NARSG

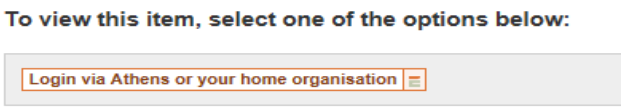
NATIONAL AMBULANCE RESEARCH STEERING GROUP

Pre-hospital Emergency Services
Current Awareness Update
Supplement, Spring to Winter 2013

Research & Best Practice

The following research papers have been published, or made available online, in the last couple of months. This is not a comprehensive overview, but represents papers which are freely available in full text, with current internet links provided.

- Papers listed as **Open Access @** are freely available in full text from the link provided.
- Papers with links listed as **Athens Access @** require you to log in with a free **NHS Athens username** and password to obtain the full text. These links take you to the abstract initially. To read the whole paper, choose either 'full text' or 'pdf' from the options on the abstract page. The full text option will present the article as a single web page; the pdf option will open as a digital copy of the original paper. Selecting either will open a page with the following link for you to enter your Athens username and password;



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The research papers have been arranged by the topic headings below:

Pre-hospital Services - Development and Quality

Pre-hospital Practitioners – Professional Development

Pre-hospital Practitioners - Ethics

Dispatch Services, Response Times & Handover

Helicopter Emergency Medical Services

Treatment and Intervention - Equipment

Treatment and Intervention – Drugs

Pre-Hospital Pain Management

Airway Management

Resuscitation & CPR

Lay Rescuer CPR

Triage and Diagnosis

Patient Outcomes

Research & Development

Guideline Compliance and Development

Case Studies

Conference Reports

Pre-hospital Services – Delivery, Development and Quality

Adverse Events in Pre-hospital Care

Little of the considerable body of research investigating patient harm has addressed pre-hospital care. Paramedics in an Australian ambulance service used a survey tool to consider an adverse event they had experienced and to nominate factors which may have contributed to it in order to assess whether patterns could be discerned from adverse patient events in the pre-hospital setting. From the 370 completed surveys eight single and fourteen groups of contributory factors were identified, the most significant single contributor being the deteriorating patient. The authors discuss their findings and the opportunities for further exploration of patient safety in pre-hospital settings.

Price R, Bendall JC, Patterson JA et al. What causes adverse events in pre-hospital care? A human-factors approach. Emergency Medicine Journal 2013;30 583-588

Athens Access @ http://emj.bmj.com/cgi/content/abstract/30/7/583?etoc

Cold Exposure During Ambulance Care

This Swedish observation study investigated the experiences of pre-hospital exposure to cold amongst injured and ill patients, which can lead to impaired cognitive function, greater pain and contribute to feelings of dissatisfaction. The authors discuss their results and the importance of keeping patients in the comfort zone while in the ambulance, and call for further research.

Aléx J, Karlsson S, Saveman B. Patients' experiences of cold exposure during ambulance care. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine 2013, 21:44

Open Access @ www.sjtrem.com/content/pdf/1757-7241-21-44.pdf

Electronic Pre-hospital Records and Emergency Department Decision Making

This American study surveyed emergency physician to gauge opinion of pre-hospital patient care reports and whether such reports were available to inform decision making in the emergency department. at the time of emergency department (ED) medical decision-making. Just over 200 physicians responded to the survey. They felt pre-hospital patient records were important to their practice and preferred electronic rather than handwritten ones due to concerns over legibility and accuracy. Electronic records were however less readily available than handwritten.

Bledsoe B, Wasden C, Johnson L. Electronic Pre-hospital Records are Often Unavailable for Emergency Department Medical Decision Making. Western Journal of Emergency Medicine. 2013 September; 14(5): 482–488.

Open Access @ www.ncbi.nlm.nih.gov/pmc/articles/PMC3789913/pdf/wjem-14-482.pdf

Evaluation of DAVROS as a Quality Indicator

This paper investigating the assumption that risk-adjusted mortality rates can be used as a quality indicator by evaluating the attributional validity of the Development And Validation of Risk-adjusted Outcomes for Systems of emergency care (DAVROS) model (which predicts 7-day mortality in emergency medical admissions) found little evidence that deaths occurring in patients with a low predicted mortality from risk-adjustment could be attributed to the quality of healthcare provided.

Wilson R, Goodacre SW, Klingbajl M et al. Evaluation of the DAVROS (Development And Validation of Risk-adjusted Outcomes for Systems of emergency care) risk-adjustment model as a quality indicator for healthcare. Emergency Medicine Journal, 2013, 10.1136/emermed-2013-202359

Athens Access @ http://emj.bmj.com/cgi/content/abstract/emermed-2013-202359v1?papetoc

In-flight Medical Emergencies

The authors reviewed the literature on in-flight medical incidents on commercial flights with the aim of quantifying and categorising them in order to inform guidance for volunteer physicians for whom this environment poses a number of challenges including legal aspects of volunteering. Studies reporting incidence were limited but syncope, gastrointestinal upset, and respiratory complaints were among the most common events reported. Chest pain and cardiovascular events were commonly associated with flight diversion.

Chandra A, Conry S. In-flight Medical Emergencies. Western Journal of Emergency Medicine. 2013 September; 14(5): 499–504.

Open Access @ www.ncbi.nlm.nih.gov/pmc/articles/PMC3789915/pdf/wjem-14-499.pdf

Paramedic Models of Care to Reduce Emergency Department Attendance

One strategy to reduce attendance at Emergency Departments is for some non-critically ill patients to be 'seen and treated' or 'seen and referred (to community services)' by Extended Care Paramedics. In this proposed study St John Ambulance Western Australia paramedics will indicate on the electronic patient care record of patients attended in the Perth metropolitan area whether they consider them to be suitable to be managed in the community. These patients will be tracked to assess whether community management would have been appropriate with the aim of informing the development of ECP protocols.

Finn JC, Fatovich DM, Arendts G et al. Evidence-based paramedic models of care to reduce unnecessary emergency department attendance -- feasibility and safety. BMC Emergency Medicine 2013, 13:13

Open Access @ www.biomedcentral.com/content/pdf/1471-227X-13-13.pdf

Patients' and ambulance service clinicians' experiences of pre-hospital care for acute myocardial infarction and stroke

This qualitative research study used interviews with patients and ambulance service clinicians, and a clinician focus group, to explore their experiences of pre-hospital care for acute myocardial infarction and stroke in order to assess the factors which contribute to service quality in the pre-hospital setting. Four themes which emerged were communication, professionalism, treatment of the condition and the transition from home to hospital. The authors note that their results revealed a discrepancy between the patients' lack of knowledge of the role of the paramedic, and the paramedics' own perceptions of patient expectation.

Togher F, Davy Z, Siriwardena AN. Patients' and ambulance service clinicians' experiences of pre-hospital care for acute myocardial infarction and stroke: a qualitative study. Emergency Medicine Journal 2013; 30:942-948

Athens Access @ http://emj.bmj.com/content/30/11/942.abstract.html?etoc

Patterns of Ambulance Demand

This study reviewed published research to look for evidence of temporal patterns (time of day, days of the week, seasons) in demand for ambulance services. An analysis of the 38 research papers found showed patterns in overall demand existed for the time of day, but varied over days of the week and season. Analysis by the type of case showed time of day patterns again. The authors note that the populations seen in these patterns for ambulance demand are distinct from those reported in hospital data. They note that research into demand patterns could be used to improve services.

Cantwell K, Dietze P, Morgans A et al. Ambulance demand: random events or predicable patterns? Emergency Medicine Journal 2013; 30:883-887 NOV 12

Athens Access @ http://emj.bmj.com/content/30/11/883.abstract.html?etoc

Pre-hospital delay in acute stroke and TIA

This study assessed the pre-hospital pathway for acute stroke and TIA with the aim of identifying factors associated with delay. Results for 440 patients, 70.5% of whom arrived at hospital by ambulance, showed the average time from onset of symptoms to hospital admission to be 3 hours. Hesitation in contacting the emergency services account for 55.1% of delay in the pre-hospital pathway. The results showed that severe stroke, transport by ambulance and a younger age of patient were associated with less pre-hospital delay.

> **Waqar Faiz K, Sundseth A, Thommessen B et al. Pre-hospital delay in acute stroke and TIA. Emergency Medicine Journal 2013;30 669-674 AUG 12**
>
> **Athens Access @** http://emj.bmj.com/cgi/content/abstract/30/8/669?etoc

Pre-hospital Telemedicine System

This study evaluated the implementation phase of a mobile telemedicine system to support paramedics in four German emergency medical services to assess feasibility and possible limitations. The system enabled paramedics could initiate a consultation with emergency physicians at a teleconsultation centre using audio communication, real-time vital data transmission, 12-lead electrocardiogram, picture transmission on demand, and video streaming from a camera embedded into the ceiling of each ambulance. The system was demonstrated to be feasible, providing advanced care on-scene and support to lone paramedics. Availability of mobile networks could be a limitation and the authors call for a larger trial to evaluation complications and outcomes.

> **Bergrath S, Czaplik M, Rossaint R et al. Implementation phase of a multicentre pre-hospital telemedicine system to support paramedics: feasibility and possible limitations. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine 2013, 21:54**
>
> **Open Access @** www.sjtrem.com/content/pdf/1757-7241-21-54.pdf

Reducing Inappropriate Emergency Department Attendances

The authors retrospectively reviewed all ambulance attendances to the emergency department at Ninewells Hospital in Dundee over a 7-day period, to identify which of these patients could be seen and treated more appropriately in other parts of the health service. The results revealed that one-third of patients presented via ambulance, 30%–32% of whom were found to be attending inappropriately. Of this group 74%–80% could have been managed in primary care. The authors note that reducing inappropriate ambulance attendances could reduce the departmental patient load by 11%.

> **Patton GG, Thakore S. Reducing inappropriate emergency department attendances--a review of ambulance service attendances at a regional teaching hospital in Scotland. Emergency Medicine Journal 2013;30 459-461**
>
> **Athens Access @** http://emj.bmj.com/cgi/content/abstract/30/6/459?etoc

Responding to the deaf in disasters

This US paper assessed deaf and hard-of-hearing related emergency preparedness training needs for both state emergency management agencies and community-based organizations finding that preparedness for this population group is rare and lacks standardisation and evaluation.

