What has the 4-hour access standard achieved?

Few performance management measures create as much heat and debate as the 4-hour target for emergency departments. This article critically reviews the history, evidence and effectiveness of the 4-hour standard for patients attending emergency departments.

The 4-hour access standard for patients attending emergency departments creates an enormous amount of work and pressure for clinicians and managers in the NHS. Despite the pressure, the effects and value of the 4-hour target are incompletely understood and evaluated.

Crowding in emergency departments is increasingly recognized as a serious health issue; there is an emerging literature demonstrating that crowding in emergency departments is associated with a number of adverse patient outcomes, including increased mortality (Pines et al, 2009; Guttmann et al, 2011; Plunkett et al, 2011) of emergency attendances. Morris et al (2011), Moskop et al (2009) and Schull et al (2004) showed that crowding increased time to antibiotics for pneumonia and analgesia for pain. Bernstein et al (2009) and Fee et al (2011) showed that crowding delays most treatments. Popa et al (2010) showed that emergency department crowding also adversely impacts on staff, leading to burnout. As a result, most emergency medicine professional bodies have guidelines on emergency department crowding (Affleck et al, 2013; Boyle et al, 2014). The World Health Organization (2006) recognizes timeliness as a key component of high quality health care and patients attending emergency departments repeatedly value short waiting times.

The history of the standard

In 2000, the English government was under significant pressure to improve care in emergency departments, with negative articles regularly appearing in the press (Frith, 2002). The government therefore decided to place a mandatory limit on the time patients spent in emergency departments, as part of *The NHS Plan. A Plan for Investment. A Plan for Reform* (Department of Health, 2000). In 2004, the English government introduced a rule that 98% of all patients would spend no longer than 4 hours in an emergency department, and other devolved nations in the UK followed shortly afterwards. Failing to comply with this rule attracted significant financial and administrative penalties. This rule was later amended to a 95% target in 2010. The cut-offs of 98% and 95% were not based on any evidence or even expert opinion. There were plans by Crouch and Cooke (2011), endorsed by the Department of Health, that this target should be removed and replaced with eight key performance indicators. The plan was later dropped.

The proponents of the 4-hour access standard claim that it is an intuitive, pragmatic and simple measure that holds acute trust boards to account to improve emergency care. It provides an incentive to improve flow of patients through emergency departments.

Pressure to achieve the standard was cited by Francis (2013) as a contributing factor to the poor standards of care in Stafford Hospital. Critics of the standard point out that it is merely a process measure and does little to improve quality of care. Mason et al (2010) published criticisms of the standard; that it leads to 'gaming' and 'cheating'. Other criticisms described by Wilkinson (2007) are that it impairs training and recruitment, reduces professional satisfaction, and creates an adversarial culture between the emergency department and other inpatient specialties. Data quality issues potentially compromise any evaluation of the standard. One of the major difficulties is that the standard is applied equally to all emergency departments, from a specialist emergency centre providing stroke thrombolysis or trauma care to a paediatric emergency department, or even an eye emergency clinic. The published performance figures do not reflect case-mix, which creates problems with data interpretation and performance comparison between trusts. Trust performance is often disproportionately affected by inclusion of data from satellite minor injury units

Evidence

There is surprisingly little published evidence about the impact of the standard. Munro et al (2006) described how trusts have had to pour resources into already stretched emergency departments in order to achieve the target. One might have expected that the standard would have been developed with pilot sites, compared to

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control sites and continuously re-evaluated, but this is has not been the case. The majority of evidence relating to the impact of the 4-hour standard comes from independent academic evaluations. A systematic review by Jones and Schimanski (2010) identified that most evaluations were either qualitative or used retrospective 'before and after' methods. There are no prospective, controlled trials.

Staff and patient perceptions

Qualitative studies by Weber et al (2011) and Mason et al (2012) on health-care staff and managers reveal that the standard can be useful to garner organizational support both from within the hospital and from commissioners. Munro et al (2006) showed some evidence that the 4-hour standard encouraged hospitals to increase the number of senior emergency physicians and emergency nurse practitioners. Access to investigations, including diagnostic imaging, also improved. Hospitals which tended to perform well described whole system support. However, Mortimore and Cooper (2007) showed that the burden of the pressure to meet the target often fell on the nursing staff, who were made to feel responsible for breaches and felt they could spend less time with patients. While there has been a significant reduction in exit block, sicker and more complex patients benefited less from the standard than those with more minor conditions. Overall, the standard was seen by staff as positive, but with significant caveats. Qualitative evidence from patients was positive about being seen quickly, but some patients also reported feeling rushed (Jones and Schimanski, 2010).

