

# What should we do about crowding in emergency departments?

## ABSTRACT

Our emergency departments have never been under so much pressure. Crowding in these departments is both a cause and symptom of this pressure. Crowding kills patients and harms staff. It is the most important problem affecting emergency departments in the UK. The causes are described and include factors relating to input, throughput and output. Interventions aimed at these causes may confer benefit, but the most important problem remains unsolved. This is exit block caused by lack of beds, and flow through those beds, exacerbated by downgrading of capacity in unscheduled care in the evenings, weekends and during holiday periods.

**A**nyone working in acute care over the last year cannot have failed to notice the increased pressure that hospital emergency departments, and the wider acute care system, have been under. This has been reflected in the worst ever performance against the 4-hour access standard, which has become a surrogate and imperfect measure of emergency department crowding (Boyle and Mason, 2014). NHS data confirmed the findings of the Royal College of Emergency Medicine's Winter Flow Project that patients in the winter of 2017–18 waited longer in emergency departments than any time since the standard was introduced in 2004 (Howes, 2018). This was despite assertive performance management from NHS leaders.

The effects were legion: ambulances were unable to offload and were stuck outside hospitals instead of being able to respond to further emergency calls. There were patients in those ambulances, or in emergency department corridors, either waiting to be assessed or to be transferred to an inpatient ward. Assessing patients in corridors is clearly sub-optimal and compromises the privacy and dignity of the patient, but also the effectiveness and safe practice of the treating clinicians. It is tempting to ascribe the poor performance over the winter to unusually cold weather and a virulent flu outbreak, but the system was performing poorly beforehand and has not recovered as well as expected now the weather has improved. Emergency

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department performance against the 4-hour access standard varies substantially across hospitals in England, implying that crowding and poor flow are not inevitable (Howes, 2018).

## Why must crowding be tackled?

Emergency department crowding matters because it is associated with avoidable and preventable morbidity and mortality (Moskop et al, 2009). International studies have consistently shown excess mortality and longer hospital stays in patients who arrive into crowded emergency departments (Sprivulis et al, 2006; Sun et al, 2013). Crowding is also associated with poor patient experience, especially privacy and dignity (Morris et al, 2012). Those most affected by the harms of crowding are the elderly, the critically ill, the mentally ill and the vulnerable (Stoklosa et al, 2018). Crowding also creates a poor staff experience, and affects staff recruitment and retention (Rowe et al, 2006).

## What are the causes?

The causes of crowding are multifactorial, but a good understanding is important to guide interventions. Aspin et al (2003) created a conceptual model of emergency department crowding, which describes the underlying causes in an intuitive input, throughput and output model.

## Input

As far as input is concerned, the number of attendances to type 1 emergency departments has increased in line with population growth (type 1 emergency departments are those attached to hospitals, who would be expected to deal with most acute injuries and illnesses). Growth in other urgent care settings such as minor injury units has been higher still. This is not usually the fault of the patient, as significant proportions have attempted to access other forms of health care before attending the emergency department, either by phoning NHS 111 or their GP (Benger and Jones, 2008). With much of the health system still working to a traditional working week, access to many services is reduced when patients need it. Public health campaigns for time-critical conditions such as stroke, myocardial infarction and sepsis have driven increased demand with little evidence of improved benefit. Finally, as less sick patients are diverted to other facilities, the casemix of patients in major emergency departments has shifted towards sicker, more complex and more elderly patients.

## Throughput

Once patients hit the door throughput factors kick in, with patients being treated in facilities which are often mismatched in terms of their capability to deal with their numbers and acuity, as a result of the physical space and layout, and the staffing levels they can offer. Access to investigations, specialist opinions and other services may be limited. Despite these constraints emergency care systems have got better at avoiding urgent admissions, reflecting the welcome rise of ambulatory care and the increased seniority of staff working in emergency departments, but this has been accompanied by increased investigation and time spent in those departments (Wyatt et al, 2017). All this contributes to reduced flow through the emergency department and increased crowding.

The temporal distribution of emergency department attendances contributes to crowding. Patients typically arrive in emergency departments throughout the day, including evenings, night times, weekends and bank holidays. There is often an additional peak in weekday evening arrivals at assessment areas as a result of patients being referred in by GPs. Hospital occupancy tends to be at its highest in the evenings as these groups of patients compete for access to beds still being occupied by patients awaiting discharge. The occupancy problem is usually worse after weekends and bank holidays because hospitals gradually fill up over these periods as a result of lack of access to senior decision makers, diagnostics, treatments and discharge enablers.