> **Engelman A, Ivey SL, Tseng W et al. Responding to the deaf in disasters: establishing the need for systematic training for state-level emergency management agencies and community organizations. BMC Health Services Research 2013, 13:84 (7 March 2013)**
>
> **Open Access @** www.biomedcentral.com/content/pdf/1472-6963-13-84.pdf

Reducing Ambulance Diversion

This systematic review of published simulation studies had three aims – to identify the balance between ambulance diversion and emergency department waiting times, the predicted impact of patient flow interventions on reducing diversion and optimal regional strategies for reducing diversion. Ten papers met the criteria for inclusion in the review with the authors noting from these the following 'promising avenues for reducing diversion'; smoothing elective surgery caseloads, adding emergency department fast tracks, using holding units for inpatient boarders, improving emergency laboratory turnaround times, and implementing regional cooperative agreements among hospitals.

> **Delgado MK, Meng LJ, Mercer MP et al. Reducing Ambulance Diversion at Hospital and Regional Levels: Systemic Review of Insights from Simulation Models. Western Journal of Emergency Medicine. 2013 September; 14(5): 489–498.**
>
> **Open Access** @ www.ncbi.nlm.nih.gov/pmc/articles/PMC3789914/pdf/wjem-14-489.pdf

Using Ambulance Data to Reduce Community Violence

This research asked whether police-Emergency Department interagency data-sharing could be used to reduce community-violence using a hotspots methodology. The results showed at least one in every two police hotspots did not overlap with an ambulance hotspot whilst more severely injured patients tended to be injured in the places with the highest number of police-recorded crimes. The authors suggest data sharing could lead to reduced community violence by way of prevention and improved efficiency of resource deployment.

> **Ariel B, Weinborn C, Boyle A. Can routinely collected ambulance data about assaults contribute to reduction in community violence? Emergency Medicine Journal 10 December 2013**
>
> **Athens Access** @ http://emj.bmj.com/content/early/2013/12/10/emermed-2013-203133.abstract.html?papetoc

Pre-hospital Practitioners – Professional Practice and Development

Continuous Professional Competence for Emergency Medical Technicians in Ireland

This study invited all Emergency Medical Technicians registered in Ireland to complete a questionnaire relating to the planned Continuous Professional Competence framework including what they considered the optimum educational outcomes and activity to be and their attitude towards CPC. Based on input from the 43% who responded response rate, the authors report that EMTs are supportive of CPC as a key part of their professional development and registration. Blended learning, which involves clinical and practical skills and e-learning, is the optimum approach.

> **Knox S, Cullen W, Dunne C. Continuous professional competence (CPC) for emergency medical technicians in Ireland. BMC Emergency Medicine 2013, 13:25**
>
> **Open Access** @ www.biomedcentral.com/content/pdf/1471-227X-13-25.pdf

Impact of Emergency Care Practitioners in the NHS

This paper updates and expands on two previous reviews of the emergency practitioner role in the NHS, identifying and summarising national evidence-based literature on the impact of ECPs on healthcare delivery, effectiveness of practice and related health service resource use. The authors found research describing the successful implementation of the ECP role and note that further research to investigate whether the beneficial impact of the role is seen equally across all operational settings and patient groups, and does not simply reflect new investment in clinical services.

> **Hill H, McMeekin P, Price C et al. A systematic review of the activity and impact of emergency care practitioners in the NHS. Emergency Medicine Journal online first; July 2013,**
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> **Athens Access** @ http://emj.bmj.com/cgi/content/abstract/emermed-2013-202660v1?papetoc

Impact of New Pre-Hospital Practitioners on Ambulance Transportation To The Emergency Department

This systematic review examined the impact of new pre-hospital practitioner roles, including emergency care practitioners, paramedic practitioners and extended care paramedics, on ambulance transportation to the emergency department in Australia. Thirteen relevant studies were identified although the majority of these did not fully report potential confounding factors the pooled results should that new pre-hospital practitioners were less likely to convey patients to the emergency department and more likely to discharge patients at the scene than conventional ambulance crews. Evidence for the appropriateness of these decisions and the safety of patients was not well supported by the reported studies.

> **Tohira H, Williams TA, Jacobs I et al. The impact of new pre-hospital practitioners on ambulance transportation to the emergency department: a systematic review and meta-analysis. Emergency Medicine Journal 2013, doi:10.1136/emermed-2013-202976**
>
> **Athens Access @** http://emj.bmj.com/content/early/2013/11/15/emermed-2013-202976.abstract.html?papetoc

Patient Experiences of Extended Pre-hospital Practitioner Roles

This study used a postal questionnaire to compare patient experiences of care provided by emergency care practitioners and usual providers in different emergency and urgent care settings. The results showed users of ECP services were more likely to be highly satisfied with overall care than usual provider patients in the various study settings.

> **O'Keeffe C, Mason S, Knowles E. Patient experiences of an extended role in healthcare: comparing emergency care practitioners (ECPs) with usual providers in different emergency and urgent care settings. Emergency Medicine Journal online first; 19 June 2013, 10.1136/emermed-2013-202415**
>
> **Athens Access @** http://emj.bmj.com/cgi/content/abstract/emermed-2013-202415v1?papetoc

Who Does What in Pre-hospital Critical Care?

Paramedic training in the UK has been extended to respond to challenges including increasing call numbers, calls for non-emergency care and the need to provide critical care where appropriate. This paper describes the clinical competencies of three groups of pre-hospital providers in order to inform the future planning and delivery of pre-hospital critical care. Data sources including lists of competencies from the Great Western Ambulance Service, professional guidance documents, and log sheets of pre-hospital care episodes were used to identify 389, 441 and 449 competencies for paramedics, CCPs and PHCC physicians, respectively.

> **von Vopelius-Feldt J, Benger J. Who does what in pre-hospital critical care? An analysis of competencies of paramedics, critical care paramedics and pre-hospital physicians. Emergency Medicine Journal online first: 21 August 2013, 10.1136/emermed-2013-202895**
>
> **Athens Access @** http://emj.bmj.com/cgi/content/abstract/emermed-2013-202895v1?papetoc

Patients' Refusal of Treatment

This case report discusses an ethical communication dilemma set in an airport, where a patient with chest pains consistent with serious heart disease wanted to catch her plane and was unwilling to let paramedics assess her heart with an electrocardiogram. The paramedics had to decide whether to respect the patient's refusal or to persuade her to accept the treatment. They chose to persuade the patient very directly and she was ultimately grateful. This article discusses the dilemmas about communication, patient autonomy and paternalism raised.

Nordby H. Should paramedics ever accept patients' refusal of treatment or further assessment? BMC Medical Ethics 2013 , 14 : 44 (4 November 2013)

Open Access @ www.biomedcentral.com/content/pdf/1472-6939-14-44.pdf

Refusal of Treatment in an Ambulance

This paper discusses an earlier paper which examined the ethics in a case of treatment refusal on religious grounds (below), arguing that some of the authors' reasons for helping patients to rationalise decisions which form the basis of their conclusions are problematic. The author of this commentary paper explores the arguments about consent and rationality in the original paper, with particular reference to religious beliefs.

McMahon-Parkes K. Rationality, religion and refusal of treatment in an ambulance revisited. Journal of Medical Ethics, 2013, vol./is. 39/9(587-590)

Open Access @ http://jme.bmj.com/content/39/9/587.abstract

This paper examined a case study encountered by ambulance staff in the context of the basic principles of medical ethics, where a driver involved in a traffic accident, suspected of suffering from internal bleeding, objected to the administration of intravenous serum as this would break his current fast during Ramadan. When informed that his injuries are life-threatening the patient again refused the serum and asserted that if was due to die, then he would wish to die whilst fasting on a holy day (Friday). The authors discuss how the ambulance physician should make the time-critical decision regarding treatment of the patient without compromising his values.

Erbay H, Alan S, Kadıoğlu S. Clinical ethics: A case study from the perspective of medical ethics: refusal of treatment in an ambulance. Journal of Medical Ethics 2010;36:11 652-655
Open Access @ http://jme.bmj.com/content/36/11/652.abstract

Dispatch Services, Response Times and Handover

Comparing Actual Versus Predicted Emergency Ambulance Journey Times

This study retrospective cohort study of emergency ambulance admissions in the northeast of England examined how accurately commercially available GIS packages could predict emergency ambulance journey times under differing conditions. The study results showed statistically significant under-prediction of journey times for all population densities, but the authors suggest this is not likely to be significant clinically and that it would be reasonable to use generic GIS software with small adjustments to account for under-prediction.

McMeekin P, Gray J, Ford GA et al. A comparison of actual versus predicted emergency ambulance journey times using generic Geographic Information System software. Emergency Medicine Journal online first; 5 June 2013, 10.1136/emermed-2012-202246

Athens Access @ http://emj.bmj.com/cgi/content/abstract/emermed-2012-202246v1?papetoc

Comparison of Requests in Non-Stroke and Stroke Calls

It has been estimated that over 50% of strokes are wrongly classified in calls to emergency medical services. This study builds upon previous research into callers' descriptions of stroke symptoms and subsequent dispatcher response by exploring the use of keywords which callers use, comparing stroke and non-stroke emergency calls. The results showed that people calling about non-stroke conditions rarely use the terms 'stroke, limb weakness, speech problems or facial weakness'.

Leathley MJ, Jones SP, Gibson JME et al. "Can you send an ambulance please?": a comparison of callers' requests for emergency medical dispatch in non-stroke and stroke calls. Emergency Medicine Journal online first; 13 July 2013, 10.1136/emermed-2013-202752

Athens Access @ http://emj.bmj.com/cgi/content/abstract/emermed-2013-202752v1?papetoc

Effect of AMI Symptoms on Pre-hospital Delay Time

This study used a questionnaire completed by 116 patients with acute myocardial infarction to assess their knowledge of AMI symptoms, and the symptoms they had experienced personally. The answers were used to assess how these symptoms related to pre-hospital delay time. Each patient experienced a mean of 3.6 symptoms and the results revealed that patients actually having AMI symptoms and patients being aware of symptoms were inversely correlated with pre-hospital delay time. The authors conclude greater public awareness of AMI symptoms would shorten delay and improve survival rates.

Gao Y, Zhang H-J. The effect of symptoms on pre-hospital delay time in patients with acute myocardial infarction. Journal of International Medical Research, 2013, vol./is. 41/5(1724-1731)

Open Access @ www.ncbi.nlm.nih.gov/pubmed/23926196

Evaluation of Ambulance Offload Delay

This pilot study used direct observation by research assistants to assess the Ambulance Offload Delay at an American university. A sample of 483 patients was observed over 12 month periods and with Ambulance Offload Delay times ranging from 0 to 157 minutes with a median of 11 minutes. The data were analysed for any relationship with overcrowding using National Emergency Department Overcrowding Scale. The median delay time was considered significant, raising concerns for patient care and EMS system resource availability.

