EVIDENCE IDENTIFIED IN RELATION TO SCENARIOS FOR THE PROVISION OF ACCIDENT AND EMERGENCY SERVICES IN LANARKSHIRE

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CRITERION	***APPLICATION TO SCENARIOS***
Safety	
Cooke et al. (2003) (1-) reported that there is no evidence to support any recommendation in relation to whether initial assessment of patients presenting to emergency departments should be undertaken in an A & E department or on an observation ward. They suggest that "it is unlikely that geographical location is significant but that the intervention offered is more important". Their review supports the need for access to senior staff and diagnostic services, should set goals of care that can be achieved within 24 hours, that the unit should be within or directly adjacent to the emergency department and that there is some evidence that turnaround time is quicker when they are managed by emergency medicine specialists.	Applicable to all except A.
Telephone triage by an experienced nurse practitioner of patients presenting to an ophthalmic accident and emergency service has been shown to be safe in relation to clinical decision making (Marsden, 2000). (2-)	All except Status Quo (F).
For people calling the ambulance service with Category C calls, it has been demonstrated that the nurses and paramedics who participated in this study, using a computerised clinical decision support system can offer telephone assessment, triage and advice instead of despatching an ambulance and that this can be done safely (as confirmed by an independent expert panel who reviewed the clinical case records of people whose calls had been managed in this way). (Dale et al., 2004) (1-)	Applicable to all scenarios.
Dale et al. (2003) investigated the potential impact of telephone assessment and triage for non-serious (Category C calls) as classified by ambulance call handlers. Fifty-two per cent were triaged as not requiring an emergency ambulance and 36.6% of these did not attend an accident and emergency department. They conclude that this sort of telephone assessment identifies people who are less likely to need care in an accident and emergency department and that nurses are more likely to assess calls as requiring an alternative response to ambulance despatch than paramedics. (1-)	Applicable to all scenarios, except Status Quo (F).
Pell et al. (2001) found that shorter ambulance response times for people who had had a cardiopulmonary arrest were significantly associated with an increased probability of receiving defibrillation and surviving to the point of being discharged from hospital. They suggest that a reduction in ambulance response times has the potential to almost double the survival time for people in cardiac arrest not witnessed by ambulance crews. (2++)	Applicable to all scenarios.
Mackay, Terris and Coats (2000) have demonstrated that rapid sequence induction performed by emergency medicine physicians on patients involved in significant trauma can be performed safely and that there is not a higher rate of procedural problems when compared with anaesthetists. (2-)	Applicable to A, B and C
Patients who are critically ill and whose transfer to intensive care is delayed by more than 6 hours are more likely to die (Chalfin et al., 2007) (3)	Applicable to A, B and C
Anderson et al. (2004) reported that the implementation of a pre-hospital triage strategy for patients presenting with symptoms of a possible myocardial infarction could ensure that a greater number of patients are appropriately diverted to facilities with a percutaneous coronary intervention facility. (3).	All, except Status Quo (F).
Svensoon et al. (2003) have shown that prehospital thrombolysis to be safe when the treatment is initiated in urban or rural areas. (2-)	Applicable to all scenarios.
Lyon et al. (2004) presented data that indicated there is no difference in survival in relation to the distance between the place where someone experiences an out of hospital cardiac arrest and the hospital that they are taken to in an ambulance. (2-)	Applicable to all scenarios.

