

Research report October 2018

# Rethinking acute medical care in smaller hospitals

Dr Louella Vaughan, Nigel Edwards,  
Candace Imison and Ben Collins

nuffieldtrust

## About this report

Across England, millions of people rely on smaller hospitals as their first recourse in an emergency, their first source of expertise when conditions worsen, and their first choice for planned operations. But these hospitals are facing increasing challenges in delivering effective acute medical services in the context of growing patient numbers, an increasingly complex mix of cases arriving for care, workforce shortages, changing societal expectations and severe restrictions in funding growth.

The Nuffield Trust was asked by NHS England to develop a better understanding of the problems associated with acute medicine in smaller hospitals and to find possible solutions. This report brings together what we have learnt from a review of the literature, discussions with experts from a number of health systems in other countries and interviews with senior clinicians and managers in England, Scotland and Wales, many of whom have already developed partial solutions to the problems associated with smaller and rural hospitals. We also draw on insights from other ongoing research at the Nuffield Trust.

The report is intended to be a stimulus for local innovation and to dissuade the thought that the reconfiguration of services is the only solution to staffing and other challenges posed by running smaller hospitals in an increasingly complex health care landscape.

# Contents

|          |   |            |
|----------|---|------------|
|          | <b>List of figures and tables</b>   | <b>2</b>   |
| <b>1</b> | <b>Executive summary</b>  | <b>3</b>   |
| <b>2</b> | <b>Introduction</b>   | <b>11</b>  |
| <b>3</b> | <b>A profile of smaller hospitals in England</b>  | <b>14</b>  |
| <b>4</b> | <b>Key problems</b>   | <b>18</b>  |
| <b>5</b> | <b>Developing viable models of acute medicine<br/>– potential solutions</b>                               | <b>33</b>  |
| <b>6</b> | <b>Conclusions</b>  | <b>59</b>  |
| <b>7</b> | <b>Recommendations</b>  | <b>61</b>  |
|          | <b>Appendix A: The configuration of acute medical<br/>services – a high-level review of the evidence</b>  | <b>67</b>  |
|          | <b>Appendix B: International models of acute medical<br/>care – interviews with international experts</b> | <b>80</b>  |
|          | <b>References</b>   | <b>106</b> |
|          | <b>Acknowledgements</b>   | <b>124</b> |

# List of figures and tables

## Figures

|   |    |
|---|----|
| Figure 1: Trust catchment areas, as defined by the trusts   | 15 |
| Figure 2: Hospital setting  | 16 |
| Figure 3: Distance to the next nearest ED   | 16 |
| Figure 4: Number of ED attendances by hospital site in 2015/16  | 17 |
| Figure 5: Approximated use of occupied beds for acute emergency medical admissions (excluding short stay) for 2017/18 | 19 |
| Figure 6: Basic service models in acute medicine  | 22 |
| Figure 7: Sankey diagram of patient flows in a medium-sized district general hospital                                 | 23 |
| Figure 8: Number of consultants in post by core discipline  | 26 |
| Figure 9: Number of ED consultant posts (filled and locum) by hospital site   | 27 |
| Figure 10: Number of acute physicians (filled and locum) by hospital site   | 28 |
| Figure 11: Representation of a multidisciplinary ‘front-door’ service   | 51 |
| Figure 12: Future Hospital Commission – a vision for a new model of hospital medical care                             | 57 |
| Figure A1: The five drivers of clinical service configuration   | 68 |
| Figure A2: The vacating field of clinical generalism  | 73 |
| Figure A3: Making it work framework for remote and rural recruitment and retention                                    | 78 |
| Figure B1: What patients need as they move through the system   | 82 |
| Figure B2: Basic UK pathway from the ED to the ward   | 84 |
| Figure B3: Basic service models in acute medicine   | 85 |
| Figure B4: Basic international pathway from ED to the ward  | 86 |
| Figure B5: Basic pathway from the ED to the ward in Australia   | 86 |

## Tables

|  |    |
|--|----|
| Table B1: Immediate response to the patient’s presentation at the acute hospital – internationally | 87 |
| Table B2: Early care – internationally   | 90 |
| Table B3: Inpatient/specialist care – internationally  | 91 |

# 1 Executive summary

There is an urgent need to create sustainable models for acute medicine in smaller hospitals. Too often, the knee-jerk reaction has been to try to close or downgrade these services rather than to develop solutions that better suit the needs of the local community. As a result, attempts to close these services have tended to fail, while the problems they were trying to address remain.

The Nuffield Trust was asked by NHS England to work with a group of clinical leaders, Royal College representatives and other experts to develop a better understanding of the problems associated with acute medicine in smaller hospitals and to find possible solutions. We reviewed the literature, looked at local and international examples and drew on our own extensive research in this area.

We mainly focus on hospitals serving 140,000 to 300,000 people – in particular those that are geographically isolated. These hospitals typically have an average of 30 to 40 emergency admissions of adult medical cases a day. By international standards, this type of hospital would not be regarded as small. Some of the issues the hospitals face are specific to this type of service, while others reflect more general problems in the way that emergency and acute medicine is organised in the United Kingdom.