Cooney DR, Wojcik S, Seth N et al. Evaluation of ambulance offload delay at a university hospital emergency department. International Journal of Emergency Medicine. 2013; 6: 15.

Open Access @ www.ncbi.nlm.nih.gov/pmc/articles/PMC3663714/pdf/1865-1380-6-15.pdf

Frequent Callers

The authors of this systematic review searched for primary research examining the characteristics and impact of frequent users upon emergency medical services of research on frequent users of EMS. Eighteen relevant studies were retrieved. No two studies used the same definition for frequent users, and the percentage of patients identified as 'frequent callers' reported ranged from 0.2% to 23%. None of the studies focused upon the callers' characteristics. The authors call for research to identify predictors and characteristics of frequent users and a consistent definition of a frequent caller to or user of emergency medical services.

Scott J, Strickland AP, Warner K et al. Frequent callers to and users of emergency medical systems: a systematic review. Emergency Medicine Journal online first; 3 July 2013, 10.1136/emermed-2013-202545

Athens Access @ http://emj.bmj.com/cgi/content/abstract/emermed-2013-202545v1?papetoc

Impact of Shorter Pre-hospital Transport Times on Outcomes in Abdominal Vascular Injuries

Time to haemorrhage control is an important factor affecting survival in patients with abdominal vascular injuries as most deaths are caused by exsanguination and irreversible shock. This study compared outcomes for patients with ABVI presenting to an urban level 1 trauma centre before (1991-4) and after (1995-2004) the implementation of changes leading to a reduction in pre-hospital transport times. The results revealed that the reduction in transport times lead to increases in the number of patients presenting with ABVI with abdominal vascular injuries, the proportion physiologic extremis, and overall mortality

Ball C, Williams B, Tallah C et al. The impact of shorter pre-hospital transport times on outcomes in patients with abdominal vascular injuries. Journal of Trauma Management & Outcomes 2013, 7:11

Open Access @ www.traumamanagement.org/content/pdf/1752-2897-7-11.pdf

Implementing a Criteria-Based Emergency Medical Dispatch System

A criteria-based nationwide Emergency Medical Dispatch system was recently implemented in Denmark. This paper describes the system and analysed hospital admissions and case-fatality risks for calls over a 6-month period to study its ability to triage patients according to the severity of their condition. The results showed that the criteria-based dispatch system seemed to triage patients with high risk of admission and death to the highest level of emergency. The authors call for further studies to determine the over- and under triage and prognostic factors.

Andersen MS, Johnsen S, Sørensen J et al. Implementing a nationwide criteria-based emergency medical dispatch system: A register-based follow-up study. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine 2013, 21:53

Open Access @ www.sjtrem.com/content/pdf/1757-7241-21-53.pdf

Pre-hospital Transport Times and Survival for Hypotensive Patients

This retrospective cohort study investigated the hypothesis that in urban Level I Trauma Centres in the US, shorter pre-hospital times would predict outcomes in penetrating thoracic injuries. Data from a trauma registry was analysed for total pre-hospital times which were then compared with crude and adjusted mortality rates. The results showed mortality to be strongly predicted by injury severity, although shorter pre-hospital times are associated with improved survival.

Swaroop M, Straus DC, Agubuzu O et al. Pre-hospital transport times and survival for hypotensive patients with penetrating thoracic trauma. Journal of Emergency Trauma and Shock. 2013 Jan-Mar; 6(1): 16–20. doi: 10.4103/0974-2700.106320

Open Access @ www.ncbi.nlm.nih.gov/pmc/articles/PMC3589853/?report=classic

Use of Documented Pre-Hospital Observations In Secondary Care

This review of patient records at a university hospital assessed how far eight parameters of prehospital documentation were correctly transferred to hospital records. Emergency department registrars reported a preference for verbal handovers combined with a hand-written prehospital report, and information from other doctors was deemed to be more important that information from the ambulance crew. The review showed less than half of the eight parameters in the prehospital notes were transferred to hospital records with abnormal vital signs transferred less often than injury mechanism, medication administration and immobilisation in trauma.

> **Knutsen GO, Fredriksen K. Usage of documented pre-hospital observations in secondary care: a questionnaire study and retrospective comparison of records. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine 2013, 21:13**
>
> **Open Access** @www.sjtrem.com/content/pdf/1757-7241-21-13.pdf

Use of the Cincinnati Pre-hospital Stroke Scale During Telephone Dispatch

The Italian Ministry of Health has issued stroke and TIA guidelines to pre-hospital emergency services which include the Cincinnati Pre-hospital Stroke Scale (CPSS) use. This study assessed the ability of emergency dispatchers to recognised stroke and TIA symptoms and whether using the CPSS improved accuracy. Results from over 21,000 cases showed centres using CPSS more often during phone dispatch showed greater agreement with on-the-scene pre-hospital assessments, both in correctly identifying cases giving fewer false positives. Extreme variability in the performance among centres was also revealed.

> **De Luca A, Rossi P, Villa G. The use of Cincinnati pre-hospital stroke scale during telephone dispatch interview increases the accuracy in identifying stroke and transient ischemic attack symptoms. BMC Health Services Research 2013 , 13 : 513**
>
> **Open Access** @ www.biomedcentral.com/content/pdf/1472-6963-13-513.pdf

Helicopter Emergency Medical Services

Air Versus Ground Transport of Stroke Patients

This prospective controlled observational study was designed to test the hypothesis that helicopter transport would reduce system delay to thrombolytic treatment at the regional stroke centre. For the 330 patients included in the study, 265 transported over ground and 65 by air, significantly shorter time from contact to triaging neurologist to arrival in the regional stroke centre was found when stroke patients were transported by primarily dispatched ground ambulance compared with a secondarily dispatched helicopter.

> **Hesselfeldt R, Gyllenborg J, Steinmetz J et al. Is air transport of stroke patients faster than ground transport? A prospective controlled observational study. Emergency Medicine Journal published 6 February 2013**
>
> **Athens Access** @ http://emj.bmj.com/cgi/content/abstract/emermed-2012-202270v1?papetoc

HEMS Over-Triage

Over-triage of helicopter emergency medical service patients in New South Wales occurs frequently. Generally, HEMS patient treatment costs are higher than average and the study examined the financial implications of over-triage from the perspective of major trauma centres in the region. The authors found patients with minor injuries made up the majority of HEMS transports and that future funding models need to account for the trauma patients' variability and the proportion of patients transported via HEMS.

> **Taylor CB, Curtis K, Jan S et al. Helicopter Emergency Medical Services (HEMS) over-triage and the financial implications for major trauma centres in NSW, Australia. BMC Emergency Medicine 2013, 13:11 (1 July 2013)**
>
> **Open Access** @ www.biomedcentral.com/content/pdf/1471-227X-13-11.pdf

Impact of Introducing a Major Trauma Network on a Regional Helicopter Emergency Medicine Service

This study analysed six months' clinical data from the Midlands Air Ambulance service to review the impact of introducing the West Midlands major trauma network on the operation of this regional HEMS unit. Data for the corresponding period for the previous year was reviewed for comparison and the contribution of trauma cases to workload, outcomes and the number of interventions performed at the scene was compared. The authors report that HEMS asset use seems to be better targeted for significant injury cases and fewer missions have been cancelled since the major trauma network began operating. The authors call for a detailed evaluation of patient outcomes.

> **McQueen C, Crombie N, Perkins GD et al. Impact of introducing a major trauma network on a regional helicopter emergency medicine service in the UK. Emergency Medicine Journal online first; 14 July 2013, 10.1136/emermed-2013-202756**
>
> **Athens Access @** http://emj.bmj.com/cgi/content/abstract/emermed-2013-202756v1?papetoc

Model for Specialist Pre-hospital Care Provision when Helicopters are not Available

Traditionally in the UK, Helicopter Emergency Medical Services are limited to daylight operations. The safety and feasibility of operating at night is a topic of debate. This paper discusses the Medical Emergency Response Incident Team (MERIT) which provides a physician-led pre-hospital care service that responds by air in daylight and by Rapid Response Vehicle in darkness within the West Midlands Major Trauma Network. MERIT is coordinated and supported by a dedicated Major Trauma Desk manned by a HEMS paramedic in the ambulance service control room.

> **McQueen C, Apps R, Mason F et al. 'Interception': a model for specialist pre-hospital care provision when helicopters are not available. Emergency Medicine Journal 2013; 30:956-957**
>
> **Athens Access @** http://emj.bmj.com/content/30/11/956.abstract.html?etoc

Obstetric Caseload of a Physician-Based Helicopter Emergency Medical Service

Retrieval records over 4 years for the Greater Sydney Area Helicopter Emergency Medical Service were searched to identify keywords associated with pregnancy or obstetric complications with the aim of quantifying the obstetric caseload for the service and then to provide targeted training. Of the 66 cases found, half were retrieved for non-obstetric diagnoses and obstetric interventions by HEMS physicians were rare. The authors note that educational resources should prioritise general critical care of the pregnant woman rather than specific obstetric procedures.

> **Kaye R, Shewry E, Reid C et al. The obstetric caseload of a physician-based helicopter emergency medical service: case review and recommendations for retrieval physician training. Emergency Medicine Journal, 10.1136/emermed-2013-202422**
>
> **Athens Access @** http://emj.bmj.com/cgi/content/abstract/emermed-2013-202422v1?papetoc

Real-Time Audiovisual Feedback

This study used a monitor-defibrillator with a quality analysis feature to evaluate the quality of cardiopulmonary resuscitation in a physician staffed helicopter emergency medical service. Analysis of data during the study period showed that using quality-controlled CPR technology resulted in the indicators of good quality CPR as described in the 2005 resuscitation guidelines being mostly achieved, although with insufficient compression depth. The technology was used for only 52 out of 187 patients and the authors discuss barriers to implementation.

> **Sainio M, Kämäräinen A, Huhtala H et al. Real-time audiovisual feedback system in a physician-staffed helicopter emergency medical service in Finland. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine 2013, 21:50**
>
> **Open Access** @ www.sjtrem.com/content/pdf/1757-7241-21-50.pdf

Search and Rescue Helicopter Transfer of STEMI Patients

This paper describes part of the Danish national reperfusion strategy offered to a remote island population on Bornholm in the Baltic Sea, whereby ST-elevation myocardial infarction patients are transferred for primary percutaneous coronary intervention by air. For the small population of STEMI patients airborne transfer appears feasible and safe, with 30-day mortality after pPCI comparable with the mainland population despite inherent reperfusion delay exceeding guidelines.