Price et al. (2005) reported that emergency medical services personnel are able to correctly identify the majority of patients that do not require critical care or those patients likely to be discharged after being treated in the emergency department. (3)	Applicable to all scenarios, except Status Quo (F).
Fan et al. (2006) reviewed the literature up to and including January 2005 and concluded that there are no published data available to draw conclusions in relation to the mortality, morbidity or risk factors that are associated with the transport of intubated and mechanically ventilated adult patients between clinical facilities. (1+)	Applicable to scenarios A, B and C
O'Connor et al. (2004) reported that the presence of an emergency physician in an accident and emergency department results in significantly greater efficiency regarding the assessment and disposal of patients in the triage category 4. (2+)	Applicable to all scenarios.
Shah et al (2006) suggest that it is feasible for a physician to be involved in the direction of ambulances to emergency departments that are most able to provide people with appropriate and timely care. (2-)	Applicable to all scenarios, except the Status Quo (F).
Killeen et al. (2007) systematically reviewed literature relating to the association between the number of vascular procedures conducted by hospitals and surgeons and mortality. Better clinical outcomes are associated with high provider volume for the following vascular procedures – abdominal aortic aneurysm repair, carotid endarterectomy and lower extremity revascularisation. (2++)	Applicable to all scenarios, except F
Fulda et al. (2002) found that there is no difference in terms of mortality rates of trauma surgeons based within emergency departments in comparison to trauma surgeons who are on call elsewhere within hospital facilities and can attend patients within 15 minutes of being called. (2+)	Applicable to scaenrios E, F and G for surgery.
Demetriades (2005) reported that designated trauma centres improve mortality and disability at the point of discharge for people with severe traumatic injuries (2++)	Applicable to all except Status Quo (F).
Mulholland et al. (2005) concluded from their systematic review of the literature that there was no evidence and support of paramedic's judgement as a method for pre-hospital triage of trauma patients. (2++)	Applicable to the emergency referral system.
Schull et al. (2006) examined the risks of missed diagnosis of acute myocardial infarction in relation to the numbers of acute myocardial infarction patients admitted per year among the department studied. They concluded that emergency departments with the lower volume of myocardial infarction patients are more likely to miss the symptoms of acute MI. (2+)	Applicable to all scenarios except the Status Quo (F).
Pitt (2002) examined the number of errors made by paramedics identifying patients with acute myocardial infarction who were suitable for pre-hospital thrombolysis. Their study suggested the paramedic selection of patients were pre-hospital thrombolysis is feasible and safe and was associated with a potential reduction of 'call to needle' time. (3)	Applicable to all scenarios.
Cassar et al. (2001) studied the death rates of ruptured abdominal aortic aneurysm and concluded that distance from the treating hospital had no significant impact on rates of death. (2+)	Applicable to all scenario except F.
Benger (2002) studied the requests and interpretations for radiographs made by nurses working peripherally from an Accident and Emergency Department. Their results suggest that nurses requested appropriate radiographs and interpreted these to a high standard. (3)	Applies to CCUs.
Van 't Hof et al. (2006) examined the diagnostic, triage and therapy skills of paramedics in relation to St-elevation myocardial infarction patients. They concluded that the early pre-hospital diagnosis, triage and therapy within the ambulance with direct transportation to the nearest centre providing percutaneous coronary intervention was feasible in 95% of patients and that this	Applicable to all scenarios except Status Quo, (F). Links to the

resulted in earlier diagnosis and initiation of treatment. They also reported an independent association with better cardiac functioning when compared to patients whose care pathway includes visits to non-PCI centre. (2++)	emergency referral service.
Morrison et al. (2000) systematically reviewed literature in relation to pre-hospital thrombolysis and association with treatment delay. They concluded that there is sufficient evidence to suggest that pre-hospital thrombolysis reduces delays to treatment, particularly where there are longer transit times. (1-)	Applicable to all scenarios.

Ligtenberg et al. (2005) studied the transit of critically ill patients to an intensive care unit, concluding that transfer of critically ill patients is associated with significant risks and these require to be carefully managed. (3)	Applicable to scenarios A, B and C
Dunn et al. (2003) reported that ambulance staff are not able to accurately assess whether less urgent patients need ambulance transport. Their study included many patients transported to an emergency department who could have safely attended via another route. (2+)	Applicable to all scenarios.
McGuffie et al. (2001) reported that trauma outcomes do not differ in relation to the distance travelled by ambulance in patients who had sustained either moderate or major trauma. (2-)	Applicable to all scenarios, except Status Quo (F).