## The current position

There is no single, agreed model for acute medicine. Furthermore, there is very little good evaluation of the different approaches to medical assessment and structuring used in these systems. Our site visits and interviews revealed such a wide variety of approaches and types of staffing models that imposing a single model – even if there was evidence of superior performance – would be near impossible.

Many hospitals are using highly complex and fragmented models, often with unhelpful divisions between acute medical and other, related services – particularly the emergency department (ED) and critical care. Having several different services that ‘carve out’ sub-groups of patients into increasingly specialist care may work for large hospitals, but for smaller units it fragments scarce staff, spreading them more thinly.

Recruitment to smaller organisations has always been difficult, but most smaller hospitals are now completely dependent on high levels of locum staffing. Of the 48 sites studied, we found nine with more than half the acute physician posts occupied by locums. Some 80% of the sites found it difficult to ensure junior doctor cover for emergency work. The level of support being received from larger hospitals is very variable and smaller hospitals appear to be at the bottom of the pecking order for the allocation of trainees.

The tendency for some specialists to opt out of the general medical rota has increased staffing problems and has increased the pressures on the remaining staff. There is limited evidence that the benefits outweigh the problems that this can create, and more imaginative networked solutions have been adopted in some places.

These problems with staffing are further exacerbated by the imposition of minimum staffing levels, specific rota designs and other standards by external regulators. In many cases these rules are based on guidance developed for larger (often urban) centres, and there is limited evidence that these standards translate into improved outcomes. Smaller and remote hospitals need to be free to design the acute medical service in a less rigid way.

The fragmented and complex systems that have emerged for EDs, acute medical units (AMUs), frailty units and a variety of other internal systems are often hard for hospitals to coordinate. Moving patients between units, and the handovers of responsibility that accompany this, become inefficient. Work is duplicated, reducing the overall resilience of the system and creating potential for delays and even harm.

## Improving existing acute medical services: practical solutions

As many services have grown up over time, the staffing model, the way that care is organised and the working patterns of staff have not kept pace with changes in demand.

The development of a suitable model for acute medicine should start with an analysis of the actual pattern of need in the local area and should recognise the unique starting point in each case. However, some general components of an improved model of acute medical care can still be identified from our research.

**Establish a slick process at the ‘front door’ of the hospital** – Patients should rapidly be assessed by a senior decision-maker in the ED, with clinical investigations and a plan for onward care carried out and agreed as soon as possible. To make the best use of limited staffing resources and to reduce the number of times a patient is moved, where possible patients should remain in the initial assessment area until a diagnosis has been established or the patient is clinically stable enough for transfer. Patients with a clear need for specialist care would benefit from going directly to the appropriate specialist ward.

Patients whose need for specialist care remains undecided after an initial period of assessment and patients who require a concentration of resources (such as rapid access to diagnostics, higher levels of monitoring or greater intensity of multidisciplinary input) would benefit from being grouped together. Many of these patients are likely to stay in hospital for less than two days. For patients staying longer, disruptions to continuity of care should be minimised. Decisions to change the unit the patient is cared for in should be based on patient need rather than time constraints.

**Create a single ‘front door’ team** – In smaller hospitals that are struggling with limited numbers of consultant staff, the solution may be to pool clinician capacity and adopt a more inter-disciplinary approach to the process at the front of the hospital. For example, this could mean merging ‘front door’ assessment in acute medicine, ED and/or geriatrics to provide medical

assessment cover during extended hours, or it could mean a merger of the ED, intensive care unit or trauma (with or without acute medicine) rosters to cover emergencies out of hours.

**Remove ‘carve out’** – Smaller organisations do not have enough staff to provide identical patient assessments in several units in the hospital (the ED, the AMU, the frailty unit and ambulatory emergency care), but they can still provide ambulatory care processes from within the ED and/or the AMU. For similar reasons it may be better not to create a separate frailty unit: many remote hospitals have such a high proportion of admissions of frail patients that it does not make sense to separate these patients out.

**Create clear plans for dealing with high-risk patients** – Smaller hospitals should continue to provide 24/7 interventional services wherever possible. Where they cannot, mixed models, a combination of ‘traditional’ on-call services during extended hours and ‘treat and transfer’ overnight (~midnight to 8am) could be considered. Where general surgery cannot be sustained at all or during out-of-hours periods, patients could be initially managed and investigated by a senior clinician, supported by ready access to CT and remote specialist advice and transferred as quickly as possible if necessary. Networked rotas for sending patients with gastrointestinal bleeds already operate in some parts of the country.

**Specialist advice through new on-call arrangements** – If more of a distinction is made between types of on-call arrangements – so that clinicians can be on call frequently, but sustainably (because the volume of calls and visits to hospital may be very low), this would create more flexibility. Mechanisms are needed to support consultants, especially subspecialists and those required for urgent interventions, to participate in more than one on-call or on-take rota.

**Create continuity of care** – Continuity of care, particularly at consultant level, is integral to the delivery of high quality care and maintaining patient flow. However, there is no research evidence on what the ideal model for this should be and we propose two different approaches to this depending on the type of staff the hospital currently has. One suggests general wards with specialist input; the other directs appropriate patients to specialist wards as soon as possible, regardless of their expected length of stay.

