involved sports. Soft tissue injuries dominated (70%). The lower limb was the most common anatomical area injured (60%). Other injuries involved the upper limb (25%), head and neck (10%) and the trunk (4%). Ankle sprains were the most common injury (19%). The majority of patients were referred to their General Practitioner for review (61%). 25% were reviewed at out-patient clinics, 5% were referred for physiotherapy, and 3% required hospital admission. The remainder required no follow-up. Two cardiac arrests are reported, one during a football game, the other whilst swimming. One of these patients died, the other was resuscitated but suffered significant brain damage.

Conclusion: Many people participate in exercise and sporting activities. In pursuing an active lifestyle they can suffer injury. Management of the sports injured patient presents different problems to the clinician as patients often wish to return their sport as soon as possible. A greater emphasis should be placed on the prevention of injury and the use of hospital specialists, sports injury clinics and physiotherapy during the rehabilitation process.

Prehospital care

57 DOES THE PUBLIC UNDERSTAND PRIORITY DISPATCH OF AMBULANCES? - A QUESTIONNAIRE SURVEY

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Introduction: In West Yorkshire the ambulance service (WYMAS) categorises all 999 calls using the Advanced Medical Priority Dispatch System (AMPDS) into priority A (high priority), priority B (medium priority) and priority C (low priority), but does not currently use the AMPDS category to guide its response. All callers are sent a "blue lights and sirens" ambulance in time order.

Aims: The aims of this study were to find out if a sample of the general public could accurately assign AMPDS priorities to real 999 calls and to document their views as to the most acceptable ambulance service response each should receive.

Methods: Eight real 999 calls (2 priority A, 1 priority B and 5 priority C) received by WYMAS were transcribed (omitting patient identifiable data), and shown to a sample of 100 adults who were either patients or accompanying patients in A&E. The interviewer was blind to the actual AMPDS category assigned. Subjects were asked to prioritise each call based on the definitions for categories A, B and C used by WYMAS, and to decide upon the most appropriate response from a list of six possible responses. They were also asked for a general

Abstract 57 Table 1

CALL >	1 Child with rash (C)	2 Man with backache (C)	3 Woman with dyspnoea (A)	4 Man with chest pain (A)	5 Elderly woman with epistaxis (B)	6 Adult PV bleed (C)	7 Youth with ankle # (C)	8 Woman who fainted (C)
A	92	5	44	95	17	66	1	13
B	6	61	41	5	56	32	33	47
C	2	34	15	0	27	2	66	40
Proportions of subjects assigning most appropriate response to each call								
	1	2	3	4	5	6	7	8
Lights/Sirens ambulance	86	5	32	93	11	62	2	7
Paramedic but no lights/sirens	8	36	41	7	35	34	22	33
Non-paramedic ambulance	0	32	5	0	20	2	32	13
Send caller a taxi	2	5	2	0	16	2	41	19
Re-route to GP	3	22	19	0	18	0	2	28
Re-route to NHS Direct	1	0	1	0	0	0	0	0

opinion as to the best way for the ambulance service to respond to 999 calls and if responses other than "blue lights and sirens" would be acceptable to them.

Results: Three percent of the subjects felt that the best way to respond to 999 calls was to send a "blue lights and sirens" ambulance to all calls in time order, 80% felt that priority of dispatch should be based on clinical need whilst sending all callers a paramedic ambulance, whilst only 17% felt that both the time and type of response should be determined based on the perceived severity of the illness. The proportions of subjects assigning each priority to the eight real 999 calls are recorded in the table (actual priority assigned by WYMAS in brackets); the table also displays their views as to the most appropriate response the ambulance service should have made in each case.

Comment: This study shows that the general public's views on call prioritisation differ from those assigned by AMPDS. The use of priority dispatch systems to guide ambulance responses other than sending a paramedic staffed ambulance, may not be acceptable to the general public.

58 A SURVEY OF THE UTILISATION OF 999 CALLS: IS THERE A ROLE FOR PRIORITY BASED DISPATCH?

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Introduction: 999 calls demand immediate response as at present there is no system for prioritising calls. As a result, calls are dealt with on a first-come-first served basis, regardless of the nature of the complaint. The aim of this pilot study was to evaluate 999 calls for patients attending A&E and to apply criteria which ambulance dispatch may use to prioritise response.

Methods: Data was collected on consecutive patients presenting to A&E following a 999 call. A&E notes and ambulance report forms were reviewed retrospectively. An unblinded researcher abstracted data onto standardised forms. This included; age, date, time, person who called, location, reason for call, prehospital and A&E GCS, respiratory rate, heart rate and systolic BP, and A&E diagnosis. The researchers devised 9 criteria which could be used by a dispatcher to decide if a patient required an emergency ambulance i.e. blue lights and siren. These are shown here: Chest pain; Cardiac arrest; Shortness of breath; Altered mental status / seizure; Abdo / loin pain > 65 years old; Fresh haematemesis; Fall > 2m; RTA; Stabbing.

Results: To date, 150 patients have been recruited to the study. 54% of patients were male, the mean age of the sample was 50 years. 134 calls came from bystanders or the patients themselves, GPs initiated 9 calls, another hospital initiated 2 calls and 5 calls were made by the Police. 55% of patients were admitted. 68 patients (45%) met the criteria described above.

Discussion: The response to true emergency calls can be delayed if an emergency ambulance is dealing with relatively minor cases. Immediate response puts ambulance personnel and other road users at risk and may make no difference to the outcome of the patient. This pilot work shows that the majority of patients do not meet the above criteria for an immediate ambulance response thus supporting the argument for priority based dispatch. It would be hoped that the introduction of such a system would reduce response times to those who are seriously ill and also reduce levels of stress in ambulance crews who feel the service is being abused. This is a small study that will form the basis of further work aimed at improving the service provided by the emergency ambulance service.

59 999 AMBULANCE OR BLUE LIGHT TAXI SERVICE?: THE SOUTH GLASGOW EXPERIENCE

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Introduction: 999 calls to the ambulance service are increasing. Previous studies have questioned the appropriateness of this emergency response for all callers. We set out to determine whether all patients brought to the A&E department by 999 ambulance genuinely need to attend hospital.

Design: Prospective cohort study of all patients brought to an urban A&E Department by 999 ambulance over a 3-week period.

Method: All patients arriving in the A&E department over a three-week period were identified prospectively, and their records examined for treatments, investigations or admission.

Results: 314 patients were transported to A&E by 999 ambulance during the study period. Complete data was available for 290/314 (92.4%) patients. 61 (19.4%) of 999 ambulances arrived between 1am and 9am, 126 (40.1%) between 9am and 5pm and 127 (40.4%) arrived between 5pm and 1am. 122/290 (42.1%) had blood tests performed, 168 (57.9%) had x-rays and 112 (38%) had a 12 Lead ECG done. 198 (68%) had a blood test or x-ray or both. 212 (73.1%) had any one or more of blood test, x-ray or ECG. 16/290 (5.5%) had an ECG and were then discharged without follow up. The treatments carried out were: 32 (11.0%) had a dressing, 118 (40.7%) had drugs prescribed, 27 (9.3%) had sutures and 4 (1.4%) had a POP. The disposals for all 314 patients were available. 179 (57.0%) were referred to an inpatient specialty, 6 (1.9%) were transferred to another hospital, and 2 (0.6%) patients died. 16 (5.1%) were discharged to a return clinic, 95 (30.3%) were discharged without follow-up, and 16 (5.1%) discharged against medical advice. In 23 (7.9%) cases no investigations or treatments were required, and the patient was discharged without follow-up.

Conclusions: Most patients who are brought to the A&E by 999 ambulance receive investigations or treatment or are admitted. It would appear that attending hospital is appropriate for approximately 90% of patients who call 999. If Priority Based Dispatch is introduced to identify 'true' emergency cases, we suggest that alternative transport should be made available for patients who are not able to attend by their own means, and have no other choice at present but to dial 999.

60 THE SURREY EMERGENCY CARE SYSTEM (SECS) - A FOUNDATION FOR THE FUTURE

J. Navein, I. McNeill, A. Kennedy. *Surrey Ambulance Service*

The Surrey Emergency Care System (SECS) is a pioneering telemedicine project linking the ambulance service and emergency departments in Surrey into a single clinical network. Phase 1 has been initiated and will link 11 front line ambulances with Frimley Park Hospital before rollout across Surrey.

The component parts of SECS include an electronic patient record form (e-PRF) with embedded clinical decision support software and audit tools and direct electronic input from monitors and ECGs. The e-PRF will be transmittable directly into an electronic patient record within a best of breed A&E system which will also include decision support and audit tools. The A&E systems within all 7 A&E departments in Surrey will be linked together into one single EMS network.

SECS provides the foundation upon which Surrey will modernise its emergency services. It delivers a single electronic record from 999 to discharge, effectively removing the seam from emergency care and

enables effective pre-warming of incoming cases. SECS will facilitate pre-hospital interventions, with appropriate oversight from A&E or elsewhere whilst decisions support and audit tools will encourage a uniformly high quality of care. The County wide network, with links into the community trusts, PCGs and social services will give the ambulance service a real time "eagle's eye" view of resources across Surrey and thereby to provide a planned and tailored response to a given case at a given time. Ultimately SECS will enable virtual cases conference whereby paramedics or other community based professional can call together resources to manage some cases without automatic transfer to hospital. This work is well advanced and could lead to a 50% reduction in emergency transfers to hospital.