## Output

Finally, there is output. Despite input and throughput playing a part, this remains the major factor in the crowding equation. In the UK, the declining bed base and failure of many parts of the health system to adapt to the need to work over extended hours, every day of the week, has led to reduced output and exit block, causing crowding. It should be remembered that exit block trumps everything when it comes to the causes of crowding and will render solutions based on input and throughput meaningless.

## Which interventions can be used?

Understanding the causes of crowding is essential to ensure appropriate interventions; however, interventions aimed at a single part of the system are unlikely to succeed as there are multiple balancing and competing measures. There is a temptation to institute short-lived interventions at times of crisis, which confuses activity with progress. The Royal College of Emergency Medicine has consistently argued for several years that the proportion of low acuity patients who could be treated in alternative health-care settings is no more than 15%, and requires much less than 15% of the effort and workload. Despite this, a disproportionate effort seems to be directed toward providing interventions to the low acuity patients, either to avoid attendance or direct them away. Such efforts may carry quality benefits

## KEY POINTS

- Crowding is the most important problem facing emergency departments in the UK. It is getting worse.
- Crowding kills patients and harms staff.
- The most important cause is exit block caused by inadequate numbers of hospital beds, and poor flow through these beds. This is exacerbated by reduction in acute hospital capacity and capability in the evenings, at weekends and during holiday periods.
- Multiple system interventions are required to improve crowding. However, without focus on exit block and flow through hospital, other interventions will not succeed.

but will have little effect on crowding. The Royal College of Emergency Medicine thinks that the greatest benefit in reducing crowding will come from improving coordination and capacity of the hospital bed base and the wider system that keeps the beds accessible.

The Royal College of Emergency Medicine (2015) has published a toolkit of interventions that are effective, and identified which interventions are unhelpful and wasteful. The evidence base about crowding and exit block has consistently identified that crowding is harmful, while there is little strong evidence to guide interventions or policy (Mason et al, 2017). Effective crowding management requires leadership and a whole system view. This involves spreading the risk across an entire urgent and emergency care system.

The Royal College of Emergency Medicine has also argued for co-located urgent care services, such as primary care, frailty and liaison psychiatry. While there are concerns that these may cause supply-induced demand, co-locating these services is more patient centred and probably more efficient. The Royal College of Emergency Medicine is clear that patients who attend an emergency department should be seen by a trained clinician, even if they are triaged to another service.

There are some effective interventions that can occur in a crowded emergency department, and these are mainly under the control of the emergency department staff. Staffing needs to be able to support effective triage, for when there is a surge in attendances. Front loading investigations is helpful. A designated senior doctor

and nurse to support flow can mitigate many of the harms of crowding. The evidence around senior doctor triage is weak and conflicting (Abdulwahid et al, 2016). Hospital operations teams should have agreed escalation procedures.

The Royal College of Emergency Medicine has proposed that selected patients are sent to their destination inpatient wards, even before the ward bed is ready. Small decompressions of an emergency department have a big effect on safety, and this process known as 'boarding' is hoped to stimulate the inpatient wards into earlier discharges. This process should not be seen as simply moving crowding to another already crowded area, such as a busy medical assessment unit, but a way of balancing and reducing risk across a hospital (Boyle et al, 2015). This controversial proposal is unlikely to alter flow through an emergency department very much, but does improve whole hospital engagement and appears to be tolerable to patients (Bartlett and Fatovich, 2009). Many emergency department staff will have noticed that the hospital is frequently full at 7pm, but beds become more available after 9pm, coinciding with the change in inpatient ward nursing shifts.

While there is controversy around whether 7-day working is needed for everything, it is clear that unscheduled care pathways should be operating into the evenings, and over weekends and bank holidays. The crises affecting hospitals after weekends, Christmas, Easter and other bank holidays are unjustifiable when they are so predictable and amenable to intervention.

The number of acute beds in UK hospitals is currently insufficient to meet demand. This is a combination of raw numbers of beds and their real time availability. While it is tempting to point out the associations between delayed transfers of care and long waits in emergency departments and poor 4-hour access standard performance, it must be remembered that the delayed transfers of care metric is an imperfect measure of people who are in hospital but unable to go home because they require some form of additional support. The delayed transfers of care metric can be manipulated and gamed, like any other. Metrics based around stranded patients or length of stay are likely more useful.

