

Reconfiguring emergency and acute services: time to pause and reflect

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A dominant trend over the past few decades has been the reconfiguration of acute hospital services to provide more centralised and specialised care, particularly for complex conditions, resulting in fewer hospitals each serving a higher volume of patients. Centralisation is usually framed as a response to concerns about the safety of care in smaller hospitals. In this issue of the journal, Flojstrup and colleagues report on the impact of a hospital reconfiguration programme for emergency and acute care in Denmark.¹ The ongoing programme, which began in 2008, involves closure of most small, rural hospitals and halving the number of acute hospitals. The quality of Danish registry data allows for the survival outcomes (adjusted in-hospital and 30-day mortality rates) of a large cohort (11367655 unplanned non-psychiatric episodes) to be described throughout the centralisation programme and across different diagnoses and arrival times. The use of a unique patient identifier across datasets enables a comprehensive analysis of case-mix changes over time.

The results are disappointing for proponents of centralisation. Although there were some possible benefits for small groups of patients (myocardial infarction, stroke, aortic aneurysm, major trauma), there was no overall improvement in the in-hospital mortality trend and a slight worsening of the 30-day mortality trend.

The study has some limitations. Like many major system evaluations, the authors were unable to unpick the effect of individual components of the programme, such as increased exposure to senior specialists. Specific implementation dates for each hospital could not be pinpointed, making it difficult to identify when effects might appear. Further, they could not account for effects on patient decision-making, such as disincentivising

rural patients to attend an emergency department (ED).

RECONFIGURATION: WHAT DOES THE EVIDENCE SAY?

There are long-standing concerns about the effectiveness of reconfiguration. Although reconfiguration is framed as ‘evidence based’, it is often presented without a comprehensive analysis of how each of the assumptions underlying any programme theory is supported by research. In the sections below, we provide such an analysis.

ASSUMPTION 1: THERE IS A PROBLEM WITH THE QUALITY OF EMERGENCY CARE THAT NEEDS TO BE FIXED

Emergency care has been seemingly on the brink of crisis for at least the last two decades. Yet, while the increasing numbers of patients attending EDs have been well documented, there is no evidence that this has translated into increased patient mortality at the aggregated level. Instead, the trend has been for improvements in mortality coupled with a decrease in hospital length of stay.² Crucially, mortality improvement trends were faster before the onset of centralisation in both the Flojstrup and colleagues study and a similar study conducted in Ireland.¹³ This suggests major ongoing improvements in the delivery of care over the past two to three decades that are independent of reconfiguration. Some of this is undoubtedly due to innovation in the treatment of critically unwell patients, such as percutaneous coronary intervention for myocardial infarction. However, there have been mortality improvements for diseases without similar breakthroughs in treatment, such as severe asthma.⁴ This suggests a broader trend towards higher-quality care.

So, why then is emergency care presented as constantly in need of radical



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transformation? In our view, the sense of crisis is not because of safety issues in smaller hospitals, but because of the obvious capacity shortfall across the health system as a whole. EDs are the ‘canary in the coal mine’ for a host of structural problems, such as poor access to general practice, lack of capacity elsewhere in the health system, economic challenges and payment reforms.⁵ More recently, the COVID-19 pandemic has exacerbated ongoing problems with recruitment and retention of qualified hospital staff, most markedly in acute settings. All of these problems exist outside the ED but are at the root of the staffing and overcrowding problems we see within the ED.

Why is closing smaller EDs used to address these systemic issues? The reasoning seems to be that by consolidating resources at a smaller number of large hospitals, we will at least have some properly staffed and managed EDs, and that patients who had previously attended smaller EDs will either find alternative care pathways or find their way to the larger facilities if necessary. In essence, centralisation is hoped to solve workforce issues at the surviving hospitals (by consolidating staff to these sites), increase patient throughput (through greater exposure to senior decision-makers) and introduce a form of demand reduction on the emergency care system as a whole. We argue that the framing of emergency care centralisation as focused on safety issues in smaller hospitals is therefore misleading—it is used to solve other problems within the system, such as workforce recruitment, budgetary constraints and the growing need for acute services within ageing societies. We also argue in the sections below that closing smaller EDs does not actually alleviate the systematic pressures on emergency care systems and in fact exacerbates these pressures.