SECS has been planned and developed over 4 years and went live earlier this year. This paper will provide an overview of the project with an emphasis on the clinical and service benefits of a whole systems approach to emergency care. It will also highlight the pre-requisites for such a project together with the barriers to its implementation and how they have been overcome.

61 APPROPRIATE USE OF THE EMERGENCY AIR AMBULANCE IN THE UK: A STUDY OF THE LINCOLNSHIRE SERVICE

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Objectives: (1) To compare mortality for emergency air ambulance (EAA) trauma patients with those of the ground based emergency ambulance (GBEA). (2) To examine the pattern of use of the EAA in order to attempt to define its appropriate and efficient use in the UK, using the Lincolnshire Air Ambulance as a model of a rural service.

Methods: Use of Lincoln County Hospital notes and TARN submission data to compare EAA and GBEA with for all trauma patients 1/1/2000 - 31-12/2000, using survival or death at discharge as the outcome measures. Within this a comparison of EAA and GBEA patient groups stratified according to Injury Severity Score (0-25, 26-50, 50+), scene Revised Trauma Score (0-3, 4-7, 8-12) and age (0-15, 16-59, 60+). Retrospective analysis of records of EAA patients to compare actual use with the indications in the Deployment Guidelines.

Results: Analysis in progress; preliminary findings as follows: No significant difference in mortality for EAA versus GBEA for overall trauma. No significant differences between EAA and GBEA for any of the subgroup bands (ISS, RTS, age). 90% EAA cases are trauma. 20% EAA cases discharged from A&E without admission. Deployment Guidelines vague, but not strictly adhered to. Figure 1 - Overall mortality of EAA vs. GBEA. Figure 2 - Mortality based on ISS group for EAA vs. GBEA. Figure 3 - Mortality based on RTS group for EAA vs. GBEA. Figure 4 - Mortality based on age group for EAA vs. GBEA. Figure 5 - Pie chart for case type for EAA patients. Figure 6 - Pie chart for disposal of EAA patients from A&E. (All charts to be completed when results finalised).

Conclusions: (To be finalised when results complete). No clinical advantage in terms of survival to discharge of EAA patients versus GBEA patients for trauma in Lincolnshire, regardless of age or degree of injury. EAA is overused with safety and resource implications. Use of the EAA in trauma should be strictly reserved for cases where GBEA access is difficult or significantly delayed. Further studies including six month mortality, morbidity and non-trauma patients would help define appropriate use of this costly service that is not without its own hazards.

62 SCOTTISH MOUNTAIN RESCUE MAJOR TRAUMA STUDY

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Introduction: Scottish mountain rescue teams assess and treat over 170 casualties with injuries and illnesses per year. No previous study has examined the injuries and pre-hospital care requirements of mountain casualties with major trauma.

Method: Retrospective study of casualties rescued by mountain rescue teams in Scotland in 1998 and 1999. Information from Scottish Trauma Audit Group database, hospital case records and rescue reports.

Results: 337 casualties with injuries and illnesses rescued in 1998 and 1999. 12 (3.6%) of casualties who survived had Injury Severity Scores of greater than 15. Most common injuries in this group were head, spinal and chest. 3 (0.9%) casualties initially alive at the time of rescue died during or after rescue. 57 deaths occurred in the study

period. 12 (3.6%) casualties suffered spinal injuries. Half of all casualties had lower limb injuries. 26 (7.7%) were suffering from medical illnesses. 47 (14%) were suffering from cold or exhaustion. One casualty died after rescue from hypothermia.

Discussion: Adequate training and equipment are required by mountain rescue teams to treat this significant number of seriously injured casualties. The current equipment supplied and classroom training appear to be of the appropriate level. The low frequency of major trauma managed by individual teams raises concerns about opportunities for skills attainment and maintenance.

Conclusion: Scottish MRTs are required to provide an advanced level of care for a significant number of seriously injured casualties. There is a need for formalised opportunities for in hospital training, management protocols and continuing research and audit—none of which currently exists.

63 BEING A SHIP'S DOCTOR ON POLAR CRUISES

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Introduction: There has been significant recent development of commercial small ship adventure and ecological travel to polar regions on ice breaking vessels. These ships carry fewer than 150 passengers and use Zodiac landing craft and helicopters to gain access to otherwise impossible places. In this amazing environment these trips provide a unique experience in remote medicine.

Demographics: In 16 trips in 1997-1998 30 nationalities were represented, although the most frequent were: American (26%), Australian (23%), European (20%) and British (18%). Of the 900 passengers over 50% were in the age group 60-74 with 10% older than 74. The oldest was age 90 with gout, atrial fibrillation, TIAs, anticoagulation and metastatic cancer of the prostate.

Challenges for the doctor: Environment: heavy seas, extreme cold, immersion, zodiac and helicopter travel, animals, sun exposure, 24 hour daylight. Safety officer and risk management. Passenger entertainment. Case mix: commonest causes for logged consultations were acute respiratory tract complaints, acute soft tissue and musculoskeletal complaints, seasickness, and skin, gastrointestinal problems. Emergencies: a selection of emergencies from the last four years (4 ships) . . . cardiac arrest, acute myocardial infarction, pneumonia following chest injury resulting in sepsis and renal failure, diabetic ketoacidosis, GI bleed (in a Russian ship's doctor), psychosis, ruptured ectopic pregnancy, acute appendicitis, fractured limbs, dislocated shoulder, severe head injury.

Medical facilities: All ships are fitted with a designated hospital room with arcane Russian equipment and a minimum of supplies. There are significant challenges to the doctor: lack of investigations, lack of intensive care facilities, absence of nurse support and need to undertake all procedures alone.

Supplies: 1) Ashore bag containing basic first aid kit; 2) Diagnostic bag with stethoscope, sphygmomanometer, ophthalmoscope, thermometer, urine testing. 3) Advanced life support kit with bag/valve/mask, ET tubes, surgical airway, chest drains, iv cannulae, fluids; a semi-automated defibrillator; there is a limited oxygen supply and hand operated suction; there is no ventilator and no paralyzing agents; hand ventilation could be effected with narcotics and benzodiazepines +/- ketamine; 4) Trauma supplies including simple dressings, suture materials, plaster of Paris; 5) Medical supplies are selected with a number of factors in mind: cost, shelf life, familiarity, spectrum of use, ease of re-supply in remote areas. Promethazine (Phenergan) is probably the best treatment for motion sickness but can also be used for general nausea and vomiting, allergy, pain from burns, sedation and cough suppression. As well as antibiotics, analgesics, anticonvulsants, steroids, inhalers, skin ointments and eye drops there are a limited number of cardiac drugs such as amiodarone, lignocaine, adrenaline but no thrombolytics.

64 OFFSHORE IMMEDIATE MEDICAL CARE FOR A FLEET OF LUXURY MOTOR YACHTS

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Immediate medical care was provided for the owner's family and guests and approximately 50 officers and crew from 1.5.99 - 31.10.99 as the fleet sailed from San Diego to the Red Sea via the Panama and Suez Canals. An electronic medical log was created to facilitate a survey and audit of medical activity of the fleet as part of medical risk management.

During this time there were 390 acute consultations. The fleet was at sea for 60% of this time. 232 (59%) were new visits, 158 (41%) were reviews, recalls or reattendances. 83% of the episodes were managed entirely on board. There was an average of 2.4 consultations per day (range 0-15). The commonest diagnoses for presentation were medical (40%), minor trauma (30%), and ENT and dental (23%). Two patients were seriously injured, one of whom required evacuation by seaplane, and 7 patients have required in-patient care. There were 46 paediatric presentations (aged 2 -16 years), the majority for minor trauma and acute ENT related problems.

This presentation will review the extensive onboard medical facilities (including a recompression chamber), in addition to the mobile emergency medical equipment and its deployment. Training scenarios for all the fleet officers and crew, in preparation for a medical emergency or serious accident, including rescue from remote and challenging environments, will also be discussed.

