

Does rapid assessment shorten the amount of time patients spend in the emergency department?

Background: Overcrowding in the emergency department is a common phenomenon. This study assessed the impact of introducing a consultant-supported rapid assessment model, known as EDIT, and point of care testing upon the length of time patients spend in the emergency department.

Methods: A prospective, observational cohort study was conducted in an emergency department in a district general hospital in the UK. The study consisted of two phases. Patients who attended the emergency department during phase 1 were assessed using a nurse-led triage model with blood samples being analysed in a centralized hospital laboratory. Phase 2 patients were assessed by a consultant-supported rapid assessment model with blood tests being analysed using point of care testing. The time from patient arrival in the emergency department to the time that care was complete and the patient was ready to move on to the next destination of care was recorded. These times from the two phases were compared using the Wilcoxon rank sum test.

Results: A total of 11 213 patients attended the emergency department during the whole study period, of whom 4622 patients were eligible for the study. Phase 1 contained 3835 patients and phase 2 had 787 patients. The median time for patients to be declared ready to leave the emergency department in phase 1 was 129 minutes compared to 76 minutes for phase 2 ($P=0.0025$). This was a reduction in the median of 53 minutes or 41.1% (95% confidence interval 39.7–42.3%).

Conclusions: This study demonstrates that a consultant-supported rapid assessment model using point of care testing significantly shortens the time patients spend in the emergency department.

Introduction

Overcrowding in the emergency department is commonplace. This is because the time patients spend in the emergency department is often inefficient and coupled with inadequacies in the wider health-care service. The symptoms of this are patient journeys being characterized by short bursts of activity interspersed with long periods of waiting. In addition, the processes in place within emergency departments may not be capable of meeting the demand put upon them without making the patient wait (Taylor et al, 2011).

It is the authors' hypothesis that nurse-led triage may not be the most efficient

method of initiating care in the emergency department. They believe that rapid assessment teams administering the initial management of undifferentiated illness patients (as opposed to injury) could be more efficient than triage and one possible solution to overcrowding in the emergency department. In addition, assessment of patients by a dedicated senior emergency department team supported by point of care testing rather than nurse-led triage would aid the flow and disposition of patients through the emergency department.

This study compared the impact of introducing a rapid assessment model supported by point of care testing on the amount of time patients spend in the emergency department, and hence overcrowding, with traditional nurse-led triage.

Method

A prospective, non-randomized observational study was conducted in an emergency department in a district general hospital (major trauma unit) in the UK with approximately 65 000 emergency department attendances a year.

Patient selection

All patients (adults and children) presenting to the emergency department between 09:00 and 17:00hr were included in the study unless they were deemed to be suffering from a minor injury (i.e. patients with isolated limb injury or patients with isolated minor head injuries). Patients treated in the resuscitation room were included in the study.

Models of care in the emergency department

The study consisted of two consecutive phases:

Phase 1

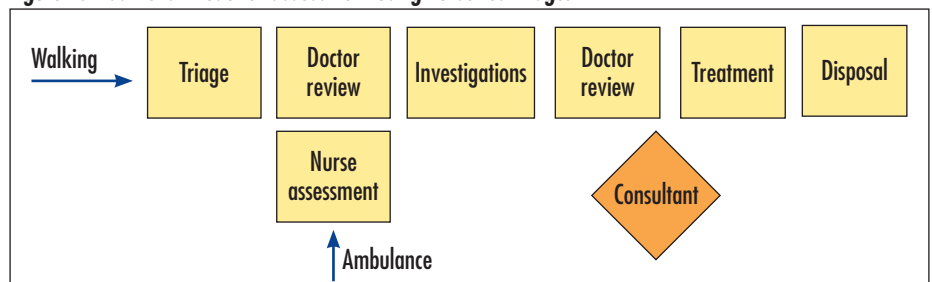
Patients attending during phase 1 were assessed and treated using a traditional, nurse-led triage model (Figure 1) with one consultant and one emergency department middle grade doctor providing the senior decision-maker role to the whole emergency department.