> **Malby Schoos M, Kelbaek H, Pedersen F et al. Search and rescue helicopter-assisted transfer of ST-elevation myocardial infarction patients from an island in the Baltic Sea: results from over 100 rescue missions. Emergency Medicine Journal online first; 22 July 2013**
>
> **Athens Access** @ http://emj.bmj.com/cgi/content/abstract/emermed-2013-202771v1?papetoc

Survival Benefit of Helicopter Emergency Medical Services

Physician-staffed helicopter emergency medical services (HEMS) in Germany reduce rescue times and increase catchment area but availability is connected to a high financial burden and depends on the weather, day time and controlled visual flight rules. This study analysed Trauma Register data for over 13,000 patients treated either by HEMS or ground emergency services to identify evidence regarding the benefits of HEMS in terms of improved clinical outcome. The authors report that although HEMS patients were more seriously injured and had a significantly higher incidence of MODS and sepsis, these patients demonstrated a survival benefit compared to GEMS.

> **Andruszkow H, Lefering R, Frink M. Survival benefit of helicopter emergency medical services compared to ground emergency medical services in traumatized patients. Critical Care 2013, 17:R124**
>
> **Open Access** @ http://ccforum.com/content/pdf/cc12796.pdf

Treatment and Intervention - Equipment

Backboard Time for Patients Receiving Spinal Immobilization

In light of potential harms associated with backboard use this study at a US academic trauma centre aimed to determine the total and interval backboard times for patients arriving via emergency medical services. The patients observed had a mean total backboard time of around an hour. The authors call for a study with a larger sample of patients to further investigate the association of time with harm and possible reduction strategies.

Cooney DR, Wallus H, Asaly M et al. Backboard time for patients receiving spinal immobilization by emergency medical services. International Journal of Emergency Medicine. 2013; 6: 17. Published online 2013 June 20. doi: 10.1186/1865-1380-6-17

Open Access @ www.ncbi.nlm.nih.gov/pmc/articles/PMC3691613/pdf/1865-1380-6-17.pdf

Biomechanical Analysis of Spinal Immobilisation

In this study a crew of two paramedics and four fire-fighter first responders simulated extracting a conscious patient from a motor vehicle using nine different extraction techniques. Biomechanical analysis was used to establish which technique resulted in the minimal deviation of the cervical spine from a neutral inline position. Conventional extrication techniques record up to four times more cervical spine movement than controlled self-extrication. The authors call for further evaluation of current rescue techniques.

Dixon M, O'Halloran J, Cummins NM. Biomechanical analysis of spinal immobilisation during pre-hospital extrication. Emergency Medicine Journal online first; 28 June 2013

Athens Access @ http://emj.bmj.com/cgi/content/abstract/emermed-2013-202500v1?papetoc

Bispectral Index to Monitor Sedation Depth

This prospective study of mechanically ventilated patients in the pre-hospital setting examined whether the bispectral index of the EEG (BIS) might be useful as a tool to evaluate the depth of sedation. The results showed a poor correlation between BIS values and clinical assessment of sedation depth, the authors concluding that its use as a tool cannot be recommended.

Duchateau F-X, Saunier M, Larroque B et al. Use of bispectral index to monitor the depth of sedation in mechanically ventilated patients in the pre-hospital setting. Emergency Medicine Journal online first; 25 May 2013

Athens Access @ http://emj.bmj.com/cgi/content/abstract/emermed-2012-202238v1?papetoc

Emergency Cricothyrotomy

This systematic review aimed to identify whether commercial emergency cricothyrotomy kits were superior to traditional surgical and needle techniques. The authors found limited research evidence of suitable quality to draw conclusions, with the majority of published studies too small to show statistically significant differences. They comment that their findings do not necessarily indicate each method to be equally good.

Langvad S, Hyldmo PK, Nakstad AR et al. Emergency cricothyrotomy -- a systematic review. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine 2013, 21:43

Open Access @ www.sjtrem.com/content/pdf/1757-7241-21-43.pdf

Equipment to Prevent, Diagnose and Treat Hypothermia

The survey of 42 pre-hospital practitioners from 543 Norwegian pre-hospital units (ground, fixed wing and helicopter ambulance services and search and rescue services) explored the range of equipment used to prevent, diagnose and treat hypothermia and whether protocols were in place. Duvets, plastic bubble wrap and cotton blankets were found to be the most common types of equipment across all service types. The authors reported that most vehicle ambulance units did not have external heating devices or suitable thermometers available.

> **Karlsen AM, Thomassen Ø, Vikenes BH et al. Equipment to prevent, diagnose, and treat hypothermia: a survey of Norwegian pre-hospital services. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine 2013, 21:63**
>
> **Open Access** @ www.sjtrem.com/content/pdf/1757-7241-21-63.pdf

Measuring Tissue Oxygen Saturation

This pilot study assessed the feasibility of pre-hospital tissue oxygen saturation in patients with major trauma undergoing pre-hospital anaesthesia. Recordings from 13 patients showed continuous tissue oxygen saturation monitoring was achieved with no adverse outcomes reported, although the equipment required was found to be bulky and heavy in the pre-hospital setting.

> **Lyon RM, Thompson J, Lockey DJ. Tissue oxygen saturation measurement in pre-hospital trauma patients: a pilot, feasibility study. Emergency Medicine Journal 2013;30 506-508**
>
> **Athens Access** @ http://emj.bmj.com/cgi/content/abstract/30/6/506?etoc

Pre-hospital Emergency Ultrasound

This paper examines the clinical applications of ultrasound in the pre-hospital setting with a focus on applications providing information to guide the triage and management of critical patients. Challenges are described in terms of cost impact on emergency medical service agencies, provider training, and skill maintenance in addition to challenges related to the technical aspect of ultrasound.

> **El Sayed M, Zaghrini E. Pre-hospital Emergency Ultrasound: A Review of Current Clinical Applications, Challenges, and Future Implications. Emergency Medicine International. 2013; 2013: 531674.**
>
> **Open Access** @ www.ncbi.nlm.nih.gov/pmc/articles/PMC3792527/pdf/EMI2013-531674.pdf

Pre-hospital Treatment of Acute Cardiogenic Pulmonary Oedema Using CPAP

Early use of continuous positive airway pressure can be beneficial for acute cardiogenic pulmonary oedema. This retrospective case series study evaluated the implementation, practical use and complications of the Boussignac CPAP system in pre-hospital treatment protocols in The Hague. The protocol leaves diagnosis of ACPE to the discretion of the paramedics with the facial mask applied immediately after diagnosis. Hospital records for the study period revealed a significant portion of patients with clinical signs of acute cardiogenic pulmonary oedema in the pre-hospital setting was not treated according to the protocol using BCPAP but that for the small group of patients receiving BCPAP treatment it seemed a feasible and effective pre-hospital treatment.

> **Spijker EE, de Bont M, Bax M et al. Practical use, effects and complications of pre-hospital treatment of acute cardiogenic pulmonary oedema using the Boussignac CPAP system. International Journal of Emergency Medicine. 2013; 6: 8.**
>
> **Open Access** @ www.ncbi.nlm.nih.gov/pmc/articles/PMC3637480/pdf/1865-1380-6-8.pdf

Tissue Interface Pressures and Cervical Immobilisation

Cervical immobilisation is commonly applied following trauma but semi-rigid disposable cervical collars are known to cause pressure ulcers, impede effective airway management and exacerbate head injury if external compression of the jugular veins increases intracranial pressure. This systematic review summarises research methods and technologies used to measure tissue interface pressure and assess the jugular vein from immobilisation devices, noting it is difficult to compare studies and devices but a pressure of less than 30 mmHg appears desirable.

Sparke A, Voss S, Benger J. The measurement of tissue interface pressures and changes in jugular venous parameters associated with cervical immobilisation devices: a systematic review. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine 2013 , 21:81

Open Access @ www.sjtrem.com/content/pdf/1757-7241-21-81.pdf

Treatment and Intervention - Drugs

Aspirin Administration by Emergency Medical Dispatchers

This retrospective study used data from three emergency medical dispatch centres in the UK and the USA to establish whether Emergency Medical Dispatchers could use standardised instructions and an aspirin diagnostic and instruction tool (ADxT) to enable bystanders to administer aspirin to chest pain and heart attack patients before the arrival of the emergency services. The tool was successfully completed in nearly 70% of over 44,000 cases with unavailability of aspirin found to be the main reason for eligible patients not taking it as advised. The authors suggest EMDs can enable early aspirin therapy using this protocol and call for further research to explore reasons for it not being used.

Barron T, Clawson J, Scott G et al. Aspirin administration by emergency medical dispatchers using a protocol-driven aspirin diagnostic and instruction tool. Emergency Medicine Journal 2013;30 572-578

Athens Access @ http://emj.bmj.com/cgi/content/abstract/30/7/572?etoc

Audit of Pre-hospital Oxygen Use

In 2009 the Wellington Free Ambulance implemented an education programme to reduce high concentration oxygen delivery to patients with an acute exacerbation of chronic obstructive pulmonary disease (AECOPD). This audit compared pre-hospital oxygen delivery to patients with AECOPD before and after the programme, in 2005 and 2010 finding that the proportion of patients administered supplemental high concentration oxygen therapy had markedly decreased in 2010. However over half these patients were exposed to high concentration oxygen from oxygen-driven nebulisers. The authors recommend using air-driven nebulisers or metered dose inhalers with spacers to address this.

Pilcher J, Cameron L, Braithwaite I et al. Comparative audit of oxygen use in the pre-hospital setting, in acute COPD exacerbation, over 5 years. Emergency Medicine Journal November 2013, doi:10.1136/emermed-2013-203094

Athens Access @ http://emj.bmj.com/content/early/2013/11/15/emermed-2013-203094.abstract.html?papetoc

Pre-Hospital Treatment of Traumatic Rhabdomyolysis

This article describes the aetiology of traumatic rhabdomyolosis, explores associated complications, and reviews the literature about management of the condition for hospital and out-of-hospital settings.