## Conclusions

Until the whole system is geared towards improving flow through hospitals, and reducing delays at every potential step, the trump card will remain in play and emergency departments (and hospitals) will remain crowded. With current patterns of demand, it is certain that unless health systems stay ahead of the curve, patients and staff will continue to come to harm as a result of crowding. **BJHM**

*Conflict of interest: none.*

- Abdulwahid MA, Booth A, Kuczawski M, Mason SM. The impact of senior doctor assessment at triage on emergency department performance measures: systematic review and meta-analysis of comparative studies. *Emerg Med J*. 2016 Jul;33(7):504–513. <https://doi.org/10.1136/emermed-2014-204388>
- Asplin BR, Magid DJ, Rhodes KV, Solberg LI, Lurie N, Camargo CA Jr. A conceptual model of emergency department crowding. *Ann Emerg Med*. 2003 Aug;42(2):173–180. <https://doi.org/10.1067/mem.2003.302>
- Bartlett S, Fatovich DM. Emergency department patient preferences for waiting for a bed. *Emerg Med Australas*. 2009 Feb;21(1):25–30. <https://doi.org/10.1111/j.1742-6723.2008.01147.x>
- Benger JR, Jones V. Why are we here? A study of patient actions prior to emergency hospital admission. *Emerg Med J*. 2008 Jul 01;25(7):424–427. <https://doi.org/10.1136/emj.2007.050856>
- Boyle A, Mason S. What has the 4-hour access standard achieved? *Br J Hosp Med*. 2014 Nov 02;75(11):620–622. <https://doi.org/10.12968/hmed.2014.75.11.620>
- Boyle A, Viccellio P, Whale C. Is “boarding” appropriate to help reduce crowding in emergency departments? *BMJ*. 2015 Apr 28;350 apr28 31:h2249. <https://doi.org/10.1136/bmj.h2249>
- Howes S. 2018. RCEM Winter Flow Project 2018. (accessed 14 August 2018) [https://www.rcem.ac.uk/docs/Policy\\_Winter\\_Flow/RCEM\\_Winter\\_Flow\\_2017-18.pdf](https://www.rcem.ac.uk/docs/Policy_Winter_Flow/RCEM_Winter_Flow_2017-18.pdf)
- Mason S, Knowles E, Boyle A. Exit block in emergency departments: a rapid evidence review. *Emerg Med J*. 2017 Jan;34(1):46–51. <https://doi.org/10.1136/emermed-2015-205201>
- Morris ZS, Boyle A, Beniuk K, Robinson S. Emergency department crowding: towards an agenda for evidence-based intervention. *Emerg Med J*. 2012 Jun;29(6):460–466. <https://doi.org/10.1136/emj.2010.107078>
- Moskop JC, Sklar DP, Geiderman JM, Schears RM, Bookman KJ. Emergency department crowding, part 1--concept, causes, and moral consequences. *Ann Emerg Med*. 2009 May;53(5):605–611. <https://doi.org/10.1016/j.annemergmed.2008.09.019>
- Rowe B, Bond K, Ospina M, Blitz S, Afilalo M, Campbell S, Schull M. 2006. Frequency, determinants, and impact of overcrowding in emergency departments in Canada: a national survey of emergency department directors. (accessed 14 August 2018) [https://www.cadth.ca/sites/default/files/pdf/320c\\_overcrowding\\_tr\\_e\\_RIB.pdf](https://www.cadth.ca/sites/default/files/pdf/320c_overcrowding_tr_e_RIB.pdf)
- Royal College of Emergency Medicine. 2015. Tackling Emergency Department Crowding. (accessed 14 August 2018) <https://www.rcem.ac.uk/docs/Service%20Design%20+%20Delivery/52a.%20ED%20crowding%20overview%20and%20toolkit%20-%20Dec%202015.pdf>
- Sprivulis PC, Da Silva J-A, Jacobs IG, Frazer ARL, Jelinek GA. The association between hospital overcrowding and mortality among patients admitted via Western Australian emergency departments. *Med J Aust*. 2006 Mar 6;184(5):208–212.
- Stoklosa H, Scannell M, Ma Z, Rosner B, Hughes A, Bohan JS. Do EPs change their clinical behaviour in the hallway or when a companion is present? A cross-sectional survey. *Emerg Med J*. 2018 Jul;35(7):406–411. <https://doi.org/10.1136/emermed-2017-207119>
- Sun BC, Hsia RY, Weiss RE et al. Effect of emergency department crowding on outcomes of admitted patients. *Ann Emerg Med*. 2013 Jun;61(6):605–611.e6. <https://doi.org/10.1016/j.annemergmed.2012.10.026>
- Wyatt S, Child K, Hood A, Cooke M, Mohammed MA. Changes in admission thresholds in English emergency departments. *Emerg Med J*. 2017 Dec;34(12):773–779. <https://doi.org/10.1136/emermed-2016-206213>