ASSUMPTION 2: SMALLER HOSPITALS PROVIDE WORSE CARE THAN THEIR LARGER COUNTERPARTS

Undoubtedly, the delivery of time-critical, high-risk interventions in fewer specialist centres has improved outcomes for certain life-threatening conditions. This has contributed to the perception of volume as a virtue, which automatically confers better outcomes and economies of scale.

A more forensic reading of the literature suggests that this is not entirely true. First, the proportion of patients with acute conditions who benefit from specialist care is actually very small. Patients with myocardial infarction, stroke and major trauma, groups that benefit from centralising care, account for only 1% of all ED attendances.⁶ If other conditions for which other highly skilled, but less time-critical interventions, such as surgery for abdominal, vascular, obstetric and intracranial emergencies, are included, still only 5% of all ED presentations need care in specialist centres.⁶

For the remaining 95% of patients, there is little or no evidence that care in smaller hospitals is necessarily

worse. In England, for example, analysis across a basket of quality and performance indicators for smaller versus larger hospitals did not find any relationship between quality of care and size.⁷ Findings were similar for national studies of individual conditions, such as emergency abdominal surgery, general surgery and intensive care.^{8,9} International studies of surgery also show that lower-risk procedures can be safely conducted in lower-volume settings.¹⁰

Moreover, the characteristics of individual clinicians and teams are probably more important than the type of hospital in which they work. For example, although high-volume teams in high-volume hospitals were found, in a national study of emergency abdominal surgery, to have performed best on all metrics, high-volume teams in low-volume hospitals outperformed the rest.¹¹ The worst outcomes were for low-volume teams in high-volume hospitals.

In short, the literature supports the notion that safe and high-quality care for at least 95% of patients with acute and emergency conditions can be provided in smaller organisations, close to their own homes.

ASSUMPTION 3: RECONFIGURATION PRODUCES BETTER OUTCOMES

While studies of centralisation of care for individual services show better outcomes for specific patient groups, the population-level evidence for whole-scale reconfiguration through changes to ED services tells a different story.

The two largest European studies so far on the population impact of reconfiguration (including the study by Flojstrup and colleagues) found a net worsening of mortality trends after implementation.^{1,3} In the USA, a larger body of evidence has emerged on the impact of hospital closures. This shows that ED closure is associated with worsening mortality, both for patients overall and those with time-critical conditions (myocardial infarction and trauma).¹² There is a strong suggestion that this is due to increased travel times,¹³ a finding echoed in Swedish research on ED closure.¹⁴ Other studies have demonstrated that hospital closures affect socioeconomic, geographical and ethnic groups differently, with the burden of closures falling most heavily on the more vulnerable.¹⁵

ASSUMPTION 4: REMAINING ORGANISATIONS ARE MINIMALLY AFFECTED BY RECONFIGURATION

It is assumed when ED services within a region are closed, the remaining hospitals are able to be cushioned from capacity shock, not least through patients being dissuaded from travel and seeking help elsewhere in the system.

The evidence, however, suggests that the remaining hospitals often suffer from substantial negative ‘spill-over effects’, with overall mortality actually rising for their emergency patients.¹⁶ The mechanisms are

unclear—increases in travel times, overcrowding and ‘speed up’ (whereby organisations ‘process’ patients more quickly) have all been implicated. A range of other spillover effects have also been identified—increases in length of stay and readmission rates,¹⁶ ED overcrowding with consequent increases in waiting times on trolleys,³ increases in the pressures on ambulances services (time on the road, incidents)¹⁷ and various other forms of ‘operational strain’.

Given that the biggest problems currently facing acute and emergency services internationally are rising admissions and overcrowding, these studies strongly suggest that removing *any* capacity from an already overstretched system is likely to do harm.

ASSUMPTION 5: RECONFIGURATION HAS OTHER BENEFITS AND NO UNINTENDED CONSEQUENCES

Centralising care is assumed to bring about other benefits, such as increased workforce levels (due to the presumed preference of staff to work in larger urban facilities), better access to diagnostics and other expensive resources and improved flow and coordination of care. While centralisation does allow faster access to certain types of diagnostics and interventions, there is very little evidence that reconfiguration produces other desirable outcomes and rather has a number of unintended negative effects.