Quality	
Jibuike et al. (2003) evaluated effect of introducing a screening service for acute knee injuries ran by an experienced physiotherapist. Their study suggested an improved quality of care. (3)	Applicable to all scenarios.
Donald et al. (2005) demonstrated that the presence of an emergency physician on site in a rural hospital led to reduced waiting times, a number of tests performed per patient and the overall length of stay within the accident and emergency department. (2-)	Applicable to all scenarios
Nicholl et al. (2007) examined the relationship between distance from hospital and mortality upon arrival at hospital or discharge from hospital. They concluded that increased journey distance was associated with an increased risk in mortality, stating that a 1% absolute increase in mortality is associated with each 10km increase in straight line distance from the accident and emergency department. The authors state that their study is “fraught with difficulties” when “inferring causality” due to confounding variables. Most notably no attempt was made to adjust for ambulance response time, which means that these data could support the assertion that not having a rapid ambulance response results in a greater risk of mortality than distance from hospital. (2-)	Applicable to A, B and C for medical and A, B, C and D for surgical admissions
Bounoua et al. (2007) examined clinical outcomes of patients who had been treated for ruptured abdominal aortic aneurysm and included more efficient care and improved outcomes are associated with surgical repair occurring within a designated hospital providing specialist surgery. (3)	Applicable to all scenarios.
Richardson et al. (2005) compared initial assessment and management by a physiotherapist with routine practice in an accident and emergency department. They concluded that although this improved patient satisfaction there were increases in the time taken to return to daily activities and no significant difference in clinical outcomes relative to routine care. (1+)	Applicable to all scenarios, except Status Quo (F).
Derkson et al. (2007) reported that emergency nurse practitioner nurses who are trained to treat ankle and foot injuries can do so as well as junior medical staff and this is associated with excellent patient satisfaction and reduced waiting times. (1+)	Applicable to all scenarios,
Cooper et al. (2002) found that emergency nurse practitioners when compared to junior medical staff produced clinical documentation of higher quality and patient satisfaction ratings were higher. There were no differences reported in recovery	Applicable to all scenarios.

times, symptom, time off work or any unplanned follow-up. (1+)	
Juan et al. (2006) outline evidence that emergency department short-stay units are an effective and safe alternative to standard inpatient hospitalisations, particularly in patients with chronic obstructive pulmonary disease and acute heart failure. (2+)	Applicable to scenarios B, C, D, E and G.
Aminzadeh and Dalziel (2002) described the distinct patterns of service use and care needs of older people using accident and emergency services. They use services at higher rates, require more resources and are more likely to experience adverse health outcomes after visiting an accident and emergency department. New models of care may be required. (1+)	Applicable to all scenarios.
Moore et al. (2006) evaluated changes in the system of care that allowed the early placement of medical emergencies under the care of the most appropriate specialist team with interim care provided by specialist acute physicians on an acute medicine unit. They report an additional reduction in mortality of patients under 65 and suggest that appropriate specialist management improved clinical outcomes for medical emergencies particularly amongst this younger patient group. (2-)	Applicable to scenarios C,D, E and G.
Akins et al. (2000) examined the clinical outcomes of stroke patients receiving thrombolysis in the accident and emergency department. Their data confirmed that thrombolysis can be safely and effectively administered by physicians working in the accident and emergency department. (2-)	Applicable to all scenarios.
Tilluckdharry et al. (2005) reported that outcomes for critically ill patients admitted to an intensive care unit from an emergency department within 24 hours were not better than those who remained in an accident and emergency department for a longer duration. Prolonged stays in an emergency department did not impact upon the quality of care. (3)	Applicable to all scenarios.
Aizen et al. (2001) suggest that older people living in nursing homes would have a successful outcome if they were admitted directly to an acute geriatric medicine unit as opposed to an accident and emergency department. (2-)	Applicable to C,D, E,F and G.