Mortality

Quantitative evidence shows a less positive picture. There is only weak and inconsistent evidence that the 4-hour standard was associated with reduced inpatient mortality among emergency admissions in the UK and the stronger study designs, such as Weber et al (2012), showed no impact on 7-day mortality. The Australian picture is more positive. Geelhoed and de Klerk (2012) evaluated the introduction of the National Emergency Access Target and found it was associated with a substantial decrease in mortality from 1.12% to 0.98%. Although this change is small, in a high volume system it reflects a significant and substantial health benefit. Jones and Schimanski (2010) showed that the intradepartmental mortality rate was also unchanged, although this only represents a small number of the deaths among emergency admissions. Royce (2014) showed no convincing association between hospital standardized mortality ratio performance and 4-hour standard performance.

Other quality measures

The number of patients seen and discharged within 4 hours has improved considerably since the introduction of the target. Before 2001, 23% of patients spent longer than 4 hours in an emergency department (Department of Health, 2000). In 2014 this has been reduced to less than 6%. Evaluation of the standard by Mason et al (2012) showed that the flow dynamics were dramatically altered, with a surge of activity of patients leaving in the last 20 minutes of a 4-hour stay. In addition, 'minors' patients were mainly being seen, treated and discharged within 2 hours, and 'majors' patients were waiting longer. However, the most prolonged waits had reduced significantly. Importantly the 4-hour standard did not change the proportion of admissions to hospital which remained static at 23%, or the number of return visits within 1 week.

The 4-hour standard has improved timeliness of care in emergency departments, but the lack of controlled studies means that the net effect of many confounding changes cannot be evaluated. Case-mix has changed over the last decade, with increasing numbers of older people and patients with mental health problems attending emergency departments. The staffing mix of emergency departments and hospitals has changed; emergency nurse practitioners are now well established in emergency departments and there are more senior emergency department doctors available for extended hours.

The 4-hour standard has reduced the time that patients spend in the emergency department, but it does not promote other aspects of quality defined by the World Health Organization (2006). It is not equitable as important patient groups, such as those requiring critical care, the elderly and mental health patients, present with the most time-sensitive conditions. There are concerns that the standard may result in 'effort substitution' (where the activity measured takes precedence over equally valuable care). If the 4-hour target were a medicine or medical device, then a much more rigorous evidence base would have been required to justify the effort and expense.

The effect on training

There is even less data on whether the 4-hour access standard improves or impairs training of medical staff. Mason et al (2012) found that real-time training opportunities were being lost as a result of the pressures of the target and that key skills (e.g. complex suturing) were not being taught or practised because relevant patients were referred to other specialties for treatment. The pressure that the standard brings may be a contributing factor to the current recruitment difficulties in emergency medicine.

Alternatives to the 4-hour access standard

Any discussion of the 4-hour access standard should consider alternatives. The UK government briefly considered removing the 4-hour target, but found that other potential key performance indicators could not be reliably collected.

Removing the target completely would remove an incentive for trusts to improve care in emergency departments. Experience from the USA shows that hospitals may prioritize income-generating elective work over poorly funded emergency care; this contributes to emergency department crowding. Other care standards exist for indicator conditions, e.g. time to receive antibiotics for pneumonia or time to a cardiac catheter laboratory for patients with acute myocardial infarction. These measures create a halo effect, where the indicator condition receives disproportionate resources at the expense of other patients. The College of Emergency Medicine is of the opinion that any emergency department standard should promote quality across all patient groups, including the large number of those with undifferentiated presentations. Standards must promote improvements across all domains of quality, not just timeliness of care, and should also be applied across all points of urgent and emergency access – not just the emergency department. The Council of the College of Emergency Medicine voted unanimously to retain the 4-hour standard in March 2014.

Conclusions

The 4-hour access standard has become part of the fabric of UK hospital care for the last decade. The underlying evidence shows that it is probably beneficial to patients, but the greatest advantage does not accrue to those in greatest need. Substantial costs have been incurred to deliver the target and pressures on staff have become extreme at times. The prevalence of exit block remains an issue of national concern that the 4-hour target has not yet fully addressed. **BJHM**

Conflict of interest: Professor S Mason and Dr A Boyle have both received non-commercial grants to research the effects of the 4-hour target.

Affleck A, Parks P, Drummond A, Rowe BH, Ovens HJ (2013) Emergency department overcrowding and access block. *CJEM* **15**(6): 359–70

Bernstein SL, Aronsky D, Duseja R et al; Society for Academic Emergency Medicine, Emergency Department Crowding Task Force (2009) The effect of emergency department crowding on clinically oriented outcomes. *Acad Emerg Med* **16**(1): 1–10 (doi: 10.1111/j.1553-2712.2008.00295.x)

Boyle A, Higginson I, Henderson K (2014) *Crowding in Emergency Departments.* College of Emergency Medicine, London

Crouch R, Cooke M (2011) Making care count: introducing the Emergency Department quality indicators. *Int Emerg Nurs* **19**(2): 67–8 (doi: 10.1016/S1755-599X(11)00019-X)