Desjardins M, Strange B. Pre-hospital treatment of traumatic rhabdomyolysis. Emergency Nurse, 2013, vol./is. 21/8(28-33), 13545752

Open Access @ www.ncbi.nlm.nih.gov/pubmed/24313421

Safety and Efficacy of Pre-hospital Diltiazem

This study, based in a New Jersey suburb with advanced life support provided by fly-car units (emergency response vehicles), aimed to determine whether the pre-hospital administration of diltiazem induced hypotension and to evaluate its efficacy in the pre-hospital setting. Records for 278 patients who received diltiazem were analysed retrospectively. The data showed diltiazem to be associated with a very low rate of hypotension and that it appeared to be effective in adequately decreasing heart rate. The authors call for prospective studies to confirm their findings.

Luk JH, Walsh B, Yasbin P. Safety and Efficacy of Pre-hospital Diltiazem. Western Journal of Emergency Medicine. 2013 May; 14(3): 296–300

Open Access @ www.ncbi.nlm.nih.gov/pmc/articles/PMC3656713/?report=classic

Pre-hospital Pain Management

Long-Term Pain Prevalence: Ketamine Versus Morphine

This research aimed to determine differences in the prevalence of long term persistent pain amongst patients administered ketamine or morphine for traumatic pain in the pre-hospital setting. Patients were followed up 6 to 12 months after enrolling in the trial. The authors found a high incidence of persistent pain after traumatic injury, even when the injury was relatively minor. Ketamine use decreased pain scores on arrival at hospital but there was no difference when compared to morphine 6 months on.

Jennings PA, Cameron P, Bernard S et al. Long-term pain prevalence and health-related quality of life outcomes for patients enrolled in a ketamine versus morphine for pre-hospital traumatic pain randomised controlled trial. Emergency Medicine Journal online first; 13 July 2013,

Athens Access @ http://emj.bmj.com/cgi/content/abstract/emermed-2013-202862v1?papetoc

Pre-hospital Analgesia Using Nasal Administration

Delivering analgesia for pain management in the pre-hospital setting can be problematic in harsh winter conditions. This paper describes a series of 9 cases in Sweden where S-ketamine was administered intranasally when intravenous access proved too challenging at the scene. Side-effects were few and non serious. The authors note that this needleless approach can have advantages for both patient and practitioner and may reduce on-scene time. This off-label use is only a last resort and the authors propose further study.

Johansson J, Sjöberg J, Nordgren M et al. Pre-hospital analgesia using nasal administration of S-ketamine -- a case series. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine 2013, 21:38 (14 May 2013)

Open Access @ www.sjtrem.com/content/pdf/1757-7241-21-38.pdf

Pre-hospital Pain Management

Significant delays can arise in initiating pre-hospital pain therapy. A 2001 quality improvement programme in Chicago demonstrated improvement in paramedic knowledge, perceptions, and management of pain. This follow-up study survey 176 paramedics to examine the impact of the original program, repeated educational intervention and effectiveness of a new pain management standard operating procedure. The results showed that paramedics' baseline knowledge, perceptions, and management of pain had all improved.

French SC, Chan SB, Ramaker J. Education On Pre-hospital Pain Management: A Follow-Up Study. Western Journal of Emergency Medicine. 2013 March; 14(2): 96–102.

Open Access @ www.ncbi.nlm.nih.gov/pmc/articles/PMC3628488/?report=classic

Airway Management

Advanced Airway Management by Anaesthesiologists

This study of data relating to anaesthesiologist-provided pre-hospital advanced airway management in eight critical care teams in Central Denmark aimed to estimate incidences of failed and difficult pre-hospital endotracheal intubation, and complications. The results showed pre-hospital airway management by anaesthesiologists to be associated with high success rates and relatively low incidences of complications. The incidence of intubations requiring more than one attempt was higher than suspected.

> **Rognås L, Hansen TM, Kirkegaard H et al. Pre-hospital advanced airway management by experienced anaesthesiologists: a prospective descriptive study. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine 2013, 21:58**
>
> **Open Access** @ www.sjtrem.com/content/pdf/1757-7241-21-58.pdf

Comparison of Intubation Modalities

Interruptions in chest compressions during CPR can negatively impact survival. This randomised study used a sample of emergency physicians to compare three different endotracheal intubation techniques (direct laryngoscopy (DL), GlideScope video laryngoscopy (GVL) and GlideScope video laryngoscopy with bougie) on time to intubation in a simulated cardiac arrest during uninterrupted chest compression. The results showed time to intubation to be shorter for GVL than DL. A longer time to intubation was seen with GVL with bougie.

> **Tandon N, McCarthy M, Forehand B et al. Comparison of intubation modalities in a simulated cardiac arrest with uninterrupted chest compressions. Emergency Medicine Journal online first; 12 July 2013, 10.1136/emermed-2013-202783**
>
> **Athens Access** @ http://emj.bmj.com/cgi/content/abstract/emermed-2013-202783v1?papetoc

Laryngeal Mask Airway Use

This Dutch study evaluated the effectiveness and suitability a novel Laryngeal Mask Airway Supreme (LMA-S) as an alternative to bag-valve mask ventilation in patients who cannot be intubated by ambulance paramedics. After training and use in practice on 50 occasions over nine months, paramedics were unanimous that the LMA-S was an easy to insert and valuable resource. The authors conclude that the device is safe and effective.

> **Bosch J, de Nooij J, de Visser M et al. Pre-hospital use in emergency patients of a laryngeal mask airway by ambulance paramedics is a safe and effective alternative for endotracheal Intubation. Emergency Medicine Journal online first; 15 June 2013, 10.1136/emermed-2012-202283**
>
> **Athens Access** @ http://emj.bmj.com/cgi/content/abstract/emermed-2012-202283v1?papetoc

Laryngeal Tube Disposable

This prospective 42-month study investigated the use of the laryngeal tube disposable by paramedics in pre-hospital emergency cases in Germany. Data from 130 patients showed no significant problems in 93% of the cases and that the LT-D was used as the first-line airway device in about 66% of cases instead of bag-mask-valve ventilation. The authors conclude that the LT-D may enable ventilation rapidly and usually effectively, reducing hands off time for cardiac arrest.

> **Müller J-U, Semmel T, Stepan R et al. The use of the laryngeal tube disposable by paramedics during out-of-hospital cardiac arrest: a prospectively observational study (2008–2012). Emergency Medicine Journal 2013; 30:1012-1016**
>
> **Athens Access** @ http://emj.bmj.com/content/30/12/1012.abstract.html?etoc

Paramedic Endotracheal Intubation

This study aimed to provide a recommended number of times laryngoscopic endotracheal intubation should be practiced by paramedics and to report changes in the frequency of complications along the learning curve. The authors report that 30 live experiences of performing an ETI are sufficient for obtaining a 90% ETI success rate, but little benefit was seen with fewer than 13 experiences. The frequency of complications remained at a high level even after the training.

> **Toda J, Toda A, Arakawa J. Learning curve for paramedic endotracheal intubation and complications. International Journal of Emergency Medicine, 2013 , 6 : 38 (17 October 2013)**
>
> **Open Access @** www.intjem.com/content/6/1/38

Pre-hospital Anaesthesia in a UK Major Trauma Network

Delivery of pre-hospital care in the West Midlands has been remodelled, introducing a 24 h Medical Emergency Response Incident Team (MERIT) deploying teams including physicians and critical care paramedics using ground and helicopter platforms. This paper uses a retrospective review of 12 months of data following the launch of the MERIT scheme in the West Midlands to describe the experience of delivering pre-hospital rapid sequence induction of anaesthesia. RSI was performed 142 times in the review period with one recorded case of failure to intubate. The authors comment that their study demonstrates that operation within a system providing high levels of exposure, underpinned by robust standard operation procedures and training, promotes levels of performance in successful pre-hospital RSI regardless of base speciality or profession.

> **McQueen C, Crombie N, Hulme J et al. Pre-hospital anaesthesia performed by physician/critical care paramedic teams in a major trauma network in the UK: a 12 month review of practice. Emergency Medicine Journal 2013 doi:10.1136/emermed-2013-202890**
>
> **Athens Access @** http://emj.bmj.com/content/early/2013/10/16/emermed-2013-202890.abstract.html?papetoc

Pre-Hospital Critical Care Anaesthesiologists

Using data from eight pre-hospital critical care teams in central Denmark the authors assessed the impact of implementing a standard operating procedure for pre-hospital controlled ventilation during transport using endotracheal intubation or a supraglottic airways device on pre-hospital anaesthesiologists' behaviour in terms of increasing the use of automated ventilators. The intervention was found to significantly increase automated ventilator use for patients requiring controlled ventilation, including those with traumatic brain injury and OHCA.

> **Rognås L, Hansen T, Kirkegaard H et al. Standard operating procedure changed pre-hospital critical care anaesthesiologists; behaviour: a quality control study. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine 2013, 21:84**
>
> **Open Access @** www.sjtrem.com/content/pdf/1757-7241-21-84.pdf

Pre-Hospital Non-Drug Assisted Intubation

This Canadian study reviewed the frequency of pre-hospital non-drug assisted intubation in trauma patients and its association with mortality. Data for over 2,200 adult trauma patients was analysed, 30.1% of whom underwent pre-hospital intubation. Intubation rates decreased from 33.7% to 14% over the period of the study, but were shown to be associated with an increased mortality risk.

> **Evans C, Brison R, Howes D et al. Pre-hospital non-drug assisted intubation for adult trauma patients with a Glasgow Coma Score less than 9. Emergency Medicine Journal 2013; 30:935-941**
>
> **Athens Access @** http://emj.bmj.com/content/30/11/935.abstract.html?etoc

Refraining from Pre-Hospital Advanced Airway Management

The authors use observational data from consecutive cases from eight pre-hospital critical care teams in Central Denmark to understand the decision-making process where the attending pre-hospital critical care anaesthesiologist considers performing pre-hospital advanced airway management but decides not to proceed.

> **Rognås L, Hansen T, Kirkegaard H et al. Refraining from pre-hospital advanced airway management: a prospective observational study of critical decision making in an anaesthesiologist-staffed pre-hospital critical care service. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine 2013, 21:75 (25 October 2013)**
>
> **Open Access** @ www.sjtrem.com/content/pdf/1757-7241-21-75.pdf

Tracheal Intubation While Wearing Personal Protective Equipment

This manikin-based study with 31 participants compared the Pentax-AWS portable video laryngoscope with the conventional Macintosh laryngoscopy for achieving intubation in potential chemical, biological, radiation and nuclear (CBRN) incidents requiring emergency practitioners to wear personal protective clothing. Unsuited and suited intubations were performed with the results showing the Pentax-AWS to be a promising device with suited intubations superior to unsuited attempts using the Macintosh.

