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Continuous flow models in urgent and emergency care

An inadequate response to the deep problems within the NHS?

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Winter is not yet fully upon us and already emergency departments in the UK are struggling with unprecedented levels of overcrowding. Record numbers of patients are waiting for longer than 12 hours for an inpatient bed, with some spending days in the emergency department. Ambulances are unable to offload patients for want of space, impeding their ability to respond to the most urgent calls.[1] So serious is the situation that it has been suggested as the main cause of the spike in excess non-covid deaths seen over the summer.[2]

One possible solution currently attracting interest is the continuous flow model, first introduced in North America in the late 1990s.[3] Also known as full capacity protocols, these effectively mandate that a set number of patients are moved at set times from the emergency department to inpatient wards, regardless of whether a bed is available. This might mean putting an extra patient in a bay or two patients in a side room or boarding them in hospital corridors. In turn, this encourages wards to discharge existing patients, allows ambulances to offload new patients in the space created in the emergency department, and relieves pressure on the whole system.

The evidence underpinning "continuous flow" is encouraging but slight. A handful of mostly before and after studies suggest that this model most consistently improves ambulance performance (offload times, diversion) and has some benefit for emergency departments, including shorter patient waiting times.[4-8] The only study looking at patient mortality found no increase associated with implementing a continuous flow model and boarding patients in hospital corridors.[4] Both the Royal College of Emergency Medicine[9] in the UK and the American College of Emergency Physicians[10] recommend continuous flow models only within the context of appropriate governance to maintain patient safety.

The risks associated with emergency department crowding are substantial: patient mortality increases, diagnoses and clinical deterioration are missed, nursing tasks go uncompleted, and patients are more likely to come to serious harm.[11] The continuous flow model offers a way to share risk, as well as a mechanism to make bed management leaner and more efficient, thereby forcing patient flow. Emergency department crowding also becomes visible to the whole hospital, particularly senior operational and inpatient teams.

Caveats

There are, however, important considerations that should inform any discussions about implementing continuous flow models. Firstly, studies of this approach describe small numbers of patients being boarded for relatively short periods—on average, one or two carefully selected patients waiting 10 hours for a bed.[4] This is different from the current situation in NHS acute trusts, where it is not uncommon for scores of patients to be waiting for beds in emergency departments, sometimes for days. Allowing substantial crowding on inpatients wards will simply replicate the risks already described in emergency departments. Worsening nursing staff to patient ratios may be detrimental to patient safety, especially when trusts already preferentially staff "front door" services such as the emergency department. An additional danger is that the increased burden on ward staff may prove intolerable and exacerbate long term staffing challenges.

Secondly, the main mechanisms through which continuous flow models operate are tighter bed management and encouraging patient discharges downstream. However desirable such forced flow might seem, the literature suggests this might increase patient harm. For example, 30 day mortality increased by 3.8% in US hospitals that reduced length of stay in response to emergency department crowding caused by closure of an adjacent institution.[12] Drives to improve patient flow can also result in other bed management practices associated with increased mortality or length of stay: multiple bed moves, moving patients at night, and patients being placed under the care of the wrong team.[13-15]

Thirdly, qualitative studies of continuous flow models highlight that they are highly resource intensive.[16 17] Success is contingent on support of senior managers, the creation of organisational solidarity and accountability among staff, additional or redeployed staff to support areas with boarded patients, real-time bed management systems, and a deep understanding of institutional bottlenecks. The work required for successful implementation has been described as "all consuming."[17] Rather than being a quick fix, the continuous flow model was found to rapidly exhaust its usefulness, specifically in the face of chronic bed shortages.

This evidence suggests that a continuous flow model might help individual organisations, particularly those that already have the resources and governance in place. Others might consider how the model works and evaluate whether less extreme measures might bring about some of the same benefits. Clearly however, it is not a magic bullet for the current complex system level problems within the NHS: too few beds, too little staff, and too little funding across the whole health and social care system. Unless and until these are fixed, the continuous flow model is just another bit of papering over the cracks.

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