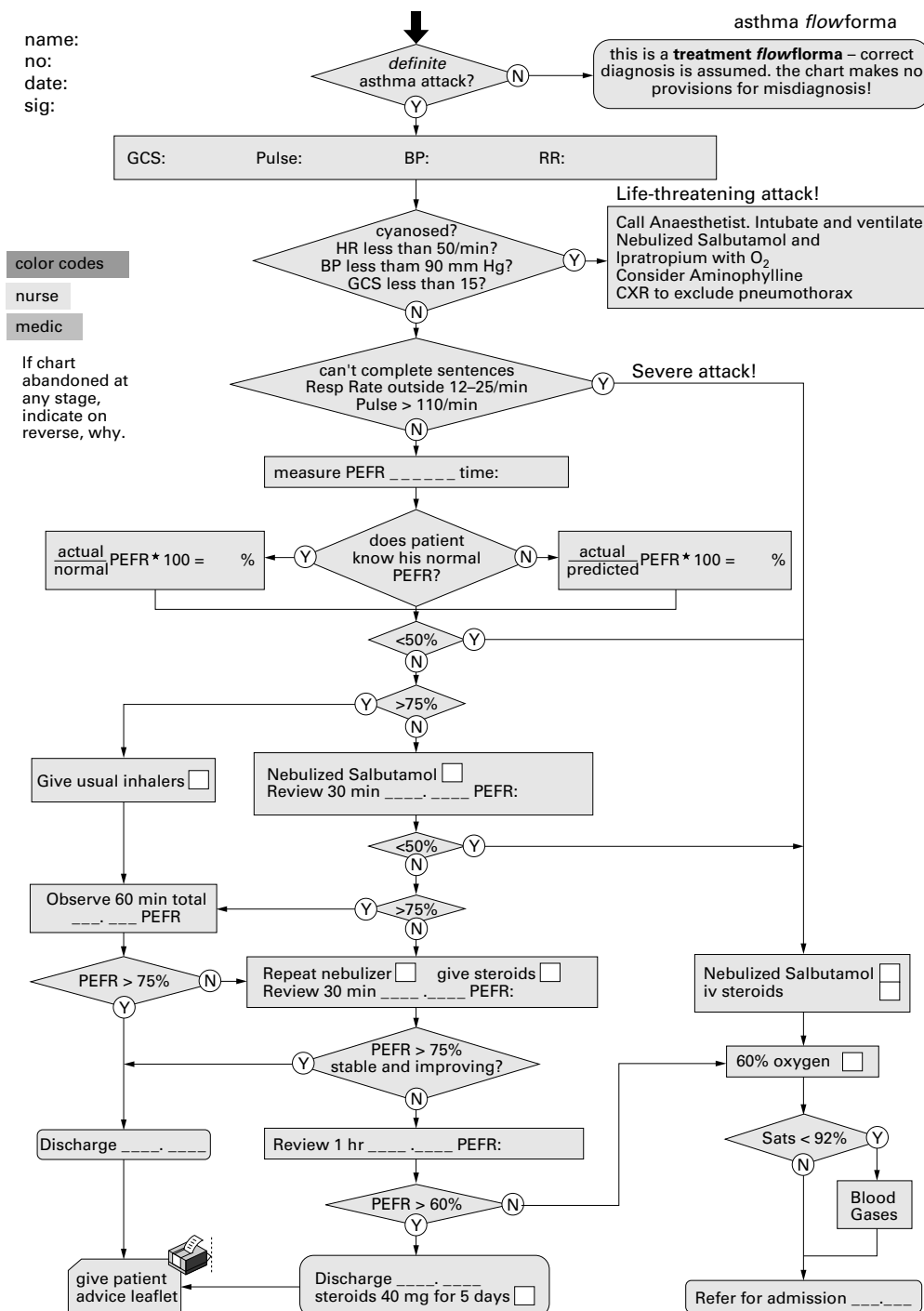
Respiratory emergencies

65 ASTHMA FLOWFORMA: A TOOL FOR INTRODUCING, MAINTAINING AND AUDITING GUIDELINE-BASED PRACTICE

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We present the concept of a flowforma as a simple tool for introducing, maintaining and auditing guideline-based clinical practice.

A flowforma is a documentation chart that combines the key elements of proforma - the systematic gathering of information



Abstract 65, Figure 1

relevant to the condition flowchart - structured decision making based on the information gathered.

In 1990, the British Thoracic Society published guidelines on the management of Asthma in A&E.¹ The guidelines were presented in simple flowchart form and widely circulated; nevertheless, they suffered the fate of many other guidelines: uptake in clinical practice remains poor.

We converted the guidelines into a flowchart and introduced it as the standard documentation chart into the department in November 1999.

Audit one year later showed a readily sustained, and statistically highly significant improvement in the number of patients managed according to guidelines (parameters: appropriate classification of severity, number of patients who had PEF measurement before treatment, appropriate administration of nebulizers vs inhalers, appropriate discharge on steroids, reduction in inappropriate use of blood gases and ipratropium).

1 Guidelines for management of asthma in adults: II—Acute severe asthma. Statement by the British Thoracic Society. *BMJ* 1990;301:797-800.

66 BTS REVISITED: A NEW FORMAT FOR THE ASTHMA GUIDELINES

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Background: The British Thoracic Society's (BTS) guidelines for the management of asthma were introduced in 1990¹ and have since been revised and updated.² Despite this the medical treatment of adult patients with the disease in accident and emergency remains varied and is often sub-standard.³

Authors have described systems to try and improve adherence to the guidelines. These include the implementation of pre-printed proformas for the recording of crucial clinical information,⁴ and the process of audit to monitor and educate medical staff in the use of the guidelines.⁵ However the audit cycle has failed to demonstrate any improvement in terms of adherence to the guidelines at the Pinderfields and Pontefract NHS Trust.

It is the author's experience that the BTS guidelines are not easy to follow in their current format, particularly when time is of the essence for patients suffering from severe or life-threatening asthma. Here a new format of the guidelines is presented based on the content of the BTS version but with some local adaptations. This layout guides the clinician in a step-wise fashion through the clinical features of a life-threatening and severe attack of asthma with clear instructions on the patients management, then allows the relevant categorisation of the patient taking account of a structured time-scale of re-evaluation every 30 or 60 minutes.

All A&E consultants and respiratory physicians of the Trust have been consulted in the production process of these guidelines that now form an integral part of asthma management within the Trust. It is planned to re-audit the management of these patients in order to evaluate how use of this format of the guidelines translates to patient care.

- 1 British Thoracic Society, Research Unit of the Royal College of Physicians of London, King's Fund Centre, National Asthma Campaign. Guidelines for the management of asthma in adults II: acute severe asthma. *BMJ* 1990;301:797-800.
- 2 The British Guidelines on Asthma Management, 1995 position statement. *Thorax* 1997;52 (supp 1):S1-24.
- 3 Hart SR, Davidson AC. Acute adult asthma—assessment of severity and management and comparison with British Thoracic Society guidelines. *Respir Med* 1999;93:8-10.
- 4 Robinson SM, Harrison BD, Lambert MA. Effect of a preprinted form on the management of acute asthma in an accident and emergency department. *J Accid Emerg Med* 1996;13:93-7.
- 5 Stell IM. Asthma management in accident and emergency and the BTS guidelines—a study of the impact of clinical audit. *J Accid Emerg Med* 1996;13:392-4.

67 EMERGENCY DEPARTMENT MANAGEMENT OF MILD TO MODERATE ASTHMA BASED UPON THE USE OF AN INTEGRATED CARE PATHWAY WITH ASTHMA NURSE SPECIALIST SUPPORT

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The management of patients with mild to moderate asthma in the Accident & Emergency department (AED) of the Royal Liverpool University Hospital, is led by an Asthma Nurse Specialist (ANS). An integrated care pathway (ICP), based upon the British Thoracic Soci-

ety (BTS) guidelines for the management of acute asthma, has been in use since 1995. Short Stay Observation Ward (SSOW) admission under the care of the AED team and close liaison with primary care are important features of the service we provide.

Seven hundred and seventy-three patients attended the AED with asthma in the 12 month period up to 31st May 2000. Forty-five percent were treated and discharged, 5% self-discharged from the AED, 25% were admitted to the SSOW and 25% underwent hospital admission. An audit of 75 patients who were discharged from the AED following presentation with mild to moderate asthma, between May and August 2000, indicated that ICP usage was 80%. Use of the ICP was associated with improved recording of Peak Expiratory Flow (PEF) at presentation (98% versus 53%), predicted or best PEF (85% versus 13%) and discharge PEF (65% versus 40%). Adherence to BTS recommendations for steroid treatment in acute asthma was also better in ICP managed patients (60% versus 33%). These results were compared to those of the previous two years. The need for concordance between the initial patient assessment on the ICP and the Manchester Triage System has been identified.

The ICP is a useful tool in improving the assessment and management of patients with mild to moderate asthma in the AED. The ongoing development of the ICP is driven by audit findings and user feedback. The role of the ANS in the AED includes patient assessment and education prior to discharge, primary care liaison, regular audit and monitoring of asthma management, and the ongoing training of medical, nursing and paramedical staff. The ANS acts as a champion for better asthma care in the AED and is a much respected member of our clinical team.

68 COMPARATIVE AUDIT OF EMPIRICAL TREATMENT OF COMMUNITY ACQUIRED PNEUMONIA AT UNIVERSITY HOSPITAL LEWISHAM

S. Wilkey, G. Rao, N. Nayeem. *University Hospital, Lewisham*

Introduction: Community acquired pneumonia (CAP) is a very common condition, especially at the two extremes of life, and more so in the winter period.