Qualitative studies strongly suggest that facility closures and mergers produce permanent losses to the workforce—both to the region, as skilled workforce members move away, and permanently, as workers either retire early or seek other work.¹⁸ Those who chose to relocate often suffer from work-related anxiety, stress and medical illnesses, and are less satisfied with their new jobs.¹⁹

The closure or downgrading of EDs in small hospitals tends to be accompanied by the removal of other ‘front door’ services, such as general medicine, general surgery and obstetrics, as well as therapy and support services. The result is a hollowed out hospital, offering a limited range of services usually only during daytime hours. This creates geographical ‘deserts of care’. While these predominantly impact the older and poorer patients who live in rural and peripheral communities, urban areas are not wholly immune, with burden again falling disproportionately on the most vulnerable.²⁰

Downgraded health services also have ripple effects beyond the health sector—immediate job losses, impact on jobs in other sectors, reduction in other public services and a gradual drift of skilled workers from the locale, to the detriment of the local economy. Health facilities are important to community identity, and their removal can lead to hidden psychological and social costs beyond the pragmatic concerns about poorer access to healthcare.¹⁸

TIME TO THINK AGAIN?

Given the absence of evidence supporting the centralisation of emergency care, why does this policy option remain attractive to decision-makers? We identify several possible reasons.

One driver is a narrow professional view of ‘proper’ medicine. The drive to standardisation of service norms is often presented as motivated by patient welfare, but we suggest that there are other reasons, often rooted in the career preferences of professionals. For example, smaller hospitals are not the ideal that motivates many medical professionals. They do not have the opportunities in terms of specialist training experience and research that is associated with career advancement. This is exacerbated by a narrow approach to working practices taken by many medical specialties. These specialties protest and sometimes actively campaign for the elimination of what they consider inadequate environments for their members in terms of, for example, volume, workforce, infrastructure and supervision arrangements. These specialties, especially acute surgery, anaesthesia and intensive care medicine, have a ‘veto power’; without them, the whole acute hospital cannot continue to function. This sort of power is a poor fit with complex system design as it promotes a ‘one-size-fits-all’ approach that is insensitive to contextual factors such as rurality, deprivation and demographic ageing. The quality and safety field has been characterised by a preference for standardisation from its inception, and we argue that while this may work at a micro level, for example, reduction of device-related infections, it is inappropriate at a larger system level for unplanned care where geographical distance and local connection to community services are important.

As a result of these factors, smaller hospitals find it difficult to recruit to their medical workforce. Responding to specialty concerns and constrained by other policies (eg, national wage agreements, limited budgets), health system administrators often choose to address these workforce challenges by imposing a ‘one-size-fits-all’ model for what a facility should look like. This fails to consider other bespoke solutions such as wage incentives, shared services and investment in improving infrastructure.

Finally, the interests and power held by large urban academic medical centres should be recognised as a driver of the centralisation agenda. Catchment and staff expansion is in the long-term interest of these centres, and clinicians and academics at these centres have a strong influence on how science is used to support the reconfiguration agenda. This can lead to a biased, cherry-picking approach to evidence framing and interpretation: policy based rather than evidence based. We argue that a fair assessment of the evidence base, as we have attempted to do above, exposes little scientific merit in arguments for centralisation.

CONCLUSIONS

It is time to hit the pause button on the reconfiguration agenda and consider reversing it in some instances. The Danish study published in this issue of *BMJ Quality and Safety* is the second national reconfiguration of emergency services that has failed to demonstrate improvements in patient outcomes. We argue that policymakers should instead focus on the main challenge we currently face in acute and emergency care: capacity. Population ageing, the workforce crisis and the aftermath of the COVID-19 pandemic warrant a focus on stability rather than ambitious system reforms with little evidence. No further capacity should be removed from overstretched systems in the vain hope of producing efficiencies and safety improvements that never actually arrive. Smaller acute hospitals represent an opportunity for growth—the structures already exist and with investment could alleviate the pressure on larger urban sites. This approach would also be consistent with other policies such as ‘levelling up’ investment across geographical areas, environmental policies and policies to reduce income inequality.