Sustainability	
Martin et al. (2002) examined the rate of 'inappropriate' attendance at an accident and emergency department. They concluded that GP registered inappropriate attendees utilised Primary Care services more than others and that this pattern of service use did not appear to be related to the presence of chronic physical illness. (2+)	Applicable to all scenarios.
Benger et al. (2004) studied the effectiveness of minor injuries telemedicine and presented data to suggest that this is both safe and clinically effective and that it provides care that is equivalent to assessment by an emergency specialist and current practice of treatment by a GP. (2-)	Applicable to A, B and C telemedicine at CCUs
Cooper et al. (2004) compared the key activities of emergency care practitioners in relation to treated patients and relative to paramedic practice. Emergency care practitioners were shown to treat more patients on scene, convey less patients to accident and emergency department and there was an observed improvement in interagency collaboration and co-operation. (3)	Applicable to all scenarios.
Terkelson et al. (2002) have demonstrated that it is technically feasible to use telemedicine for the remote day hospital diagnosis of patients presenting with suspected acute myocardial infarction. Patients had shorter door to needle times when compared to a control group who were not subject to remote day hospital diagnosis using telemedicine. (2++)	Applicable to all scenarios, except Status Quo (F).
Mason et al. (2007) researched the appropriateness, satisfaction and cost of emergency care practitioners when compared with care as usual. They concluded that emergency care practitioners carried out fewer investigations, provided more treatments and were more likely to discharge patients home than care provided as usual. Patients were satisfied with care received from emergency care	Applicable to all scenarios.

practitioners. No evidence was found of less appropriate care provided by emergency care practitioner than usual care providers for the same type of health problem. (2+)	
Conaghan et al. (2002) determined the feasibility of treating people with minor and immediate general surgical emergencies (e.g. abscesses or hernias) as day cases within 48 hours of presentation to accident and emergency services. They did this by comparing a group of patients who received standard inpatient care. This study demonstrated that there was a reduced number of nights spent in hospital for daycase patients, a small delay in time from diagnosis to treatment in the daycase group, no differences in outcome, patient or GP satisfaction between groups and that there was no increased impact on primary care services for the daycase group. This study reported savings of £150 per patient. (1+)	Applicable to all scenarios
Sukumaran et al. (2005) examined the skills of paramedics trained in advanced prehospital trauma care in comparison with ambulance technicians. They demonstrated that paramedics can correctly identify patients who required to be triaged to a resuscitation area and that the number of patients subsequently being referred for critical care suggests that there was good decision making and triage skills. This study concluded that advanced prehospital trauma care improves the identification of the seriously injured who require resuscitation or critical care. (2-)	Applicable to all scenarios, except status quo (F).
Flynn et al (2006) researched the accuracy of a computerised emergency call taking system (Medical Priority Despatch System) to detect cases of people experiencing a cardiac arrest. They found that 76.7% of patients were correctly identified and suggest that the number of false negatives (non-classification of cardiac arrest when this was in fact the case) implies that there is "room for improvement". (2+)	Applicable to all scenarios.
Lee et al (2002) studied the classifications of urgency given by nurses and by patients to problems presented to an accident and emergency department. They found that the patient self classifications were "too inaccurate for practical use". They found that there was greater accuracy among nursing staff and suggested that if additional screening mechanisms were introduced in the accident and emergency service studied that nurses could safely reassign patients to receive GP care. (3).	Applicable to all scenarios.
Ezra et al (2005) evaluated the accuracy of assessments and diagnosis made by emergency nurse practitioners for patients presenting to accident and emergency with eye injuries. Nurses were consistently more accurate in assessment and provisional diagnosis and made decisions which resulted in significantly less patients requiring subsequent out patient assessment appointments (3).	Applicable to all scenarios.

Patient Centeredness	
Kelen et al (2001) found that the establishment of a 14 bedded acute care unit that was managed by the emergency department (within the same overall hospital site as the emergency department but described as 'considerably remote' from it), led to a significant reduction in overcrowding and ambulance diversion. (2+)	Applicable to scenarios B,C,D, E and G.
Moser et al (2004) studied the attitude of people attending accident and emergency services to see a nurse practitioner in relation to being treated for minor problems such as abrasions, lacerations, bites, burns, earache, superficial foreign body removal or wound check. The majority of patients were willing to see the nurse practitioner, though some who agreed had been expecting to see a member of medical staff. The patient's acceptance of being seen by a nurse was not related to age, gender or educational status. (3).	Applicable to all scenarios.
McClellan et al. (2006) found that the introduction of an extended scope physiotherapy service to see people with soft tissue injuries in an accident and emergency department was associated with greater patient satisfaction than patients seen by emergency nurse practitioners or medical staff. (3)	Applicable to all scenarios.
Coleman et al (2001) examined whether patients who had attended an accident and emergency department and who were triaged to the two lowest priority categories, were suitable to be seen by alternative health service facilities. They also looked at how likely it was that patients would use other services in the future, given their choice of accident and emergency care. The application of criteria suggested that 55% of health problems presenting in these non-urgent categories were suitable for treatment in general practice or by self care advice. Twenty-four per cent of patients had had a prior contact with the health service before their accident and emergency visit. This study concluded that 7% of the non urgent population would be expected to attend other providers in the future and that increasingly the availability of alternative services for these 'non-urgent' problems is not likely to significantly impact on demand for accident and emergency services (2+).	Applicable to CCUs.