Why audit CAP?: It is a high-risk disease (overall mortality for CAP managed in hospitals in the U.K is 5%, and 30% in nosocomial pneumonia or CAP requiring intensive care). It is a high-volume disease (Lower respiratory tract infection occurs in 40-80/1000 adults per year in the U.K, of which 1/25 is pneumonia). Costs to the trust in terms of treatment bed occupancy, and staffing is quite high

There are 5 initial steps in the initial in-Hospital management of CAP: a) Early recognition, including atypical presentations, e.g. meningism with atypical pneumonia, and neurological signs with Legionella infection. b) Assessment of severity- Physical examination, bedside monitoring, chest X-rays and laboratory tests. c) Aetiological diagnosis i.e the pathogen. d) Supportive treatment e.g oxygen, rehydration etc. e) Empirical antibiotics. The lack of rapid, sensitive and specific diagnostic tests for everyday use in the management of CAP, leads to empirical treatment in most cases. It is important to reach an aetiological diagnosis if a narrow antibiotic approach (e.g Amoxycillin alone, for non-severe, and a broad spectrum beta-lactam +/- erythromycin for severe cases or atypical pathogens) is to be used in initial empirical treatment; especially if potentially dangerous side effects, and the risk of developing antibiotic resistance is to be avoided. We decided to audit our own empirical treatment here at UHL, using the British Thoracic Society Guidelines (1993) as our 'Gold Standard'.

Audit question: Are BTS guidelines being adhered to in the empirical antibiotic treatment of CAP at University Hospital Lewisham or is treatment random?

Methods: (Retrospective case note Audit). Population was taken from 100 patients with a triage diagnosis of 'Chest Infection' from the REMASS A&E computer system for December 1999. Of these, 23 patients whose diagnosis was clearly pneumonia, were used for a pilot audit. The BTS 1993 guidelines for treatment of CAP were used to assess relative severity of the cases, and the antibiotic combinations used for all patients who came as A&E referrals or direct referrals to the acute on-call Medical Teams were assessed. Epiinfo6 a public domain statistical software package was used to write a questionnaire, input and analyse the data. Severity of pneumonia was assessed using the parameters of diastolic BP < 60mm Hg, urea > 7mmol/L, and respiratory rate >30/minute. Any two or more of these being positive were considered severe.

Results/Conclusion: In over 50% of cases, the choice of antibiotics did not follow the BTS guidelines, and in 8% of the cases (2 out of 23) the medication was deemed inappropriate, the potential danger of the complications mentioned above seems real. Doctors need to be

made aware of BTS recommendations, local guidelines need to be instituted and revised. Though this audit was done at UHL we believe similar hospitals in the UK should do likewise.

69 MANAGEMENT OF SMOKE INHALATION IN THE ACCIDENT & EMERGENCY DEPARTMENT

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Background: Smoke inhalation has become the principal cause of death in burns patient as treatment of shock and infection improves. There are few guidelines for investigation and management of smoke inhalation in the A&E Department. The aim of this study was to determine the spectrum of clinical presentation, investigations and outcomes in patients presenting to A&E with smoke inhalation and to identify which factors influence immediate management.

Methods: This retrospective case note review used data from two A&E Departments in the West of Scotland for the calendar year 1999. Computerised registration systems were used to identify patients presenting to A&E with smoke inhalation with or without burns. A proforma was completed including detail of the following: incident data, vital signs, clinical findings in A&E investigations performed, medical therapies in A&E and patient disposal.

Results: A total of 95 patients were identified. 2 patients left A&E prior to assessment. The remaining 93 patients were classified into one of the following five categories: no burns, normal vital signs (GCS, RR, SpO₂ on arrival) an normal clinical examination (Group 1); no burns, abnormal vital signs or abnormal clinical examination (Group 2); minor burns <15% TBSA) with or without abnormal vital signs or abnormal clinical examination (Group 3 major burns (>15% TBSA) (Group 4)); in cardiorespiratory arrest on arrival at A&E (Group 5). No patients satisfied the criteria for Groups 4 or 5. The table summarises Groups 1–3. In Groups 1 and 3, only two investigations performed were significantly abnormal (COHb of 22% and 12%) and influenced management. In Group 2, arterial blood gases and COHb levels were abnormal in 25% of cases but did not influence decisions on admission or discharge. Initial chest radiograph and electrocardiographs did not influence the early management of patients in this study and in particular the decision to admit or discharge from A&E.

Abstract 69 Table 1

	Group 1	Group 2	Group 3	Total
Number of patients	60	28	5	93
Number discharged home from A&E	54	8	3	65
Mean age (years) [range]	30 [0.5-85]	46 [9-80]	57 [31-81]	36
Mean time of exposure to fumes (minutes) [range]	5 [0.5-30]	23 [2-120]	4 [2-10]	10

Conclusion: Arterial blood gas analysis, chest radiography and carboxyhaemoglobin estimation rarely influences immediate management of smoke inhalation victims. Patients who present with normal vital signs and clinical examination and a short exposure to fumes may be safe to discharge from A&E without further investigation, but this requires further prospective study.

Toxicology

70 A ONE YEAR REVIEW OF THE PATTERNS OF PRESENTATION OF OVERDOSES TO AN A&E DEPARTMENT

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The workload of all A&E Departments increasingly includes overdoses. Most of these patients have low morbidity and mortality, but are labour intensive cases for staff and ancillary services.

The purpose of this study: to try and identify any particular patterns in how overdose patients present, so as to deploy resources maximally.

In 1999, a total of 1168 patients, having taken a deliberate overdose, presented to an A&E Department serving a large urban population. For all patients, date and time of arrival was noted, as was sex and age.

The records were studied to identify differences between the sexes, and if patient age was an important factor.

Temporally, differences among months/seasons of the year and days of the week were noted. Whether or not there was any considerable diurnal variation in the pattern of presentation was also recorded.

As the perception that we are subject to lunar influence is enshrined in culture and literature, the pattern of presentation of overdose cases was also compared to the phases of the moon.¹ Friday 13th is another sinister day in popular culture, and these dates were examined to see if they differed from the normal pattern of events.

The year 1999 gave both a solar eclipse and the dawning of the new millennium. The number of patients presenting with overdoses on both dates was scrutinised to see if there were any associated aberrations.

The results of this analysis will be presented.

1 Buckley NA, Whyte IM, Dawson AH. There are days and moons. Self-poisoning is not lunacy. *Med J Austr* 1993;159:786–9.

71 ANAPHYLACTOID REACTIONS TO INTRAVENOUS N-ACETYL-CYSTEINE: A PROSPECTIVE CASE CONTROLLED STUDY

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Objectives: To investigate the existence of predictive factors in the likelihood of developing anaphylactoid reactions to intravenous N-acetylcysteine infusions.

Methods: Prospective case controlled study on a convenience sample of all patients with a diagnosis of paracetamol poisoning, who presented to the accident and emergency department at the Hull Royal Infirmary between January 1997 and June 1999, and who were treated with intravenous N-acetylcysteine on the short stay ward.

Results: Sixty-four patients received N-acetylcysteine infusions of which thirty one (48.4%) developed an anaphylactoid reaction. Nineteen patients who reacted were commenced on N-acetylcysteine prior to receipt of plasma paracetamol levels and fifteen (48.4%) were categorised as high-risk. 71% of reactions occurred within the first 15 minutes i.e. during the first bag. Eight patients (23.5%) in the non reactors group and fifteen (48.4%) in the reactors group were identified as being at high risk of hepatocellular damage. Thirteen patients treated with N-acetylcysteine infusion, who developed a reaction, had levels, which fell below the treatment lines. The levels of a further nine reactors lay above the high risk but below the normal risk lines. Only five patients who reacted had levels above the normal risk line. The levels for four patients, who took staggered overdoses, could not be plotted. Two of the patients who reacted to intravenous N-acetylcysteine subsequently presented at a later date with a further paracetamol overdose. Both required treatment with intravenous N-acetylcysteine, the first bag being infused over one hour. Neither developed a reaction.

Conclusion: We report a substantially higher incidence of anaphylactoid reactions to intravenous N-acetylcysteine than has previously been documented. It appears that these reactions are more likely to occur in high-risk patients, in those whose plasma paracetamol concentrations were found to be below the treatment lines and in late presenters. Perhaps, giving the loading dose of N-acetylcysteine over 60 minutes could reduce the incidence of adverse reactions.