Throughout phase 1 patients arriving by ambulance were transferred to a central area cubicle as soon as space was available, unless they were considered to be suffering from a minor injury. If this was the case they were directed to triage. Patients arriving by other means were assessed by a triage nurse who risk stratified them using

Dr PRE Jarvis is Consultant in Emergency Medicine and **Dr TM Davies** is Clinical Director in Emergency Care in the Emergency Department and **Dr K Mitchell** is Consultant Chemical Pathologist in the Blood Sciences Department, Calderdale & Huddersfield NHS Foundation Trust, Calderdale Royal Hospital, Halifax, West Yorkshire HX3 0PW; **Mr I Taylor** is Senior Fellow and **Mr M Baker** is Senior Fellow, Lean Enterprise Academy, Goodrich, Herefordshire

Correspondence to: Dr PRE Jarvis (Paul.jarvis@cht.nhs.uk)

Figure 1. Traditional model of assessment using nurse-led triage.



the Manchester Triage tool and streamed them according to whether they were deemed to have a minor injury or not. After initiation of treatments (such as analgesia) patients who did not have a minor injury were transferred to the waiting room to await a central area cubicle. Patients who were identified as being critically ill, irrespective of whether they arrived by ambulance or not, were transferred directly to the resuscitation room. The flow of patients through the traditional emergency department pathway is shown in *Figure 2*.

Phase 2

Phase 2 patients were assessed using a rapid assessment model known as the Emergency Department Intervention Team (EDIT). The EDIT model consisted of an additional consultant, senior nurse and a health-care assistant (*Figure 3*).

The flow of patients through the EDIT system is shown in *Figure 4*. Patients arriving by ambulance were all assessed through the EDIT process. Patients arriving by any other means were streamed according to whether they had a minor illness or not. Those patients who did not have a minor injury, irrespective of whether they arrived by ambulance or any other means, were assessed using the EDIT process.

EDIT consisted of initial assessment of the patient as soon as possible after arrival in the emergency department. The initial assessment consisted of a nursing history, observations, administration of initial treatments (e.g. nebulisers, analgesia and antipyretics), compilation of an investigation plan and execution of that plan. The consultant's role was then to sign off the investigation plan and order radiological investigations.

In addition, the EDIT consultant performed a more thorough assessment of those patients deemed eligible for discharge from the emergency department at that point. The EDIT process used point of care testing for full blood counts (Sysmex), renal function (Abbott iStat Chem8+) and blood gas analysis (Abbott iStat CG4). Any blood tests required outside the scope of these point of care tests were sent to the central laboratory for analysis. Once the EDIT process was complete patients who had not been discharged at EDIT were transferred to the central area cubicles for a more traditional history and examination by a junior doctor. The second emergency

department consultant's role was unchanged from that of the consultant in phase 1.

Outcome measures

The primary outcome measure was the time from the patient arriving in the emergency department to the point in time when all emergency department care is complete and the patient is deemed ready to move to the next destination of care. This time interval is referred to as the 'time to emergency department ready'. This was chosen as it is unaffected by any delays in bed allocation for patients who are admitted.

Secondary outcome measures were the time from emergency department arrival to the patient's first contact with a member of clinical staff (irrespective of whether this was a doctor or a nurse) and the time from emergency department arrival to the start of assessment of the patient by the emergency department doctor.

Data collection

Data relating to each patient were captured on the computerised emergency department tracking system (iSoft EDIS) in real time. These were collated and analysed retrospectively.

Figure 2. Flow of patients through the emergency department using a nurse-led triage model.

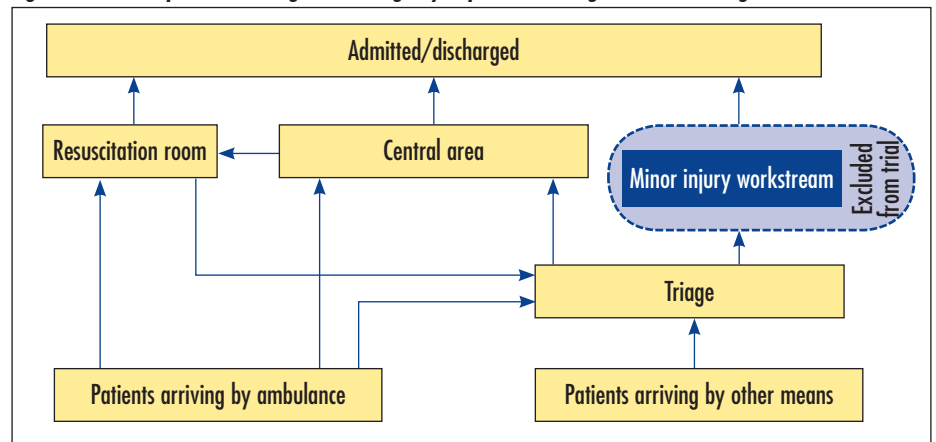


Figure 3. Emergency Department Intervention Team (EDIT) model of assessment using consultant-supported assessment.