References

Aizen, E, Swartzman R, Clarfield AM. Hospitalisation of Nursing Home Residents in an Acute-Care Geriatric Department: Direct versus Emergency Room Admission. *IMAJ* 2001; **3**, 734-738.

Akins PT, Delemos C, Wentworth D et al. Can emergency department physicians safely and effectively initiate thrombolysis for acute ischemic stroke? *Neurology* 2000; **55**, 1801-1805.

Aminzadeh F and Dalziel WB. Older Adults in the Emergency Department: A Systematic review of Patterns of Use, Adverse Outcomes, and Effectiveness of Interventions. *Ann Emerg Med* 2002; **39**, 238-247.

Anderson PD, Mitchell PM, Rathlev NK et al. Potential Diversion Rates Associated with Prehospital Acute Myocardial Infarction Triage Strategies. *The Journal of Emergency Medicine* 2004; **27**(4), 345-353.

Benger JR. Can nurses working in remote units accurately request and interpret radiographs? *Emerg. Med J* 2002; **19**, 68-70.

Benger JR, Noble SM, Coast J et al. The safety and effectiveness of minor injuries telemedicine. *Emerg Med J* 2004; **21**, 438-445.

Bounoua F, Schuster R, Grewal P et al. Ruptured Abdominal Aortic Aneurysm: Does Trauma Center Designation Affect Outcome? *Ann Vasc Surg* 2007; **21**, 133-136.

Cassar K, Godden DJ, Duncan JL. Community mortality after ruptured abdominal aortic aneurysm is unrelated to the distance from the surgical centre. *British Journal of Surgery* 2001; **88**, 1341-1343.

Chalfin DB, Trzeciak S, Likourezos A et al. Impact of delayed transfer of critically ill patients from the emergency department to the intensive care unit. *Crit Care Med* 2007; **35**(6), 1477-1483.

Coleman P, Irons R, Nicholl J. Will alternative immediate care services reduce demands for non-urgent treatment at accident and emergency? *Emerg Med J 2001;* **18,** 482 – 487.

Conaghan PJ, Figueira E, et al. Randomized clinical trial of the effectiveness of emergency day surgery against standard inpatient treatment. *British Journal of Surgery, 2002*; **89,** 423 – 427.

Cooke MW, Higgins J, Kidd P. Use of emergency observation and assessment wards: a systematic literature review. *Emerg Med J* 2003; **20**, 138-142.

Cooper S, Barrett B, Black S et al. The emerging role of the emergency care practitioner. *Emerg Med J* 2004; **21**, 614-618.

Cooper MA, Lindsay GM, Kinn S et al. Evaluating Emergency Nurse Practitioner services: a randomised controlled trial. *Journal of Advanced Nursing* **40**(6), 721-730.

Dale J, Higgins J, Williams S et al. Computer assisted assessment and advice for "non-serious" 999 ambulance service callers: the potential impact on ambulance despatch. *Emerg Med J* 2003; **20**, 178-183.

Dale J, Williams S, Foster T et al. Safety of telephone consultation for "non-serious" emergency ambulance service patients. *Qual Saf Health Care* 2004; **13**, 363-373.

Demetriades D, Martin M, Salim A et al. The Effect of Trauma Center Designation and Trauma Volume on Outcome in Specific Severe Injuries. *Annals of Surgery* 2005; **242**(4), 512-519.

Dersksen JR, Bakker FC, de Lange-de Klerk, ESM et al. Specialised emergency nurses treating ankle and foot injuries: a randomized controlled trial. *Am J Emerg Med 2007;* **25,** 144 - 151.