Abstract 71 Table 1 Time to presentation

	Non Reactors (N = 33)	Reactors (N = 31)
≤ 8 hours	19 (57.5%)	14 (45.2%)
> 8 hours	6 (18.2%)	13 (41.9%)
Staggered	8 (24.3%)	4 (12.9%)

72 PARACETAMOL OVERDOSE MANAGEMENT FLOWCHART

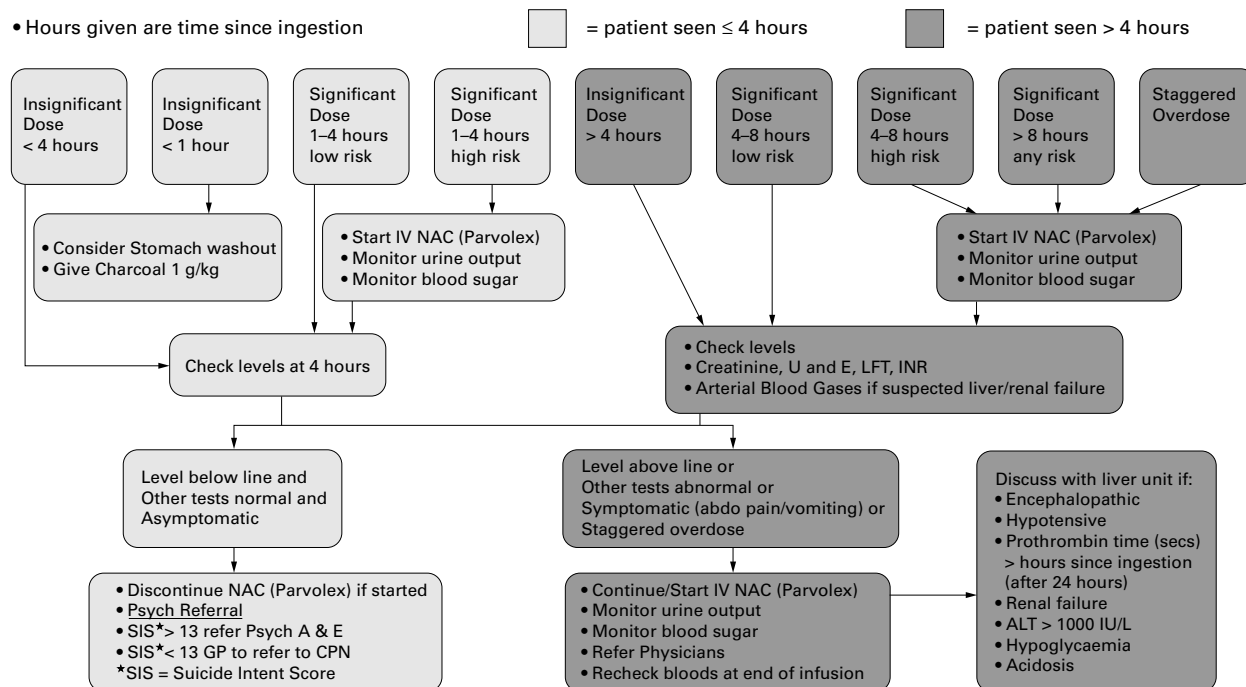
I.C. Ezeilo, M.A. Imana. *Basildon General Hospital, Essex SS16 5NL*

Paracetamol overdose accounts for a majority of the drug overdoses that present to A&E departments in the UK.

These patients are usually initially assessed and treated by senior house officers who, in most cases, are inexperienced in dealing with such a condition. This means that the quality of care given is not always appropriate

Paracetamol Overdoses

- Significant Dose = 15 tablets or > 125 mg/kg in adult or > 150 mg/kg in child
- High Risk = Chronic alcohol consumption or enzyme inducing drugs eg Phenytoin/Carbamazepine or malnutrition
- The high risk treatment line has been used for ALL patients at Basildon since July 1999
- Hours given are time since ingestion



Abstract 72, Figure 1

The flow chart has been designed by the Overdose Liaison Committee of Basildon Hospital to facilitate the initial assessment and management of such patients. It has been designed using the guidelines from the National Poisons Information Service (NPIS) and takes into account the three main variables: dose taken; time (hours) since ingestion; high risk cases (chronic alcohol ingestion, enzyme inducing drugs or malnutrition).

The high-risk treatment line is used for all cases. The A&E and Medical SHOs have found the flow chart very useful.

73 THE IMPACT OF SUBSTANCE MISUSE ON THE ACCIDENT & EMERGENCY DEPARTMENT

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Objectives: An audit of substance misuse among patients attending the Accident & Emergency department (AED) was undertaken, firstly, to describe the problem and secondly, to determine whether intervention by a dedicated nurse specialist might be appropriate in this patient group.

Methods: The study was conducted in the AED of the Royal Liverpool University Hospital between 6th November and 4th December 2000. All patients who reported substance misuse were invited to participate in the survey. Patients whom the AED staff suspected had used illicit substances, but who were unable to be interviewed at the time of presentation, were subsequently contacted by our nurse-surveyor. Data included patients' self-reports of their substance misuse and clinical assessments by AED medical and nursing staff.

Results: One hundred and thirty-four patients participated in the survey, representing 1.9% of total patient attendance for that period. Eighty-eight (66%) patients were male and the mean age was 28 years. Ninety-six attendances (72%) were directly related to substance misuse. Twelve patients (9%) were homeless and thirty-eight (28%) were living in temporary accommodation. There were only nine incidences of violence in the AED related to this patient group. Eight-five patients reported habitual opiate use. Of these, 44 (52%) had previous contact with a drug support agency and only four patients had a social worker. Twenty-eight patients were on methadone programmes. Forty-seven (55%) opiate users were sharing equipment. Fifty-three

opiate users did not know their hepatitis status. Only 14 intravenous users were hepatitis-B immunised. There were no reported cases of HIV infection. Six patients presented with opiate overdose. Crack cocaine was habitually used by 56 (66%) heroin users. Thirty-three patients admitted to ecstasy use, nineteen of whom presented because of acute ecstasy intoxication. Five of the opiate users also took ecstasy occasionally. Three patients had used other amphetamines and eight patients used cocaine alone. Among the ecstasy users eighteen (38%) regularly used cocaine. Sixteen (34%) ecstasy users reported a previous accidental overdose. Opiate (n=85) and non-opiate users (n=47) did not express high levels of concern regarding the physical effects of their drug use (50% and 32% concerned) or the potential legal consequences of their behaviour (34% and 15% concerned). However, 51 patients requested further information about drug support services.

Conclusions: This audit identified previously undocumented levels of crack cocaine use. The project highlighted social, behavioural and educational issues among substance misuse patients which require intervention. Low levels of patient contact with drug support agencies and social work services indicate that the AED may be an appropriate place to target these problems. The audit only included only patients with self-reported or obvious substance misuse. The true extent of this problem remains undetermined. Funding will be sought, on the basis of this data, for the appointment of a dedicated nurse specialist to address these patients' healthcare needs and to support and educate AED staff involved in their care.

Trauma

74 OPERATIVE VERSUS NON-OPERATIVE TREATMENT AND TIME TO OPERATION AND OUTCOME FOR TRAUMATIC INTRACRANIAL HAEMORRHAGE: A PILOT STUDY

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Introduction: Seeling¹ (1981) reported a series of 82 patient with acute traumatic subdural haematoma (SDH) who underwent surgical intracranial decompression. They found that the time from injury to operation was the single most important factor in determining outcome. This standard was subsequently adopted by the American College of Surgeons Committee on Trauma (1993),² who advocate that traumatic extradural (EDH) and subdural haematomas should be operated on within four hours to reduce mortality and morbidity. Subsequent studies have disputed these findings. Wilberger (1990)³ in a study on 137 patient with traumatic SDH found no association between time from injury to operation and outcome. The only pre-operative variable found to be significantly associated with outcome was presenting neurological condition. Croce (1994)⁴ in a study of 83 patients with acute SDH, managed by operation or conservatively, found no association between time to surgery and outcome. He suggested that in the absence of intracranial hypertension or significant neurological dysfunction there was no advantage in evacuating the clot. We undertook an analysis of all patients admitted to a selection of North Trent A&E departments with traumatic EDH or SDH to determine the association between operative and non-operative management and outcome, and in those undergoing surgery, time to surgery and outcome.

Method: All patients admitted to the A&E departments of the participating hospitals in 1994 with a head injury who were found to have an intracranial haematoma were included in the study. Patients admitted to wards as presumed medical cases and later found to have a chronic SDH were excluded. Data on age, sex, time of admission to A&E (a proxy measure of time of injury), operative or non-operative intervention, time of operation, type of haematoma and outcome were collected.

Results: A total of 71 patients were recruited. The distribution of type of haematoma (mortality) was EDH 14(0%), SDH 50(52%), mixed EDH/SDH 7(29%). Eight patients had operations within 4 hours of admission (mortality 75%), 16 had operations more than 4 hours after admission (mortality 12.5%) and 47 had no operation (mortality 47%).

Conclusion: Our results suggest that patients undergoing early operation have a higher mortality than those undergoing later operation. Non-operative management in selected patients is a reasonable option. Further work is underway in an attempt to define which patients would benefit from non-surgical intervention.

1 Seelig JM, Becker DP, Douglas Miller J, et al. Traumatic acute subdural haematoma: major mortality reduction in comatose patients treated in the first four hours. *N Engl J Med* 1981;304:1511-18.

2 American College of Surgeons Committee on Trauma. *Resources for optimal care of the injured patient*. Chicago: American College of Surgeons, 1993.

3 Wilberger JE, Harris M, Diamond DL. Acute subdural haematoma: morbidity and mortality related to timing of operative intervention. *J Trauma* 1990; 30:73-6.

4 Croce MA, Dent DL, Menke PG. Acute subdural haematoma: nonsurgical management of selected patients. *J Trauma* 1994;36:820-7.

75 LOGICAL ANALYSIS OF THE ADHERENCE TO GUIDELINES: INDICATIONS FOR CT SCANNING IN HEAD-INJURED PATIENTS

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Introduction: Guidelines are now widely available in modern clinical practice and their use has been demonstrated to improve outcome. It is therefore important as part of the continuing refinement of a given set of guidelines to identify circumstances in which they might not be followed. This can partly be achieved through retrospective analysis of actual cases.

Objectives: To develop a reliable and reproducible method for classifying cases according to a given set of guidelines into three classes: correctly managed cases, incorrectly managed cases and those too poorly documented to decide. We wanted to examine the feasibility of the approach by focusing on guidelines for CT scanning of head-injured patients hence this would allow us to compare our own with other internationally recognised guidelines.