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REFERENCES

- Flojstrup M, Bogh SBB, Bech M, *et al.* Mortality before and after reconfiguration of the Danish hospital-based emergency healthcare system: a nationwide interrupted time series analysis. *BMJ Qual Saf* 2022. doi:10.1136/bmjqs-2021-013881. [Epub ahead of print: 19 May 2022].
- Davies J. *Quality Watch: urgent and emergency care*. London: Nuffield Trust, 2021. <https://www.nuffieldtrust.org.uk/news-item/urgent-and-emergency-care>
- Lynch B, Fitzgerald AP, Corcoran P, *et al.* Case fatality ratios for serious emergency conditions in the Republic of Ireland: a longitudinal investigation of trends over the period 2002–2014 using joinpoint analysis. *BMC Health Serv Res* 2018;18:474.
- Pennington E, Yaqoob ZJ, Al-Kindi SG, *et al.* Trends in asthma mortality in the United States: 1999 to 2015. *Am J Respir Crit Care Med* 2019;199:1575–7.
- Baier N, Geissler A, Bech M, *et al.* Emergency and urgent care systems in Australia, Denmark, England, France, Germany and the Netherlands - Analyzing organization, payment and reforms. *Health Policy* 2019;123:1–10.
- NHS Digital. *Hospital episode statistics. Hospital accident and emergency activity annual report 2020-21*. London: NHS Digital, 2021. <https://digital.nhs.uk/data-and-information/publications/statistical/hospital-accident--emergency-activity/2020-21>
- Monitor. *Facing the future: smaller acute providers*. London: Monitor, 2014. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/320075/smalleracuteproviders-report.pdf
- Watson R, Crump H, Imison C, *et al.* *Emergency general surgery: challenges and opportunities*. London: Nuffield Trust, 2016. <https://www.nuffieldtrust.org.uk/files/2017-01/emergency-general-surgery-web-final.pdf>
- Shahin J, Harrison DA, Rowan KM. Relation between volume and outcome for patients with severe sepsis in United Kingdom: retrospective cohort study. *BMJ* 2012;344:e3394.
- Natafqi N, Baloh J, Weigel P, *et al.* Surgical patient safety outcomes in critical access hospitals: how do they compare? *J Rural Health* 2017;33:117–26.
- Nally DM, Sørensen J, Valentelyte G, *et al.* Volume and in-hospital mortality after emergency abdominal surgery: a national population-based study. *BMJ Open* 2019;9:e032183.
- Buchmueller TC, Jacobson M, Wold C. How far to the hospital? The effect of hospital closures on access to care. *J Health Econ* 2006;25:740–61.
- Shen Y-C, Hsia RY. Association between emergency department closure and treatment, access, and health outcomes among patients with acute myocardial infarction. *Circulation* 2016;134:1595–7.
- Avdic D. Improving efficiency or impairing access? Health care consolidation and quality of care: evidence from emergency hospital closures in Sweden. *J Health Econ* 2016;48:44–60.
- Shen Y-C, Hsia RY. Changes in emergency department access between 2001 and 2005 among general and vulnerable populations. *Am J Public Health* 2010;100:1462–9.
- Liu C, Srebotnjak T, Hsia RY. California emergency department closures are associated with increased inpatient mortality at nearby hospitals. *Health Aff* 2014;33:1323–9.
- Sookti C, Davis A, Troske K, *et al.* *Hospital closures and Short-Run change in ambulance call times*. ZA DP No. 12797. Bonn: Institute of Labour Economics, 2019. <https://docs.iza.org/dp12797.pdf>
- Wishner J, Solleveld P, Rudowitz R. *A look at rural hospital closures and implications for access to care: three case studies*. Menlo Park: The Kaiser Family Foundation, 2016. <https://files.kff.org/attachment/issue-brief-a-look-at-rural-hospital-closures-and-implications-for-access-to-care>
- Valent P. The human costs to staff from closure of a general hospital: an example of the effects of the threat of unemployment and fragmentation of a valued work structure. *Aust N Z J Psychiatry* 2001;35:150–4.
- Brown JB, Rosengart MR, Billiar TR, *et al.* Geographic distribution of trauma centers and injury-related mortality in the United States. *J Trauma Acute Care Surg* 2016;80:42–50.