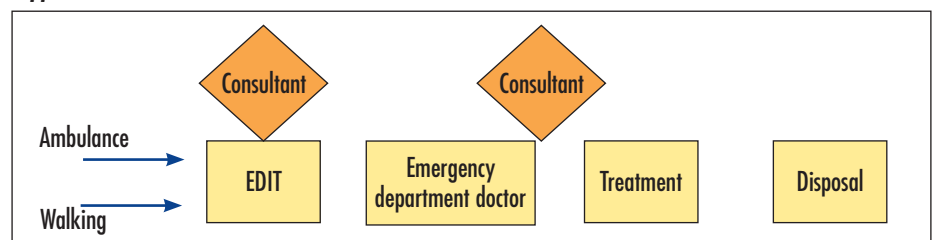
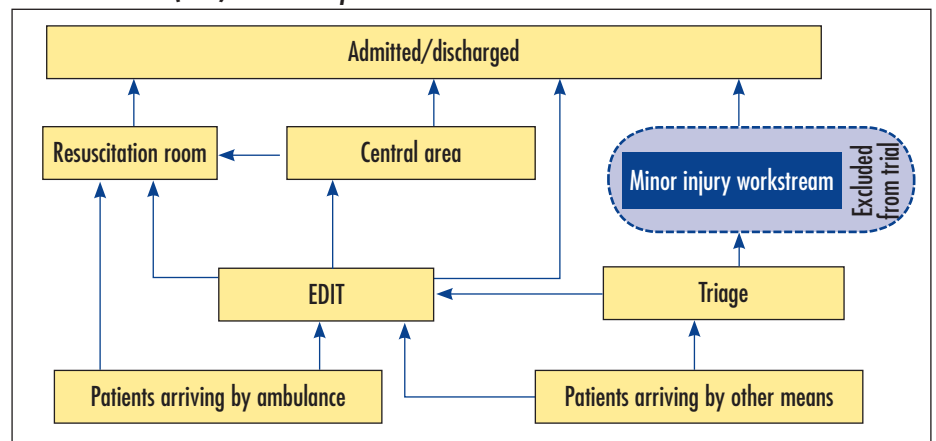


Figure 4. Flow of patients through the emergency department using the Emergency Department Intervention Team (EDIT) model for rapid assessment.



Statistical analysis

Statistical analysis comparing phase 1 with phase 2 was performed using the chi squared test. All interpretations are based on $\alpha = 0.05$ and $\beta = 0.8$.

A two-tailed sample size calculation was performed. It was calculated that 497 patients were required in both phase 1 and phase 2 of the study to have adequate power.

Results

Characteristics of the study subjects

Phase 1 ran between 1 April and 24 May 2013. During this period 9353 patients attended the emergency department. Of these, 5518 patients were deemed to have a minor injury at the time of presentation to the emergency department and were subsequently excluded from the study; 3835 patients were included in the analysis.

Phase 2 ran between 30 September and 18 October 2013. During this period a total of 1860 patients attended the emergency department. A total of 1073 patients were deemed to have a minor injury at the time of presentation and were subsequently excluded from the study, and 787 patients were included in the analysis. These details are summarized in *Figure 5*.

The baseline characteristics of the patients in each phase of the study are shown in *Table 1*. There was no statistically significant difference between any of the population characteristics examined.

The results of the study are shown in *Figure 6*.

The primary outcome measure – the median time from patients arriving in the emergency department to be declared ‘emergency department ready’ – was 129 minutes in phase 1 and 76 minutes for phase 2 ($P < 0.0001$). This was a reduction

in the median of 53 minutes or 41.1% (95% confidence interval = 39.7–42.3%).

The median time from arrival to the commencement of an assessment by a member of clinical staff (doctor or nurse) was 12 minutes for phase 1 and 4 minutes for phase 2 ($P < 0.0001$). This was a reduction in the median of 8 minutes or 66.7% (95% confidence interval = 65.0–68.3%).