Method: We reviewed the last one hundred CT head scans performed in our department and compiled a database of those patients over the age of 16 who had presented with head injury. We used simple mathematical logic to formalise four different sets of guidelines for deciding whether or not a CT scan was indicated; our own departmental guidelines; the ATLS guidelines based on the American college of Surgeons Committee on Trauma (1997); the recommendations from the Society of British Neurological Surgeons on indications for CT scanning (1998); and the clinical criteria for CT scanning in head injury defined by Haydel et al (*N Engl J Med*

2000;343:100-5). We then used a computer to classify each set of guidelines using a program developed by one of the authors (BT).

Results: Of the 100 requests for CT scanning from the department only 27 were made for the management of patient with head injury over the age of 16. In the majority of cases the requests for CT scans were justified by the clinical notes; departmental guidelines 17/27, ATLS 21/27, Society of British Neurological Surgeons recommendations 18/27 and the Haydel criteria 25/27. In two cases, the CT scan was not performed on the first attendance but was indicated by all but the Haydel criteria. These two were the only cases that were evidently managed incorrectly according to any of the four sets of guidelines. The remainder of cases fell into the category of failure of documentation.

Conclusion: Logical analysis is a powerful tool for highlighting non-compliance with clinical guidelines. We plan to apply this methodology to this and other clinical algorithms in daily use in our emergency department.

76 HEAD INJURIES IN THE ELDERLY

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Introduction: Outcome in head injuries in the over 65s compares badly with those under 65. Is this simply an effect of physiological differences in response to injury or does it reflect different treatment choices in these patients?

Methods: We identified all patients coded for subdural, extradural and traumatic subarachnoid haemorrhage and cerebral lacerations in Scotland during a 5 year period from the Scottish Trauma Audit Group database.

Results: The characteristics of 1618 patients identified are summarised in table 1. 72 patients over-65 who underwent neurosurgery are summarised in table 2. Of this group, 20 patients had a pre-operative GCS <8 and 11 (55%) of these survived. 10 patients ≥65 years old died with a significant brain injury but were not scanned despite an initial GCS ≥13; only 2 of these died primarily from extracranial injuries.

Abstract 76 Table 1 Comparison of patients <65 and >65 years old with significant head injuries

	<65 years old	>65 years old	Significance
Total patients	1227	391	Not applicable
Mortality	370 (30.2%)	192 (49.1%)	$\chi^2=46.1, P<0.001$
Immediate transfer to Neurosurgical Center	436 (35.5%)	73 (18.7%)	$\chi^2=38.3, P<0.001$
Admitted to Ward (Non ITU/HDU)	308 (25.1%)	168 (43.0%)	$\chi^2=43.6, P<0.001$
Direct or subsequent transfer to Neurosurgical Center	952 (77.6%)	209 (53.5%)	$\chi^2=84.0, P<0.001$

Abstract 76 Table 2 General characteristics of over-65s undergoing neurosurgery

	Survivors	Non-survivors	Significance
Total Number	48 (67%)	24 (33%)	Not applicable
Median GCS	11	9.5	Mann-Whitney U-test: $z=1.10, P=0.27$
Median ISS	25	25	Mann-Whitney U-test: $z=1.90, P=0.06$

Conclusions: Head injuries in the elderly have a significantly higher mortality than in younger patients. However, two thirds of over 65s undergoing acute neurosurgery survived. There was no significant difference in GCS and ISS of survivors and non-survivors of neurosurgery. Significantly fewer elderly patients were transferred for specialist neurosurgical care, more were admitted directly to wards and some elderly head injured patients were not scanned despite an initial favourable GCS.

77 A META-ANALYSIS OF GCS 15 PATIENTS

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The classification of patients with 'minor head injury' has relied largely upon the Glasgow Coma Scale. The Glasgow Coma Scale however is an insensitive way of defining this heterogenous subgroup

of patients. The aim of this study was to perform a meta-analysis on category GCS 15 patients. Eligibility for the study was defined as:- 1. Full citations and not abstracts. 2. Case control studies on GCS 15 patients (adults or adults plus children) all of whom underwent head tomography. 3. Documentation of one or more symptoms such that a 2x2 contingency table could be constructed. Five symptoms variables were defined for the purpose of the study:- headache, nausea, vomiting, blurred vision and dizziness. Three articles fulfilled the inclusion criteria. A pooled estimate (Fixed Effect model) by the Mantel-Haenszel test was used to calculate the odds ratio for an abnormal head tomogram scan for each of the five symptom variables. The odds ratio for the symptom variables were:- dizziness 0.594 (95% CI: 0.296–1.193), blurred vision 0.836 (95% CI: 0.369–1.893), headache 0.909 (95% CI: 0.601–1.375), severe headache 3.211 (95% CI: 2.212–4.584), nausea 2.125 (95% CI: 1.467–3.057), vomiting 4.398 (95% CI : 2.790–6.932). The results of this study provide a framework on which GCS category 15 patients can be stratified into four risk categories based upon their symptoms.

78 MRI STUDY OF EFFECTIVENESS OF CERVICAL SPINE IMMOBILISATION: A PILOT STUDY

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Introduction: Current accepted guidelines dictate the use of a semi-rigid collar, head blocks and tape to immobilise the potentially injured cervical spine, until injury is excluded. However the effectiveness of this technique is unproved; previous studies have looked at gross movement rather than movement of individual vertebrae. No previous studies have utilised MR scanning.

Methods: Ten healthy adult volunteers underwent cervical spine MR imaging under each of 4 conditions—no immobilisation, semi-rigid collar only, head blocks and tape only and both semi-rigid collar, head blocks and tape. With each form of immobilisation employed, sagittal MR images were obtained as the participants actively fully flexed and fully extended their necks. These images were then blindly assessed to ascertain spinal movement at all levels from the level of base of skull to the vertebral body of T1.

Results: The mean of the sum of individual spinal segment movements was 72° with no immobilisation; 41° with collar only; 35° with block only and 29° with collar and blocks. Each immobilisation technique provided a significant reduction in total movement of the cervical spine, when compared with no immobilisation ($p < 0.001$). The difference between active techniques failed to reach statistical significance. In only 3 individuals did traditional “gold standard” treatment give the best reduction in total spinal movement, although it gave best immobilisation of head relative to shoulders in half.

Conclusion: There is marked individual variation in how to achieve best immobilisation of the cervical spine. The addition of a semi-rigid collar to the patient immobilised on a spinal board with head blocks and tape may not represent any significant further benefit. Given the complications associated with semi-rigid collar use, further research is necessary to confirm its role in spinal immobilisation.

79 IS FULL SPINAL IMMOBILISATION REQUIRED IN PATIENTS WITH PENETRATING TRAUMA?

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Introduction: It has been suggested that full spinal immobilisation is rarely, if ever, required for patients with isolated penetrating trauma. We examined whether there were any incidences of unstable or potentially unstable spinal injuries requiring formal spinal immobilisation in penetrating trauma patients in Scotland.

Design: Prospective observational study of patients from the Scottish Trauma Audit Group (STAG).

Methods: Study patients were identified from the period 1992–1999 (data capture rate 95%). Patients coded for both penetrating trauma and spinal or spinal cord injury were included. Further information was obtained by examination of case records, theatre notes and post mortem information.

Results: 34,903 trauma patients were available for study; 32,974 (94.5%) resulted from blunt trauma and 1929 (5.5%) from penetrating trauma. 27 patients were identified as having both penetrating trauma and concurrent spinal injury. 10 patients were excluded as initial review clearly showed that there was a major blunt mechanism of injury also coded or that the spinal component of the injury was not

clinically significant. In the remaining 17 patients there were 8 cervical, 8 thoracic and 2 lumbo-sacral injuries. One patient had both a cervical and thoracic injury. 16 were male and all but one were assaults (the other being an industrial accident). One of the assaults was due to a gun shot wound the others were from sharp weapons. We identified 3 complete transections of the spinal cord and 6 partial cord lesions. 3 patients had a classic Brown-Sequard syndrome. All 17 patients who sustained spinal injury associated with isolated penetrating trauma either had obvious clinical evidence of a spinal injury on initial assessment or were in cardiac arrest on arrival due to the severity of their injuries. All had spinal immobilisation instituted.

Conclusions: Spinal immobilisation is not required in conscious patients with isolated penetrating trauma unless there is any obvious neurological deficit at presentation.

80 SPINAL INJURIES IN SCOTTISH MOUNTAINEERS

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Introduction: Each year 3.4m people enjoy the Scottish mountain environment. Our unit treats spinal-injured mountaineers but we could not find detailed studies of these injuries in the mountain rescue or medical literature. We undertook the present study to increase understanding of spinal injuries in walkers and climbers for mountain rescue, paramedic and medical personnel.

Methods: *Study Design* Retrospective case note review. Postal patient questionnaire requesting description of incident and subject's mountain experience. *Setting* National Spinal Injuries Unit in a Scottish university teaching hospital treating both neurologically intact and all cord injured patients in Scotland (population 5.1m). *Subjects* All mountaineering spinal injuries identified from unit database of 1200 patients over 8 years (1992–2000). Injuries from skiing and roadside incidents were excluded.