> **Shin DH, Choi PCC, Na JU et al. Utility of the Pentax-AWS in performing tracheal intubation while wearing chemical, biological, radiation and nuclear personal protective equipment: a randomised crossover trial using a manikin. Emergency Medicine Journal 2013;30 527-531**
>
> **Athens Access** @ http://emj.bmj.com/cgi/content/abstract/30/7/527?etoc

Tracheal Tube Cuff Pressures

Inappropriately cuffed tracheal tubes can lead to inadequate ventilation or silent aspiration, or to serious tracheal damage. Using results from 101 patients intubated ahead of helicopter transport this paper tested the hypothesis that cuff pressures which are too high are dependent on providers' professional The authors found that whilst pre-hospital and ICU cuff pressures were frequently too high, there was no significant difference between non-anaesthesia and anaesthesia personnel with acceptable cuff pressures best achieved using a cuff pressure manometer.

> **Harm F, Zuercher M, Bassi M et al. Prospective observational study on tracheal tube cuff pressures in emergency patients– is neglecting the problem the problem? Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine 2013, 21:83**
>
> **Open Access** @ www.sjtrem.com/content/pdf/1757-7241-21-83.pdf

Resuscitation & Professional CPR

Compression Landmark and Depth for Patients with Pectus Excavatum

This study of 22 patients with a mean age of 27 found that, as patients with pectus excavatum have a sunken chest, 3–4 cm may be the proper compression depth rather than the current compression guideline for normal subjects of 5–6 cm.

> **Hyun Lee K, Woo Kim K, Young Kim E et al. Proper compression landmark and depth for cardiopulmonary resuscitation in patients with pectus excavatum: a study using CT. Emergency Medicine Journal Published December 2013**
>
> **Athens Access @** http://emj.bmj.com/content/early/2013/12/10/emermed-2013-202671.abstract.html?papetoc

Effects of Flashlight Guidance on Chest Compression

Voices, traffic, industrial and battlefield noise can all impede the ability to maintain manual cardiopulmonary resuscitation rates as metronome pacing may not be clearly heard. This study simulated a noisy environment to test the use of flashlight-guided CPR on a manikin, where the light emitted light pulses at a rate of 100 flashes per minute. The results showed significant differences between the flashlight and control group in maintenance of compression rate – without the flashlight, the control group rate tended to decrease after one minute - but not of depth, hand position and compression release.

> **You JS, Chung SP, Chang CH et al. Effects of flashlight guidance on chest compression performance in cardiopulmonary resuscitation in a noisy environment. Emergency Medicine Journal 2013;30 628-632**
>
> **Athens Access @** http://emj.bmj.com/cgi/content/abstract/30/8/628?etoc

Family Witnessed Resuscitation

This French study used an anonymous questionnaire to assess the practices and opinions of pre-hospital emergency medical services with regard to family witnessed resuscitation. Over 90% of the 2,500 respondents psychological trauma might be caused to the family; 70% thought it might impact on the duration of resuscitation and 68% on EMS team concentration. Written guidelines are in development taking these results into account.

> **Belpomme V, Adnet F, Mazariegos I et al. Family witnessed resuscitation: nationwide survey of 337 pre-hospital emergency teams in France. Emergency Medicine Journal 2013; 30:1038-1042**
>
> **Athens Access @** http://emj.bmj.com/content/30/12/1038.abstract.html?etoc

In-Water Resuscitation

Mouth to mouth resuscitation of drowning victims while they are in the water can improve outcomes but is challenging. This study assessed the ventilation effectiveness of the Oxylator ventilator and SCUBA dive regulators on a test lung. The authors report the results for each utility and suggest professional rescue divers might be able to use the Oxylator with an oxygen tank for early onset of in-water ventilation in drowning victims.

> **Winkler BE, Froeba G, Koch A et al. Oxylator and SCUBA dive regulators: useful utilities for in-water resuscitation. Emergency Medicine Journal 2013;30 579-582**
>
> **Athens Access @** http://emj.bmj.com/cgi/content/abstract/30/7/579?etoc

Manual and Mechanical Compression During Transport

This study compared the effectiveness of manual chest compression with the LUCAS 2, AutoPulse and animax mono devices on a manikin in a standard ambulance travelling along a 5km track. Mean compression frequencies were recorded and shown to be significantly higher for manual compression than for the LUCAS2 or Autopulse with braking and gear changes affecting the quality of manual compressions. Recommended compression depth was only achieved using the animax mono. The authors discuss their results and call for further research.

Gassler h, Ventzke M-M, Lampl L et al. Transport with ongoing resuscitation: a comparison between manual and mechanical compression. Emergency Medicine Journal 2013;30 589-592

Athens Access @ http://emj.bmj.com/cgi/content/abstract/30/7/589?etoc

Pre-Hospital Epinephrine for Out-Of-Hospital Cardiac Arrest

This Japanese study analysed data from over 200,000 OCHA patients to determine whether pre-hospital epinephrine administration would improve 1-month survival. The analysis revealed that epinephrine administration for patients with initial non-shockable rhythms was independently associated with achievement of pre-hospital ROSC and had association with improved 1-month survival when epinephrine administration time was <20 min.

Goto Y, Maeda T, Goto YN. Effects of pre-hospital epinephrine during out-of-hospital cardiac arrest with initial non-shockable rhythm: an observational cohort study. Critical Care 2013, 17:R188 doi:10.1186/cc12872

Open Access @ http://ccforum.com/content/pdf/cc12872.pdf

Rescuer Fatigue

Guidelines by the European Resuscitation Council were updated in 2010, increasing the required depth and rate of chest compressions. This study used a Skill Reporter manikin to objectively assess cardiopulmonary resuscitation performance and rescuer fatigue in 62 health science students who reported their own fatigue levels, noting the point where they felt fatigue affected compression quality. The authors found that neither compression rate of rescue breath volume were affected by fatigue but that a significant decline in depth was recorded, notably between the first and second minutes. The authors found fatigue to be poorly judged by the rescuers and suggest rescuers should change over after 2 minutes.

McDonald CH, Heggie J, Jones CM et al. Rescuer fatigue under the 2010 ERC guidelines, and its effect on cardiopulmonary resuscitation (CPR) performance. Emergency Medicine Journal 2013;30 623-627

Athens Access @ http://emj.bmj.com/cgi/content/abstract/30/8/623?etoc

Shorter Compression Phase and Chest Compression Depth

This study investigated the effect of a shorter compression phase on average chest compression depth during metronome-guided cardiopulmonary resuscitation. The results from compressions performed by senior medical students showed the induction of a shorter compression phase to be correlated with deeper chest compression during metronome-guided cardiopulmonary resuscitation.

Chung TN, Bae J, Kim EC et al. Induction of a shorter compression phase is correlated with a deeper chest compression during metronome-guided cardiopulmonary resuscitation: a manikin study. Emergency Medicine Journal 2013;30 551-554

Athens Access @ http://emj.bmj.com/cgi/content/abstract/30/7/551?etoc

Lay Rescuer CPR

Avoiding Abdominal Hand Placement During Chest Compression

This trial of telephone instructions to guide chest compression before the arrival of the emergency services compared the standard instruction to *"Kneel down beside the chest. Place one hand in the centre of the victim's chest and the other on top"* with the intervention being studied *"Lay the patient's arm which is closest to you, straight out from the body. Kneel down by the patient and place one knee on each side of the arm. Find the midpoint between the nipples and place your hands on top of each other".* Thirty-six lay volunteers took part in the study and the results showed the new instructions lead to fewer caudal hand placements and no abdominal ones.

Birkenes TS, Myklebust H, Kramer-Johansen J. New pre-arrival instructions can avoid abdominal hand placement for chest compressions. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine 2013, 21:47

Open Access @ www.sjtrem.com/content/pdf/1757-7241-21-47.pdf

Community First Responder Group Volunteers

This qualitative study using five small focus groups found that although motives to volunteer for first responder groups were 'complex and individual', ideas of altruism and a sense of community were important, the flexibility of volunteering and the autonomy offered were attractive and many volunteers had prior relevant experience.

Timmons S, Vernon-Evans A. Why do people volunteer for community first responder groups? Emergency Medicine Journal 2013;30 e13

Athens Access @ http://emj.bmj.com/cgi/content/abstract/30/3/e13?etoc

Dominant Versus Non-Dominant Hand Position for Rescue

This study aimed to evaluate the effectiveness of hand position and approach side on the quality of CPR between right-handed and left-handed novice rescuers - health science university students with no previous experience of basic life support. The authors found performance during chest compressions to be influenced by the position of the dominant hand and the side of approach regardless of handedness and recommend that novice rescuers should consider hand positions for contacting the sternum identical to the side of approach after approaching from the nearest and most accessible side, for optimal CPR performance.

Sung You J, Kim H, Park JS, Relative effectiveness of dominant versus non-dominant hand position for rescuer's side of approach during chest compressions between right-handed and left-handed novice rescuers. Emergency Medicine Journal doi:10.1136/emermed-2013-202515

Athens Access @ http://emj.bmj.com/content/early/2013/12/20/emermed-2013-202515.abstract.html?papetoc

Mass Education and Attitudes Towards Cardiopulmonary Resuscitation

The study assessed the effects of a one-year television campaign and mass education (BLS and AED courses) in a rural Danish community on attitudes to providing basic life support and deploying an automated external defibrillator. Attitudes before and after the campaign were assessed by telephone. The results revealed a significant increase in the willingness to use an AED and in confidence in how to provide chest compressions and mouth to mouth ventilations, although willingness to provide CC and MMV were perhaps less influenced by the campaign.

> **Nielsen AM, Isbye DL, Lippert FK et al. Can mass education and a television campaign change the attitudes towards cardiopulmonary resuscitation in a rural community? Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine 2013, 21:39**
>
> **Open Access** @ www.sjtrem.com/content/pdf/1757-7241-21-39.pdf

Metronome Guided Dispatcher-Assisted Compression-Only Cardiopulmonary Resuscitation

Can the use of a metronome assist untrained laypeople in maintaining the required chest compression rate while being guided by an emergency dispatcher? This study compared data from 34 untrained laypeople performing metronome-guided compression-only cardiopulmonary resuscitation on a manikin with a control group of 33. The results showed that the group metronome guidance had improved chest compression rates but more shallow compression depth.