The median time from arrival in the emergency department to assessment by an emergency department physician was 96 minutes for phase 1 and 24 minutes for phase 2 ($P < 0.0001$). This was a reduction in the median of 72 minutes or 75.0% (95% confidence interval 74.6–75.3%).

Discussion

The results of this study show that the introduction of a rapid assessment model, such as EDIT, shortens the amount of time patients spend in the emergency department. The results suggest that having dedicated staff performing the initial assessment of patients supported by rapid bedside diagnostics reduces queuing, and overcrowding, in the emergency department.

The authors’ emergency department sees on average 178 patients per day, of whom

Figure 5. Participant flow chart.

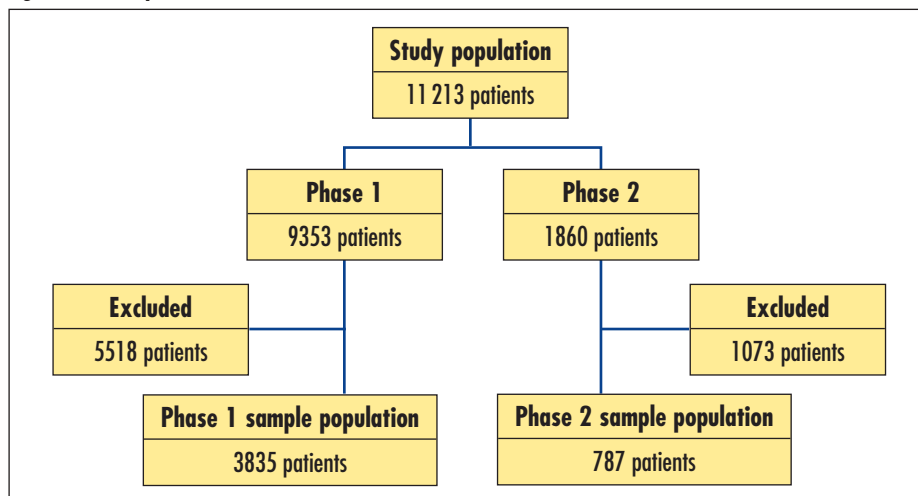


Figure 6. Bar chart demonstrating the results of the trial.

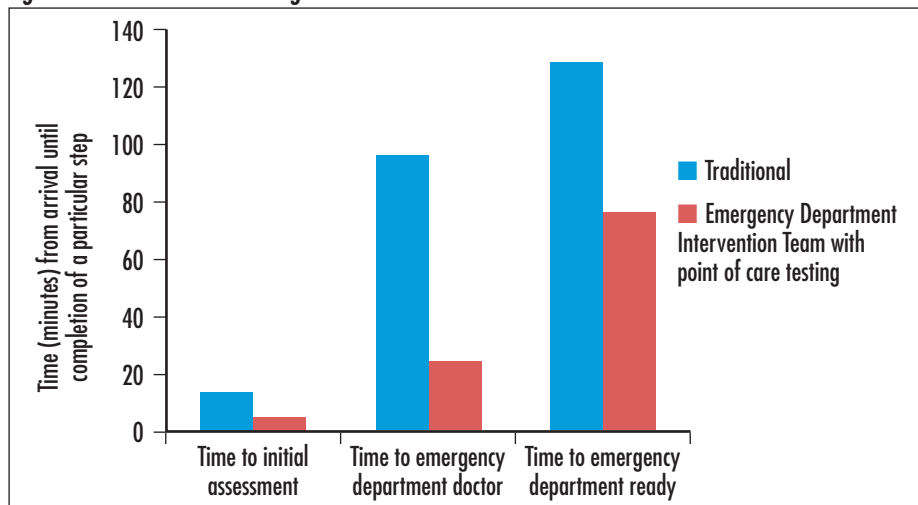


Table 1. Baseline patient characteristics for both phases of the trial

	Phase 1	Phase 2
Total	9353	1860
Sample size (%)	3835 (41.0)	787 (42.3)
Mean age (years)	42	45
Male	1986	395
Female	1849	392
% Men	51.8	50.2
Full blood counts performed (%)	2875 (75.0)	578 (73.4)
Renal functions performed (%)	2813 (73.4)	557 (70.8)
Blood gases performed (%)	1840 (26.3)	203 (25.8)
Arrived by ambulance	1028 (26.8)	192 (24.4)
Triage category 1–2	479	93
Triage category 3–5	3098	649
Category not allocated	258	45
% 1–2	12.5	11.8