Results: *Subjects* Eighteen identified (13 male). Age range 16–71 yrs (mean 35 yrs). Nine hillwalkers, nine climbers. Eleven professionals, one skilled manual worker, five students and one retired. All questionnaires returned. *Mountain experience* Seventeen subjects described themselves as competent, experienced or very experienced. Six climbers could lead at Severe grade (winter Scottish grade III) or higher. *Cause of injury* Commonest cause for hillwalkers was slip while scrambling on steep ground (n=6). Three winter hillwalkers slipped on easy ground but failed to ice-axe brake. Causes for climbers included anchor failure on abseiling (n=3) and avalanche (n=2). Twelve injuries occurred above 600m, eight above 900m. *Casualty recovery* Fifteen were carried off, three walked off with minimal or no help. *Level of spinal injury* Eight cervical, five thoracic, four lumbosacral and one double injury, cervical and lumbar. *Spinal injury severity* Seventeen fractures, one fracture dislocation. Sixteen neurologically intact, two incomplete cauda equina injuries. No complete cord injury. *Other injuries* Twelve had at least one other major injury (chest, abdomen, head or long bone fracture) and four had multiple major injuries in addition to the spinal injury. *Outcomes* Mean stay was 30 days. Seven were internally fixed. All were independent walkers on discharge. Two head injured patients had prolonged absence from work.

Discussion: These injuries caused major morbidity with personal and financial loss in a young population. There was no clear pattern of injury probably because mountaineering is not a single activity. Attempts to reduce accident rates by regulation may reduce the appeal of a popular sport with major cardiovascular training benefits but promotion of voluntary training may help. Two-thirds of patients had potentially distracting major injuries in addition to spinal injury and pre-hospital care providers should be aware of this association. Complete cord injury is found in 35% of total admissions to our Unit and its absence in the study group may reflect the length of the pre-hospital phase for casualties in remote locations. A patient with cord injury survivable in an urban setting may succumb before rescue in a hostile mountain environment. Most British mountain rescue teams carry cervical collars and vacuum mattresses and we suggest that the present study supports this practice. We are not aware of other studies describing spinal injuries in mountaineers and we suggest that our findings may be applicable to other mountain areas.

81 SAFE REMOVAL OF CERVICAL COLLARS BY THE ACCIDENT AND EMERGENCY TRIAGE NURSE

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Introduction: With improvements in pre-hospital care and the widespread adoption of ATLS principles, many patients now arrive in A&E

restrained on spinal boards with cervical collars in situ. In a busy department patients may suffer significant discomfort whilst they wait to be seen by a Doctor. A recent large multi-centre trial has defined a robust set of clinical criteria that can be used to rule out cervical spine injury.¹ This study was designed to investigate if these criteria could be used for the safe removal of c-spine collars by the A&E triage nurse.

Methods: Eight members of the senior nursing staff were first trained, attending a study day which used a mixture of factual and clinical scenario based teaching. Patients who were triaged to an area other than the resuscitation room were initially assessed by one of these nurses. Spinal boards were removed by log roll unless the patient was in severe pain, in which case they were referred to medical staff. If all the clinical criteria were met (table 1) the cervical collar was removed. Time to triage assessment and time until seen by medical staff was recorded. Patients were followed up till discharge and their radiological diagnosis noted. In patients not requiring x-ray, hospital records were checked to insure no significant injuries were missed.

Abstract 81 Table 1

No midline cervical tenderness
No focal neurological deficit
Normal alertness
No intoxication
No painful, distracting injury.

Results: 100 patients were included in the study. The clinical criteria were met in 58 and their cervical collars removed at triage assessment. Spinal board was removed in 89 patients. Cervical spine x-ray series were performed in 41 patients. Cervical spine injury was confirmed in 2 patients. No patient was found to have suffered a significant cervical spine injury having had their cervical collar removed at triage. The median reduction in time spent restrained was 24 minutes (table 2).

Abstract 81 Table 2

	Median Time
Triage Assessment	10 min
Medical Assessment	35 min
Time Saved	24 min

Conclusions: Spinal boards have been implicated in the causation of pressure sores and may make patients difficult to assess. Simple clinical criteria can be applied safely by Accident and Emergency triage nurses to allow removal of cervical collars and spinal boards. The reduced time spent restrained represents an important improvement in patient care.

1 Hoffman JR, Mower WR, Wolfson AB, *et al.* Validity of a set of clinical criteria to rule out injury to the cervical spine in patients with blunt trauma. *N Engl J Med* 2000;343: 94-9.

82 THE CAMBRIDGESHIRE TRAUMA AUDIT AND RESEARCH PROJECT: DEVELOPMENT OF AN INFORMATION SHARING PROTOCOL

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Road traffic accidents continue to be a principal cause of accidental death and injury. Across the whole UK population in 1999, 3423 people were killed, 39122 were seriously injured and 277765 were slightly injured. In Cambridgeshire there were 76 deaths and 4358 casualties with road accidents accounting for 36% of all deaths from all accidents of all types and 79% of all deaths in 15 to 24 year old males. Despite these statistics, no data is routinely analysed concerning the epidemiology of road accident injury, the impact of pre-hospital or hospital interventions or the outcome for patients. Much of the blame for the lack of research is apportioned to data collection problems. Although a great deal of data exists, the information sources are fragmented across a range of agencies each focusing on different details and using differing definitions of the same phenomena. There is a need to develop Information Sharing Protocols which will allow the development of a prospective trauma registry which links data sources and serves as a robust data collection system for prospective trials of pre-hospital and hospital interventions.

The Mid Anglia General Practitioner Accident Service (MAGPAS) has funded a long term research programme to create a trauma registry for Cambridgeshire which links data from the three A&E Departments, the Ambulance Service, the Police, the Fire Service, the

Coroner and the UK Trauma Audit and Research Network. In this presentation, the evidence for the value of information sharing is reviewed and the steps in development of an Information Sharing Protocol for road accident injury described. An analysis of 196 road accident deaths utilising data from all available sources is presented and Data Protection Act, Caldicott Guardian and confidentiality issues are discussed in the context of living patients.

It is only through such a multidisciplinary approach that a robust prospective data collection system can be put in place to support controlled trials of primary, secondary and tertiary prevention strategies.

83 AUDIT OF CXR FOR MILD TO MODERATE BLUNT CHEST TRAUMA

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Blunt chest trauma from a variety of mechanisms is a relatively common presentation to an Accident and Emergency Department. Current Royal College of Radiologist guidelines (1998) recommend no chest x-ray for minor chest trauma but that it is appropriate for moderate chest trauma to assess whether a haemo/ pneumothorax or lung contusion is present.

Based on this clinical guidelines are in place at the Mayday University Hospital Accident and Emergency Department which recommend that chest x-ray be carried out only in certain circumstances eg clinical suspicion of a complication of rib fracture, 1st or 2nd rib fractures.

A retrospective audit was undertaken at the Mayday University Hospital, Thornton Heath to establish whether radiological and clinical guidelines were being adhered to and whether chest x-rays were being performed appropriately in cases of blunt chest trauma. "Trauma Call" patients were excluded.

113 cases were identified from A&E coding whose notes were available in the 3 month period from May until July 2000.

Notes were reviewed to assess the number of chest x-rays undertaken and the criteria for these.

38% of patients (43/113) underwent chest x-ray and of these 72% (31/43) were inappropriate by clinical and radiological guidelines. In addition the radiological findings on both the appropriate and inappropriate chest x-rays were reviewed.

The implications for costs, throughput of patients via A&E, radiation exposure and training of A&E staff are considered and discussed.

84 HORSE RELATED TRAUMA IN A RURAL ACCIDENT AND EMERGENCY DEPARTMENT

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Aim: To examine the characteristics of horse related accidents attending a rural A&E department.

Method: A retrospective case record analysis was undertaken of all horse injuries seen during the year 2000 in Dumfries Infirmary. Staff were instructed to record horse injuries in the diagnostic section of the database throughout the year and cases were identified by a computerised search using the terms "horse" "pony" or "riding" as keywords.

Results: 75 horse related accidents were identified, 64 (85%) were female and 11 (15%) were male. The average casualty age was 25.9 years (range 4-91). Attendance peaked during the month of July with 19/75 (25%) presenting at this time. Seven patients had to be admitted, one with a fractured mandible, one with a detached retina and subluxed lens, one with a fractured femur, one with a fractured L3 vertebral body, 2 children with radial fractures that required manipulation and one with a supracondylar fracture. Twenty-one patients required outpatient assessment and forty-seven were discharged. The sites of main injury included thirty upper limb, twenty-eight lower limb, thirteen back, nine head, three chest and one abdominal/pelvis. There were a total of nineteen fractures diagnosed, fifteen of these were localised to the upper limb. The majority of injuries resulted from falling off horses (45) but other common mechanisms included being trampled/stood on (10) or being kicked (10). We performed 71 x-rays and one CT scan on the casualties seen.