> **Park SO, Hong CK, Shin DH et al. Efficacy of metronome sound guidance via a phone speaker during dispatcher-assisted compression-only cardiopulmonary resuscitation by an untrained layperson: a randomised controlled simulation study using a manikin.**
> **Emergency Medicine Journal 2013;30 657-661**
>
> **Athens Access** @ http://emj.bmj.com/cgi/content/abstract/30/8/657?etoc

Video Self-Instruction in CPR

This Texan study evaluated the effectiveness of a compression-only CPR self-instruction video with a personal manikin for use by lay-people. Adults without CPR training in the past year were randomized into one of three groups, all using a sensored manikin to monitor CPR proficiency. The authors found that the group using the self-instruction video did not achieve greater overall competency but did achieve some CPR skills better than without training.

> **Godfred R, Huszti E, Fly D et al. A randomized trial of video self-instruction in cardiopulmonary resuscitation for lay persons. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine 2013, 21:36**
>
> **Open Access** @ www.sjtrem.com/content/pdf/1757-7241-21-36.pdf

Voice Activated CPR Decision Support System

This prospective, randomised controlled trial used simulation to investigate whether access to a voice activated decision support system (VADSS) containing video clips demonstrating resuscitation manoeuvres was associated with increased compliance with American Heart Association Basic Life Support guidelines in lay rescuers. The authors found the support system prompted lay rescuers to follow guidelines but was associated with an unacceptable delay to starting chest compressions.

> **Hunt EA, Heine M, Shilkofski NS et al. Exploration of the impact of a voice activated decision support system (VADSS) with video on resuscitation performance by lay rescuers during simulated cardiopulmonary arrest. Emergency Medicine Journal 2013, doi:10.1136/emermed-2013-202867**
>
> **Athens Access** @ http://emj.bmj.com/content/early/2013/11/15/emermed-2013-202867.abstract.html?papetoc

Wrist Ligament Injury in Rescuers

Wrist pain in rescuers performing chest compressions as part of cardiopulmonary resuscitation has been reported anecdotally and recently in the literature. Studies have indicated that rescuers apply as much as 644 N of force to the victim's chest with each compression, while standards require one hundred compressions per minute. Recent research suggests that forces transmitted through the rescuers' wrists of less than 10% of those seen during the performance of chest compressions significantly strain the scapholunate ligament. Biomechanical research should be performed to further evaluate this possible correlation. Compensation for worker injury maybe involved.

> **Curran R, Sorr S, Aquino E. Potential wrist ligament injury in rescuers performing cardiopulmonary resuscitation. Journal of Emergency Trauma and Shock. 2013;6(2):123–125.**
>
> **Open Access** @ www.ncbi.nlm.nih.gov/pmc/articles/PMC3665060/?report=classic

Triage & Diagnosis

Accuracy of Pre-Hospital Triage Tools for Injured Children

This study used a literature review and a survey of Lead Trauma Clinicians across English Strategic Health Authorities to identify pre-hospital paediatric triage tools in order to investigate their performance characteristics for identifying seriously injured children. Eight tools were identified and their performance in terms of under- and over-triaging features was assessed using 701 patient records from the clinical registry data of the Trauma Audit and Research Network . The authors report that none of the pre-hospital triage tools met recommended criteria for over- and under-triage rates leaving an urgent need for the development of triage tools to accurately risk-stratify injured children in the pre-hospital setting.

> **Cheung R, Ardolino A, Lawrence T et al. The accuracy of existing pre-hospital triage tools for injured children in England--an analysis using trauma registry data. Emergency Medicine Journal 2013;30 476-479**
>
> **Athens Access** @ http://emj.bmj.com/cgi/content/abstract/30/6/476?etoc

Association Between Systolic Blood Pressure and Stroke

This Japanese study evaluated the association between initial systolic blood pressure (SBP) value measured by emergency medical service (EMS) and diagnosis of stroke among impaired consciousness patients finding that elevated SBP among emergency patients with impaired consciousness in the field was associated with increased diagnosis of stroke.

> **Sugihara K, Hayashida S, Nishiuchi T et al. An association between systolic blood pressure and stroke among patients with impaired consciousness in out-of-hospital emergency settings. BMC Emergency Medicine 2013, 13:24**
>
> **Open Access** @ www.biomedcentral.com/content/pdf/1471-227X-13-24.pdf

GP Triage in a Rural Community

This study examined pre-hospital emergency medicine triage performed by General Practitioners from a Norwegian island community where GPs and the ambulance service both take part in all medical emergencies, focusing upon over- and under triage. Triage at the initial telephone notification was compared with the actual physical examination of the patient. For 236 events recorded over 2 years priority status for 42% was downgraded, 11% upgraded and 47% unchanged. The authors call for individual scrutiny in cases of upgrading.

> **Rørtveit S, Meland E, Hunskaar S. Changes of triage by GPs during the course of pre-hospital emergency situations in a Norwegian rural community. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine 2013, 21:89**
>
> **Open Access** @ www.sjtrem.com/content/pdf/1757-7241-21-89.pdf

Inter-hospital Transfer Due to Failed Pre-Hospital Diagnosis

ST-elevation myocardial infarction guidelines recommend pre-hospital triage and direct referral to a percutaneous coronary intervention-capable centre. This study investigated the impact of failed pre-hospital diagnosis leading to initial referral to a non-PCI capable centre, requiring subsequent inter-hospital transfer. For 609 patients who underwent primary PCI during a two year period, 15% were found to have required inter-hospital transfer after failed pre-hospital diagnosis. Patients characteristics predicting inter-hospital transfer included being female, diabetic or having had prior myocardial infarction. The necessity for inter-hospital transfer was found to be a major predictor of ischemic time and 1-year mortality was significantly higher.

> **Mahmoud KD, Gu YL, Nijsten MW et al. Inter-hospital transfer due to failed pre-hospital diagnosis for primary percutaneous coronary intervention: An observational study on incidence, predictors, and clinical impact. European Heart Journal: Acute Cardiovascular Care, 2013, vol./is. 2/2(166-175)**
>
> **Open Access** @ http://acc.sagepub.com/content/2/2/166.full.pdf+html

Patient Outcomes

Five-Year Mortality After Acute Poisoning Treated in Ambulances

This Norwegian study is the first to examine long-term (five-year) mortality after pre-hospital treatment for acute poisoning. By following up a cohort of adults discharged after treatment for acute poisoning in either an ambulance, emergency outpatient clinic or hospital five years after discharge the authors examined causes and predictors of death. Of just over 2,000 patients, 14% had died after five years. This mortality rate was high compared with the general population with those treated in hospital having the lowest mortality and opioids the main predictor of death.

> **Lund C, Bjornaas MA, Sandvik L et al. Five-year mortality after acute poisoning treated in ambulances, an Emergency outpatient clinic and hospitals in Oslo. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine 2013, 21:65**
>
> **Open Access** @ www.sjtrem.com/content/pdf/1757-7241-21-65.pdf

Neurological Outcomes in Patients Transported to Hospital without Pre-Hospital Return of Spontaneous Circulation

Japanese pre-hospital emergency personnel are not allowed to perform termination of resuscitation in the field so most patients experiencing an out-of-hospital cardiac arrest are transported to hospital before the return of spontaneous circulation. This analysis of nearly 400,000 patient records found that nine pre-hospital factors were significantly associated with favourable neurological outcomes at one month. Four of these were crucial key factors: initial non-asystole rhythm, age <65 years, EMS-witnessed arrest, and call-to-hospital arrival time <24 minutes.

> **Goto Y, Maeda T, Nakatsu-Goto Y. Neurological outcomes in patients transported to hospital without a pre-hospital return of spontaneous circulation after cardiac arrest. Critical Care, 2013, 17:R274**
>
> **Open Access** @ http://ccforum.com/content/pdf/cc13121.pdf

Out-of-hospital Cardiac Arrest in Cork

Whilst around 5,000 deaths in Ireland each year are due to out-of-hospital cardiac arrest, little published evidence exists on survival from OHCA in the country. This study used dispatch, ambulance and hospital records for a one year period to characterise and describe presumed OHCA attended by the ambulance service in Cork City and County. For the 231 cases located, the authors note that a survival rate of 16.7% in shockable rhythms indicates scope for improvement to influence the overall survival rate, found to be 7.4%. The authors suggest real-time feedback of performance and quality of the continuum of patient care through a clinical-quality cardiac arrest registry.

Henry K, Murphy A, Willis D et al. Out-of-hospital cardiac arrest in Cork, Ireland. Emergency Medicine Journal 2013;30 496-500

Athens Access @ http://emj.bmj.com/cgi/content/abstract/30/6/496?etoc

Predicting Hospital Mortality in Older Patients with Severe Trauma

This retrospective review of severely injured elderly patients describes the different patterns of injury among this group, examines predictors of in-hospital mortality and aimed to determine how far pre-existing co-morbidities affected outcome. The authors report current trauma scoring systems to be insufficient for managing and predicting survival, with age ≥80, low GCS, elevated INR, pre-existing CRF and intubation on admission being the strongest independent predictors of mortality.

Bala M, Willner D, Klauzni D et al. Pre-hospital and admission parameters predict in-hospital mortality among patients 60 years and older following severe trauma. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine 2013, 21:91 (21 December 2013)

Open Access @ www.sjtrem.com/content/pdf/1757-7241-21-91.pdf

Young Adults Who Survive Out-Of-Hospital Cardiac Arrest

This Australian study used records from the Victorian Ambulance Cardiac Arrest Registry to identify out of hospital cardiac arrest survivors in the 18 to 39 age group from 2003 to 2008 whose longer-term outcomes might be assessed using a telephone questionnaire. 106 people were identified, five of whom had died. A further 45 were unavailable or chose not to take part. The questionnaire results for the remainder enabled the authors to assess levels of independence, mobility, activity, pain and anxiety and they conclude that telephone follow-up in this area of study is feasible, though many potential participants are lost to follow-up.

Deasy C, Bray J, Smith K et al. on behalf of the VACAR Steering Committee. Functional outcomes and quality of life of young adults who survive out-of-hospital cardiac arrest. Emergency Medicine Journal 2013;30 532-537

Athens Access @ http://emj.bmj.com/cgi/content/abstract/30/7/532?etoc

Guideline Compliance and Development

Adherence to Guidelines in Pre-hospital Care

This systematic review aimed to give an overview of professionals' adherence to (inter)national guidelines and protocols in the emergency medical dispatch, pre-hospital and emergency department settings, and to explore factors influencing adherence. Thirty-five articles met the review criteria, though none addressed the emergency medical dispatch setting or protocols. The results showed a wide variation in adherence guidelines in pre-hospital and emergency department settings and as any insight from the studies on influencing factors for adherence is minimal the authors suggest this is an area for future research.