41% of patients will be eligible for the EDIT workstream. For the purpose of these calculations this equates to a period of approximately 20 minutes between the arrival of each patient – acknowledging that in practical terms patients do not arrive in an equally spaced manner. For the triage model the median ‘time to emergency department ready’ was 129 minutes. This equates to seven patients at any one time undergoing care in the emergency department. This compares to four patients at any one time with the median time of 76 minutes seen with the EDIT model and point of care testing model. This is an illustrative example, as it assumes patients leave the emergency department when the disposition decision is made and all patients have a median length journey, but nonetheless it demonstrates a 42.9% reduction in the number of patients having to be cared for in the emergency department at any one time.

‘Front-loading’ the emergency department process with a senior decision-maker and adding rapid diagnostics to the initial assessment process reduces the amount of time patients spend in the emergency department. The EDIT model ensures investigations are ordered early in the patient’s journey, minimizing the amount of time that is unproductive. In addition, the emergency department clinician only has to see the patient once to perform a full assessment and does not have to return to the patient when the results of any investigations are available, unlike the traditional triage model.

Having a consultant as part of the initial assessment of patients allows an increased number of patients to be discharged within 30 minutes of them arriving in the emergency department. This leads to quick turnaround of relatively well patients and presumably will improve patient satisfac-

tion levels. This is a major benefit of the EDIT model over traditional triage, as the latter makes this patient group wait excessive lengths of time, contributing to overcrowding.

Point of care testing eliminates the time taken to transport blood samples to a centralized hospital laboratory. This, along with shorter sample processing times, means a greater speed of delivery of results to the clinician.

The results of this study clearly showed that the combination of consultant-led assessment, such as EDIT, and point of care testing shortens the length of time from the patient arriving in the emergency department to the clinician acting on their results. The amount of time saved by having point of care testing as part of the EDIT process is greater than the time savings identified when rapid assessment models (Redmond and Buxton, 1993; Grant et al, 1999; Sirous et al, 2001; Choi et al, 2006) and point of care testing (Koehler et al, 2013; Asha et al, 2014) have been implemented in isolation. It is unclear from these findings the level of improvement that can be attributable to point of care testing and that which can be attributed to the clinicians assessing the patients within minutes of them arriving in the emergency department. One limitation of this study is the lack of data from the utilization of the EDIT model using a centralized laboratory for blood analysis to clarify the individual advantages of EDIT and point of care testing.

Senior emergency department physicians are increasingly becoming part of the initial assessment of patients attending the emergency department. Previous studies have demonstrated that consultant-led assessment reduces waiting time (Redmond and Buxton, 1993; Grant et al, 1999; Sirous et al, 2001; Terris et al, 2004; Choi et al, 2006) in the emergency department and this is supported by these findings.

The authors found that the benefit of the EDIT model was having an additional equivalent senior clinician responsible for patients in other areas of the emergency department so that the staff in EDIT can focus solely on the initial assessment of patients without distraction. However, to make this model of working sustainable additional investment in the number of senior clinicians and nursing staff is required. This observation has been made

previously by other authors (Grant et al, 1999; Sirous et al, 2001; Choi et al, 2006).

Conclusions

This project was designed to measure the operational impact of the EDIT model supported by point of care testing rather than a formal cost analysis. The authors anticipate that the costs of implementing the EDIT model are not insignificant. Although not the focus of this study, the authors believe equipping a consultant-led team at the front door of the emergency department with rapid diagnostics is likely to improve the quality of care patients receive in the emergency department as it allows correct treatment plans to be commenced early in the patient’s journey by an experienced clinician. Further studies need to be performed to explore the impact of EDIT on patient outcomes and its cost effectiveness. **BJHM**

Conflict of interest: Abbott Point of Care donated the iStat Chem8+ and CG4 cartridges for the study period. Dr Paul Jarvis has served as an expert speaker and has received honoraria from Abbott Point of Care; Dr TM Davies, Dr K Mitchell, Mr I Taylor, Mr M Baker: no conflict of interest.

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LEARNING POINTS

- Many factors contribute to overcrowding in the emergency department.
- Senior clinicians are increasingly becoming part of the initial assessment of patients.
- Consultants performing rapid assessment of patients with access to point of care diagnostics reduces the amount of time patients spend in the emergency department.