Donald KJ, Smith AN, Doherty S et al. Effect of an on-site emergency physician in a rural emergency department at night. *Rural and Remote Health* 2005; **5**, 380.

Dunne RB, Compton S, Welch RD et al. Prehospital On-site Triaging. *Prehospital Emergency Care*; 2003; **7**, 85-88.

Ezra DG, Mellington F et al. Reliability of ophthalmic accident and emergency referrals: a new role for the emergency nurse practitioner? *Emerg Med J, 2005*; **22,** 696 – 699.

Fan E, MacDonald RD, Adhikari NKJ et al. Outcomes of interfacility critical care adult patient transport: a systematic review. *Critical Care* 2006; **10**, 1-7.

Flynn J, Archer F, Morgans A. Sensitivity and Specificity of the Medical Priority Dispatch System in Detecting Cardiac Arrest Emergency Calls in Melbourne. *Prehosp Disast Med, 2006*; **21 (2),** 72 – 76.

Fulda GJ, Tinkoff GH, Giberson F et al. In-House Trauma Surgeons Do Not Decrease Mortality in a Level 1 Trauma Centre. *J Trauma* 2002; **53**, 494-502.

Giesen P, Franssen E, et al. Patients either contacting a general practice cooperative or accident and emergency department out of hours: a comparison. *Emerg Med J 2006;* **23,** 731 – 734.

Jibuike OO, Paul-Taylor G, Maulvi S et al. Management of soft tissue knee injuries in an accident and emergency department: the effect of the introduction of a physiotherapy practitioner. *Emerg Med J* 2003; **20**, 37-39.

Juan A, Salazar A, Alvarez A et al. Effectiveness and safety of an emergency department short-stay unit as an alternative to standard inpatient hospitalisation. *Emerg Med J* 2006; **23**, 833-837.

Kelen GD, Scheulen JJ, Hill, PM. Effect of an Emergency Department (ED) Managed Acute Care Unit on ED Overcrowding and Emergency Medical Services Diversion. *Emerg Med J 2001;* **8,** 1095 – 1100.

Killeen SD, Andrews EJ, Redmond HP et al. Provider volume and outcomes for abdominal aortic aneurysm repair, carotid endarterectomy, and lower extremity revascularization procedures. *J Vasc Surg* 2007; **45**, 615-626.

Lee A, Garner A, Fearnside M et al. Level of prehospital care and risk of mortality in patients with and without severe blunt head injury. *Injury, Int J Care Injured* 2003; **34**, 815-819.

Lee A, Hazlett CB et al. How to minimize inappropriate utilization of Accident and Emergency Departments: improve the validity of classifying the general practice cases amongst the A&E attendees. *Health Policy, 2003;* **66,** 159 – 168.

Ligtenberg JJM, Arnold LG, Stienstra Y, et al. Quality of interhospital transport of critically ill patients: a prospective audit. *Critical Care* 2005; **9**, R446-R451.

Lyon RM, Cobbe SM, Bradley JM et al. Surviving out of hospital cardiac arrest at home: a postcode lottery? *Emerg Med J* 2004; **21**, 619-624.

Mackay CA, Terris J, Coats TJ. Prehospital rapid sequence induction by emergency physicians: Is it safe? *Emerg Med J* 2001; **18**, 20-24.

Marsden J. An evaluation of the safety and effectiveness of telephone triage as a method of patient prioritization in an ophthalmic accident and emergency service. *Journal of Advanced Nursing* 2000; **31**(2), 401-409.

Martin A, Martin C, Martin PB et al. 'Inappropriate' attendance at an accident and emergency department by adults registered in local general practices: how is it related to their use of primary care? *J Health Serv Res Policy* 2002; **7**(3), 160-165.

Mason S, O'Keeffe, Coleman P et al. Effectiveness of emergency care practitioners working within existing emergency service models of care. *Emerg Med J* 2007; **24**, 239-243.

McClellan CM, Greenwood R, Benger JR. Effect of an extended scope physiotherapy service on patient satisfaction and the outcome of soft tissue injuries in an adult emergency department. *Emerg Med J;* **23,** 384 – 387.