> **Ebben RH, Vloet LC, Verhofstad MH et al. Adherence to guidelines and protocols in the pre-hospital and emergency care setting: a systematic review. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine 2013, 21:9**
>
> **Open Access** @ www.sjtrem.com/content/pdf/1757-7241-21-9.pdf

Compliance with Pre-hospital Guidelines

Evidence suggests that compliance with guidelines and protocols can be low in a pre-hospital setting. This Swedish study used observations and interviews of 30 participants in a rural and an urban ambulance station to understand the use of guidelines and protocols and to identify reasons for poor compliance. The authors found the ambulance station staff to have positive attitudes towards using guidelines and protocols but that the documents being used had not been sufficiently adapted to the pre-hospital setting causing obstacles to their implementation.

> **Andersson Hagiwara M, Suserud B, Jonsson A et al. Exclusion of context knowledge in the development of pre-hospital guidelines: results produced by realistic evaluation. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine 2013, 21:46**
>
> **Open Access** @ www.sjtrem.com/content/pdf/1757-7241-21-46.pdf

Developing Guidelines for Trauma Care

In this Delphi study, a large expert panel agreed on a set of guidelines describing the optimal process of care for severely injured trauma patients in the Netherlands. Consensus was reached on 21 guidelines within 4 categories: timeliness, actions, competent teams and interdisciplinary process. Timeliness guidelines set specific critical limits and definitions for 10 time intervals from an emergency call to the patient leaving the trauma room. Action guidelines reflect aspects of appropriate care. Competence guidelines include flow charts to assess the competence of pre-hospital and emergency department teams. The next step is to implement the guidelines and monitor the performance of the Dutch trauma system based on the guidelines.

> **Hoogervorst EM van Beeck EF, Goslings JC et al. Developing process guidelines for trauma care in the Netherlands for severely injured patients: results from a Delphi study. BMC Health Services Research 2013, 13:79 doi:10.1186/1472-6963-13-79**
>
> **Open Access** @ www.biomedcentral.com/content/pdf/1472-6963-13-79.pdf

Guidelines for Field Triage of Injured Patients

These guidelines from the US Centres for Disease Control and Prevention provide the framework for assisting individual emergency medical service systems in providing evidenced based quality care, keeping in mind the local, state, and regional variations.

> **McCoy CE, Chakravarthy B, Lotfipour S. Guidelines for Field Triage of Injured Patients: In conjunction with the Morbidity and Mortality Weekly Report by the Centre for Disease Control and Prevention. Western Journal of Emergency Medicine. 2013;14(1): 69–76.**
>
> **Open Access** @ www.ncbi.nlm.nih.gov/pmc/articles/PMC3582524/?report=classic

Management of Bleeding in Major Trauma

The multidisciplinary European Task Force for Advanced Bleeding Care in Trauma was formed in 2005 with the aim of developing an evidence-based guideline for the management of bleeding following severe injury. This document represents an updated version of the guideline published by the group in 2007 and updated in 2010. Key changes encompassed in this version of the guideline include new recommendations on the appropriate use of vasopressors and inotropic agents, and reflect an awareness of the growing number of patients in the population at large treated with antiplatelet agents and/or oral anticoagulants. The current guideline also includes recommendations and a discussion of thromboprophylactic strategies for all patients following traumatic injury. The most significant addition is a new section that discusses the need for every institution to develop, implement and adhere to an evidence-based clinical protocol to manage traumatically injured patients.

> **Spahn DR, Bouillon B, Cerny V et al. Management of bleeding and coagulopathy following major trauma: an updated European guideline. Critical Care 2013, 17:R76**
>
> **Open Access** @ http://ccforum.com/content/pdf/cc12685.pdf

Research & Development

Conducting Research in the Pre-hospital Setting

Few trials have been conducted by UK ambulance services. Examples of trials experiencing problems have led to the pre-hospital environment being seen as a difficult one. The authors of this paper discuss the methodological challenges encountered during the design and conduct of their own trial – PARAMEDIC, an HTA-funded trial comparing mechanical chest compression (using the LUCAS-2 device) with manual chest compression, during attempted resuscitation after cardiac arrest.

> **Gates S, Horton J, Hennings S et al. Oral Presentation : Issues in the design and conduct of a multicentre trial in UK ambulance services. Trials 2013, 14:O82**
>
> **Open Access** @ www.trialsjournal.com/content/pdf/1745-6215-14-S1-O82.pdf

Design of the PRINCESS trial

This paper describes the methodology of an ongoing multi-centre randomised controlled trial which compares the pre-hospital initiation of intra-arrest therapeutic hypothermia using trans-nasal evaporative cooling with standard treatment, including therapeutic hypothermia, initiated after hospital admission. Improvement of neurologically intact survival at 90 days is the primary outcome.

> **Nordberg P, Taccone FS, Castren M. Design of the PRINCESS trial: pre-hospital resuscitation intra-nasal cooling effectiveness survival study (PRINCESS). BMC Emergency Medicine 2013, 13:21**
>
> **Open Access** @ www.biomedcentral.com/content/pdf/1471-227X-13-21.pdf

Case Studies

An Injured Climber

Climbing incidents present wide-ranging challenges to pre-hospital teams with decisions influenced by factors including difficulties in accessing patients, limited available resources and safe egress from scenes. This case study illustrates the importance of an adaptable and innovative approach to scene management and clinical decision making.

> **McQueen C, Bridle P, Bexon K et al. An injured climber. Emergency Medicine Journal 2013; 30:1056-1057**
>
> **Athens Access @** http://emj.bmj.com/content/30/12/1056.abstract.html?etoc

Maintaining a Safe Scene

This case study of a motorcyclist suffering time critical injuries in an accident on a motorway slip road in the East Midlands is used to illustrate the challenges faced by pre-hospital teams arriving at the scene as the first emergency services resource. The importance of innovative and adaptable approaches to scene management in order the maintain a safe scene for personnel and patients is discussed.

> **McQueen C, Bexon K, Wyse M. A safe scene? Emergency Medicine Journal 2013;30 687**
>
> **Athens Access @** http://emj.bmj.com/cgi/content/extract/30/8/687?etoc

Conferences

33rd International Symposium on Intensive Care and Emergency Medicine

Brussels, Belgium, 19-22 March 2013

The following abstracts from this conference are collected in a summary document which can be downloaded here: http://ccforum.com/content/pdf/cc12199.pdf

Immune paralysis in trauma patients; implications for prehospital intervention

M Kox, K Timmermans, M Vaneker et al. Radboud University Nijmegen Medical Center, Netherlands
Critical Care 2013, 17(Suppl 2):P**9**

Prehospital management of COPD patients in respiratory failure and short-term outcome

G Campagne, J Cuny, P Gosselin et al. Lille University Hospital Center, Lille Cedex, France
Critical Care 2013, 17(Suppl 2):P**132**

Analysis of management of non-invasive ventilation support in prehospital care for COPD patients and short-term outcome

J Cuny, G Campagne, P Gosselin et al. Lille University Hospital Center, Lille Cedex, France
Critical Care 2013, 17(Suppl 2):P**144**

Prehospital EKG evaluation in Rio de Janeiro ambulances

RV Vasconcellos, FE Erthal, RV Vargas. Instituto Nacional de Cardiologia, Rio de Janeiro, Brazil
Critical Care 2013, 17(Suppl 2):P**261**

Overtriage and undertriage in a prehospital system over 7 years

L Carenzo, F Barra, A Messina et al. Universitè del Piemonte Orientale A. Avogadro, Novara, Italy
Critical Care 2013, 17(Suppl 2):P**276**

Algorithm for the resuscitation of traumatic cardiac arrest patients in a physician-staffed helicopter emergency medical service
PB Sherren, C Reid, K Habig et al. Greater Sydney Area HEMS, Sydney, Australia
Critical Care 2013, 17(Suppl 2):**P281**

Are physicians required during HEMS winch rescue missions?
PB Sherren, C Hayes-Bradley, C Reid et al. Greater Sydney Area HEMS, Sydney, Australia
Critical Care 2013, 17(Suppl 2):**P282**

Prehospital hyperoxemia does not influence the functional neurological outcome in polytraumatized patients with traumatic head injury
V Vujanovic Popovic, T Pelcl, M Spindler et al. University of Maribor, Slovenia
Critical Care 2013, 17(Suppl 2):**P285**

Pre-hospital blood transfusion: 5-year experience of an Australian helicopter emergency medical service
PB Sherren, B Burns. Greater Sydney Area HEMS, Sydney, Australia
Critical Care 2013, 17(Suppl 2):**P295**

Pre-hospital risk stratification following out-of-hospital cardiac arrest
Y Goto, T Maeda, Y Goto. Kanazawa University Hospital, Kanazawa, Japan
Critical Care 2013, 17(Suppl 2):**P297**

Prehospital epinephrine administration and survival among patients with unshockable initial rhythm after out-of-hospital cardiac arrest
Y Goto, T Maeda, Y Goto. Kanazawa University Hospital, Kanazawa, Japan
Critical Care 2013, 17(Suppl 2):**P302**

Start value of cerebral saturation in prehospital cardiac arrest patients: does it mean something?
C Genbrugge, I Meex, S Scheyltjens et al. ZOL, Genk, Belgium
Critical Care 2013, 17(Suppl 2):**P306**

Alcohol intoxication impedes the recognition of traumatic brain injury in the prehospital setting and may worsen 6-month outcome
R Raj, J Siironen, R Kivisaari et al. Helsinki University Central Hospital, Helsinki, Finland
Critical Care 2013, 17(Suppl 2):**P321**

Japan Coma Scale used in the prehospital setting can predict clinical outcome in severe paediatric trauma
T Yagi, N Saito, Y Hara et al. Nippon Medical School Chiba Hokusoh Hospital, Inzai/Chiba, Japan
Critical Care 2013, 17(Suppl 2):**P324**

Implementation of dispatcher-assisted cardiopulmonary instructions using the ALERT protocol: preliminary results in Belgium
A Ghuysen, S Stipulante, M El Fassi et al. CHU – Ulg Liège
Critical Care 2013, 17(Suppl 2):**P301**