Conclusions: In a region with a strong horse-riding tradition the volume of work created by injuries was small. This study highlighted that females were over five times more likely to be injured than males, and although a wide age range of individuals were injured, 73% were under 30 years. Most accidents occurred in the saddle but people who

work with horses are also at significant risk of injury when out of the saddle too. The majority of injuries were minor soft tissue or orthopaedic related, and affected the upper and lower limbs. The whole spectrum of trauma was represented and there is still exists a real potential for serious injury. The increased emphasis on safety and protection in those who deal with horses appears to be effective in reducing the number of significant injuries experienced.

85 3-IN-1 FEMORAL NERVE BLOCK AS ANALGESIA FOR FRACTURED NECK OF FEMUR IN ACCIDENT AND EMERGENCY: A RANDOMISED CONTROLLED TRIAL

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Rationale: Patients who suffer fractured necks of femur are often elderly, frail and in considerable pain. Quality of care of such patients has received a high profile. Providing effective analgesia for these patients has a sound clinical as well as humanitarian basis. 3-in-1 femoral nerve block confers the potential additional advantage of a more extensive block including the lower cords of the lumbar plexus.

Literature review: Two previous studies have shown simple femoral nerve block can provide effective analgesia for fractured neck of femur, but neither employed the 3-in-1 technique, one was not controlled, and nerve blocks were administered by single, experienced, operators.

Objective: To determine whether 3-in-1 femoral nerve block is effective as analgesia for fractured neck of femur when administered by non-experts in regional anaesthesia in the Accident and Emergency (A&E) department.

Methods: An accreditation package was devised to ensure competence in the technique of 3-in-1 nerve block for all A&E medical staff. All patients with fractured neck of femur were considered for study during a six-month period, corresponding to SHO posts. Those who were confused were excluded. Patients were randomly assigned to receive 3-in-1 nerve block or intravenous morphine in the conventional way. Pain scores were recorded by blinded assessors on arrival, and at one, four, eight, twelve, sixteen and twenty-four hours after admission. Morphine consumption in the first twenty-four hours was recorded. Data were collected by a single investigator blinded to group allocation and analysed by the method of summary measures.

Results: 94 patients sustained fractured necks of femur during the study period. 50 were studied. Of the 44 not studied, all but two were excluded because of confusion, one did not consent, and one was overlooked. Mean age of block recipients was 76.4 yrs (SD +/-13.0) versus controls 80.1 years (SD +/-9.0). There were no significant differences in type of fracture or time to surgery. Patients receiving 3-in-1 nerve blocks recorded a faster time to reach the lowest pain score. The time to lowest pain score was 2.88 hours for nerve block patients compared with 5.81 hours for controls (mean difference -2.93, 95% CI -5.48, -0.38). Nerve block recipients required significantly less morphine per hour than controls: mean 0.49 mg/hr versus 1.17 mg/hr (mean difference -0.68 mg/hr, 95% CI -1.23, -0.12). There were no differences in complication rate, time to discharge, or mortality between the groups. No patient suffered a complication of nerve block technique.

Conclusion: 3-in-1 femoral nerve block was an easily learned, safe and effective method of providing analgesia to patients with fractured neck of femur in the A&E department. All grades of medical staff were able to apply and consolidate this skill.

86 'BLOOD ON THE FLOOR'. ESTIMATION OF BLOOD SPILLS BY PRE-HOSPITAL AND A&E PERSONNEL

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Introduction: "Blood on the floor and four more" is a phrase used to remind the clinician of the sources of blood loss in haemorrhagic shock.¹ The decision to administer blood products is guided by the condition of the patient as well as the response to initial resuscitation. However, estimated external blood loss at scene is often reported as part of the pre-hospital hand over, and in some cases may influence the decision to begin transfusion. Accuracy in estimating blood spills by ambulance personnel has never been investigated in the UK. This study aims to test this skill, comparing pre-hospital staff with A&E personnel and the general public

Methods: The study was conducted using a single blinded clinical model. Comparison was made between four groups made up of ambulance staff, A&E Doctors, A&E nurses, and general public

(ancillary staff, porters and radiographers). Blood spill scenarios were constructed by pouring selected volumes of packed red blood cells, reconstituted to a normal haematocrit, onto two absorbent (carpet and sheet) and one non-absorbent (vinyl) surface. Participants were asked to estimate the volume of each blood spill in millilitres.

Results: 60 participants, 15 in each group, with an average experience of 11.3 years (range 0.5–30 yrs) experience took part in the study. Mean percentage error ($\frac{\{ \text{estimated volume} - \text{actual volume} \}}{\text{actual volume}} \times 100$) was calculated for each participant and the groups compared. (table 1). On a non-absorbent surface, there was a mean overestimation of 54.3%, with 46% of participants overestimating the volume spilled. On absorbent surfaces there was a mean underestimation of 42%, with 82% quoting lower than actual volumes.

Abstract 86 Table 1

Groups	Mean % Error
Ambulance	44.2 (CI 41.5-46.9)
A&E Doctors	51.7 (CI 50.3-53.0)
A&E Nurses	54.8 (CI 52.9-57.5)
GEN Public	43.4 (CI 42.0-44.7)

Conclusion: Reports of external blood loss at scene are not reliable and are likely to be influenced by the surface onto which the blood was spilled. Experience in Accident and Emergency does not appear to improve performance, although specific training in blood volume estimation has been shown to be of value in previous studies.²

1 Greaves I, Porter KM, Ryan JM. *Trauma Care manual*:77. London: Arnold, 2001.

2 Moscati R, Billitter AJ, Marshall B. Blood loss estimation by out-of-hospital emergency care providers. *Pre-hosp Emerg Care* 1999;3:239–42.

87 THE USE OF N-BUTYL CYANOACRYLATE (INDERMIL) IN PRE-TIBIAL LACERATIONS: A NEW METHOD

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Objective: To assess whether Indermil (tissue adhesive) can produce a more viable skin flap than adhesive strips in the repair of pre-tibial lacerations.

Design: A prospective randomised controlled trial.

Setting: Accident and Emergency Department, Bradford Royal Infirmary.

Subjects: 25 consecutive patients with only pre-tibial lacerations over 18 months period irrespective of age and sex.

Main outcome measures: Tissue healing, determined by photographic assessment using a standard grid, over a period of two months.

Results: There was no statistically significant difference in the wound healing time between the two methods of treatment. Indermil is quicker to apply (reducing nurse time and costs) and can be used in certain clinical situations where adhesive strips are often ineffective i.e. oedematous or actively bleeding wounds—especially in anticoagulated patients.

Conclusions: Indermil tissue adhesive is as effective as adhesive strips in closing pre-tibial lacerations. In addition it is quicker to apply and can be used in wounds where adhesive strips commonly fail.

88 THE MANAGEMENT OF POTENTIAL SCAPHOID FRACTURES IN THE UK

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Objective: To establish the current practice of accident and emergency departments in the UK with regard to the investigation and management of potential scaphoid injuries.

Method: A structured questionnaire was designed which made inquiry with regard to the management of a patient with a potential scaphoid injury. Following a pilot study in the West Midlands region this questionnaire was circulated to clinical directors of all Accident and Emergency departments in the UK.

Results: A total of 235 replies were received from 293 questionnaires giving a response rate of 80.2%. Of these, 175 (74%) departments followed up patients with potential scaphoid injuries in their review clinics. All respondents used plain X-rays as their imaging

technique on initial presentation. 56% of respondents managed patients with potential scaphoid injury by immobilisation in either a scaphoid or Colles' plaster/backslab, 23% by semi-rigid (futuro splint) or elastic (tubigrip) support at initial presentation. 13% used variable methods according to patient symptoms. 8% used advanced imaging (Bone scan, CT, MRI) within the first 7 days post injury to establish a definite diagnosis. Patients who had persisting signs suggesting scaphoid injury following immobilisation but with no evidence of fracture on repeat x-rays at review were managed by a) further immobilisation in plaster (23%), b) semi-rigid support and further review (13%), c) Use of advanced imaging (38%), d) referral to another specialist (15%), e) discharge with mobilisation advice (5%).

Conclusions: There is no consensus among senior A & E clinicians on the management of the patient with potential scaphoid injury with negative x-rays either at presentation or at subsequent review. The evidence base for the most commonly used current practices is weak or non-existent. A large scale randomised controlled trial of management of this common problem of potential scaphoid injuries is urgently needed to establish an evidence base to guide clinical practice in this area.

89 CARDIAC LUXATION AS AN UNUSUAL CAUSE OF HYPOTENSION IN TRAUMA

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Objective: To highlight the difficulty in making a pre-mortem diagnosis of cardiac luxation.

Methods: A case report of a 21 year old male trauma victim who presented to the Emergency Department at St. Thomas's Hospital with a chest injury, labile blood pressure and a left brachial plexus injury. A review of the literature relating to the diagnosis and management of this unusual condition was performed.

Results: The patient had a persistently labile blood pressure while in the department. A laparotomy and splenectomy were performed. Post operatively he remained intermittently hypotensive. The diagnosis and repair of a pericardial tear and cardiac luxation was made some hours later at exploratory thoracotomy.

Conclusion: This case has highlighted the difficulty in making a diagnosis of cardiac luxation. It is only by having a high index of suspicion of a pericardial tear in the traumatized patient can the diagnosis be made.