Department of Health (2000) *The NHS Plan. A Plan for Investment. A Plan for Reform 2000.* Comptroller and Auditor General (NAO), London

Fee C, Weber EJ, Bacchetti P, Maak CA (2011) Effect of emergency department crowding on pneumonia admission care components. *Am J Manag Care* **17**(4): 269–78

Francis R (2013) *Report of the Mid Staffordshire NHS Foundation Trust Public Inquiry.* Controller of Her Majesty's Stationery Office, London

Frith M (2002) Abandoned in Casualty. *Evening Standard* 21 February (http://www.standard.co.uk/news/abandoned-in-casualty-6311482.html accessed 6 October 2014)

Geelhoed GC, de Klerk NH (2012) Emergency department overcrowding, mortality and the 4-hour rule in Western Australia. *Med J Aust* **196**: 122–6

Guttmann A, Schull MJ, Vermeulen MJ, Stukel TA (2011) Association between waiting times and short term mortality and hospital admission after departure from emergency department: population based cohort study from Ontario, Canada. *BMJ* **342**: d2983 (doi: 10.1136/bmj.d2983)

Jones P, Schimanski K (2010) The four hour target to reduce Emergency Department 'waiting time': a systematic review of clinical outcomes. *Emerg Med Australas* **22**(5): 391–8 (doi: 10.1111/j.1742-6723.2010.01330.x)

Mason S, Nicholl J, Locker T (2010) Four hour emergency target. Targets still lead care in emergency departments. *BMJ* **341**: c3579 (doi: 10.1136/bmj.c3579)

Mason S, Weber EJ, Coster J, Freeman J, Locker T (2012) Time patients spend in the emergency department: England's 4-hour rule-a case of hitting the target but missing the point? *Ann Emerg Med* **59**(5): 341–9 (doi: 10.1016/j.annemergmed.2011.08.017)

Morris ZS, Boyle A, Beniuk K, Robinson S (2011) Emergency department crowding: towards an agenda for evidence-based intervention. *Emerg Med J* **29**(6): 460–6 (doi: 10.1136/emj.2010.107078)

Mortimore A, Cooper S (2007) The "4-hour target": emergency nurses' views. *Emerg Med J* **24**(6): 402–4

Moskop JC, Sklar DP, Geiderman JM, Schears RM, Bookman KJ (2009) Emergency department crowding, part 1--concept, causes, and moral consequences. *Ann Emerg Med* **53**(5): 605–11 (doi: 10.1016/j.annemergmed.2008.09.019)

Munro J, Mason S, Nicholl J (2006) Effectiveness of measures to reduce emergency department waiting times: a natural experiment. *Emerg Med J* **23**(1): 35–9

Pines JM, Pollack CV Jr, Diercks DB, Chang AM, Shofer FS, Hollander JE (2009) The association between emergency department crowding and adverse cardiovascular outcomes in patients with chest pain. *Acad Emerg Med* **16**(7): 617–25 (doi: 10.1111/j.1553-2712.2009.00456.x)

Plunkett PK, Byrne DG, Breslin T, Bennett K, Silke B (2011) Increasing wait times predict increasing mortality for emergency medical admissions. *Eur J Emerg Med* **18**(4): 192–6 (doi: 10.1097/MEJ.0b013e328344917e)

Popa F, Raed A, Purcarea VL, Lala A, Bobirnac G (2010) Occupational burnout levels in emergency medicine--a nationwide study and analysis. *J Med Life* **3**(3): 207–15

Royce R (2014) Four Hours in A&E: what the target tells us about trusts. *Health Services Journal* 1 June (http://m.hsj.co.uk/5071094.article accessed 6 October 2014)

Schull MJ, Vermeulen M, Slaughter G, Morrison L, Daly P (2004) Emergency department crowding and thrombolysis delays in acute myocardial infarction. *Ann Emerg Med* **44**(6): 577–85

Weber EJ, Mason S, Carter A, Hew RL (2011) Emptying the corridors of shame: organizational lessons from England's 4-hour emergency throughput target. *Ann Emerg Med* **57**(2): 79–88 (doi: 10.1016/j.annemergmed.2010.08.013)

Weber EJ, Mason S, Freeman JV, Coster J (2012) Implications of England's four-hour target for quality of care and resource use in the emergency department. *Ann Emerg Med* **60**(6): 699–706 (doi: 10.1016/j.annemergmed.2012.08.009)

Wilkinson A (2007) A&E waiting times in doubt. *Hospital Doctor* **8**: 24–5

World Health Organization (2006) *Quality of care. A process for making strategic choices in health systems.* World Health Organization, Geneva

KEY POINTS

- The 4-hour standard has surprisingly little evidence of its effect.
- The standard has reduced the amount of time people spend in emergency departments, but probably not made any difference to mortality of people admitted as an emergency.
- The standard is supported by most emergency physicians.