McGuffie A, Graham CA, Beard D et al. Scottish Urban versus Rural Trauma Outcome Study. *J Trauma* 2005; **59**, 632-638.

Moore S, Gemmell I, Almond S et al. Impact of specialist care on clinical outcomes for medical emergencies. *Clin Med* 2006; **6**(3), 286-293.

Morrison LJ, Verbeek PR, McDonald AC et al. Database of Abstracts of Reviews of Effects (DARE) – Full record display. *JAMA* 2000; **283**(2), 2686-2692.

Moser SM et al. Attitude of emergency department patients with minor problems to being treated by a nurse practitioner. *Can J Emerg Med 2004;* **6 (4),** 246 – 252.

Mulholland SA, Gabbe BJ, Cameron P. Is paramedic judgement useful in prehospital trauma triage? *Injury, Int. J. Care Injured* 2005; **36**, 1298-1305.

Murphy AW, Plunkett PK, Bury G et al. Effect of patients seeing a general practitioner in accident and emergency on their subsequent re-attendance: cohort study. *BMJ*, **320**, 903-904.

Nicholl, J, West, J, Goodacre, S and Turner, J. (2007). The relationship between distance to hospital and patient mortality in emergencies: an observational study. Emerg Med J, **24**: 665-668.

O'Connor AE, Lockney AL, Sloan PM et al. Does the presence of an emergency physician improve access based quality indicators in a rural emergency department? *Emergency Medicine Australasia* 2004; **16**(1), 55-58.

Pell JP, Sirel JM, Marsden AK et al. Effect of reducing ambulance response times on deaths from out of hospital cardiac arrest: cohort study. *BMJ* 2001; **322**, 1385-1388.

Pitt K. Prehospital selection of patients for thrombolysis by paramedics. *Emerg Med J* 2002; **19**, 260-263.

Price TG, Hooker EA, Neubauer J. Prehospital Provider Prediction of Emergency Department Disposition: Implications for Selective Diversion. *Prehospital Emergency Care*; 2005, **9**, 322-325.

Richardson B, Shepstone L, Poland F et al. Randomised controlled trial and cost consequences study comparing initial physiotherapy assessment and management with routine practice for selected patients in an accident and emergency department of an acute hospital. *Emerg Med J* 2005; **22**, 87-92.

Schull MJ, Vermeulen MJ, Stukel TA. The Risk of Missed Diagnosis of Acute Myocardial Infarction Associated With Emergency Department Volume. *Annals of Emergency Medicine* 2006; **48**(6), 647-655.

Shah MN, Fairbanks RJ, Maddow CL et al. Description and Evaluation of a Pilot Physician–directed Emergency Medical Services Diversion Control Program. *Academic Emergency Medicine* 2006; **13**(1), 54-60.

Sukumaran S, Henry JM et al. Prehospital trauma management: a national study of paramedic activities. *Emerg Med J, 2005*; **22,** 60 – 63.

Svensson L, Karlsson T, Nordlander R et al. Safety and Delay Time in Prehospital Thrombolysis of Acute Myocardial Infarction in Urban and Rural Areas in Sweden. *Am J Emerg Med* 2003; **21**, 263-270.

Terkelsen CJ, Norgaard BL, Lassen JF et al. Telemedicine used for remote prehospital diagnosing in patients suspected of acute myocardial infarction. *Journal of Internal Medicine* 2002; **252**, 412-420.

Tilluckdharry L, Tickoo S, Amoateng-Adjepong Y et al. Outcomes of critically ill patients based on duration of emergency department stay. *Am J Emerg Med* 2005; **23**, 336-339.

Welsh RC, Chang W, Goldstein P et al. Time to treatment and the impact of a physician on pre-hospital management of acute ST elevation myocardial infarction: insights from the ASSENT-3 PLUS trial. *Heart* 2005; **91**, 1400-1406.

Van ‘t Hof AWJ, Rasoul S, van de Wetering H et al. Feasibility and benefit of prehospital diagnosis, triage, and therapy by paramedics only in patients who are candidates for primary angioplasty for acute myocardial infarction. *Am Heart J* 2006; **151**, 1255.e1-1255.e5.