**Develop an innovative approach to staffing** – Improve the way hospitals work at night by agreeing the optimal time for changeover to night shifts. Provide robust cover at night with greater concentration of senior staff. Further develop the physician’s associate and advanced practitioner roles to provide cover and allocate more senior trainees to smaller organisations.

**Invest in diagnostics and other support services** – In addition to 24/7 provision of standard sets of emergency pathology tests, there also needs to be 24/7 access to CT and 7-day in-hours availability of MRI. All acute medical and surgical services require intensive care and support from intensivists for everyday emergency decision-making, but also strategic oversight to ensure that the appropriate systems are in place – particularly to recognise and respond to deteriorating patients, develop transfer systems, etc. International standards allow other appropriately accredited specialists (anaesthetists, physicians, etc) to support out-of-hours cover. An ‘electronic’ intensive care unit, where nursing and medical staff are supported by electronic monitoring, with real-time input delivered remotely by an intensivist, may also be a useful adjunct to this.

**Create effective networks** – Acute medical services need to be part of wider networks that function well, have strong governance and that can enforce decisions. A control-centre model, where the responsibility for finding beds and specialist advice is managed centrally – allowing a ‘send and call’ model to operate – would solve some of the current problems.

**Community and primary care** – Small hospitals benefit from closer working between community and primary care services. There are limits to how far ambulance services can preselect their patients, but there is more to do to reduce the number of people being taken to small hospitals. Local control-room systems that link the hospital, community, ambulance, social care and voluntary services and that can rapidly mobilise support and provide a link to senior clinical advice could help to support this.

---

## Core principles for redesigning acute medicine in smaller hospitals

1. **There needs to be a shift from the ‘all or nothing’ understanding of acute service provision to one that is more ‘modular’,** with hospitals differentiated by their capacity to undertake the various elements of a care pathway, from stabilisation to rehabilitation. This may include differences between in-hours and out-of-hours models of care.
  2. **Small hospitals need to be part of a wider system, with strong links to local services and support from other hospitals** – in particular specialist centres. This needs to be formalised and much more reliable than is often the case at present.
  3. **Smaller hospitals will need to be able to deal with all types of emergency medical cases.** Systems and processes should be designed for the ‘usual’, but plan and allow for the unusual. All acute hospitals need to have the capability to deal safely, quickly and expertly with all patients for at least the first 2 to 3 hours of their care. Advice from main centres needs to be provided rapidly and effectively to support this.
  4. **Working arrangements should be inter-disciplinary, team-based and calibrated at ‘whole-hospital level’ to meet the needs of the local population.** Care within smaller hospitals needs to shift from the current models, which are arranged around professional boundaries, to models built around skills, expertise and experience.
  5. **The benefits of specialist services and staff should be set against the increased costs, fragmentation and threats to viability that can result** and that can reduce hospitals’ ability to effectively deal with multi-morbid patients whose severity and urgency of need has not yet been determined. Policy and training models need to recognise the importance of generalist skills. Proposals that allow further opting out of acute medical on-call care in small hospitals require very careful thought.
  6. **Systems and processes in hospitals should be organised, as far as possible, with the intention of delivering the appropriate care to the patient as quickly as possible:** ‘doing today’s work today’.
  7. **Each step in a patient’s care pathway should add value.** Movement along the pathway should be determined by need, rather than artificial time constraints. Many current models duplicate work (for example, by clerking a patient in more than one unit) and have unnecessary delays in obtaining a diagnosis. Small hospitals need a model that removes all duplication and, where possible, ensures that critical tests are done rapidly to allow patients to be put on the most suitable pathway.
  8. **Improved continuity of care should be a key objective.** This will improve the flow of patients through the hospital and reduce length of stay, as well as reducing staff workload and improving job satisfaction.
-

## Recommendations for national action

- NHS England and NHS Improvement’s regional bodies should create the types of cross-system networks we found in systems in Australia, where a ‘send and call’ model operates and where a regional control function locates the capacity to deal with urgent transfers.
- Health Education England and other regulators need to improve how they recognise and respond to the needs of smaller hospitals, including by
  - i. taking forward their report on *Training in Smaller Places*
  - ii. developing new policies on how trainees are allocated to smaller hospitals
  - iii. implementing broad-based training and specialist training for rural settings that equip emergency medicine, acute medicine and other physicians with a wider range of skills for the particular demands of rural medicine.

Health Education England and local systems also need to urgently increase support for the development of physician’s associates and other types of advanced practitioners.

- Several approaches have been successfully introduced in other countries that appear to support the development and maintenance of a medical workforce with a broad skill set. These include a more rigorous professional peer review process, and ‘credentialing’, through which clinicians gain approval and training support to expand their scope of practice and ensure skills are maintained. The General Medical Council (GMC) has explored the introduction of credentialing, but this has stalled in the face of concerns raised by the profession. The GMC’s original proposals should be reviewed to ensure that they align to the needs of smaller organisations. Smaller organisations may be suitable ‘test beds’ for the introduction of credentialing.
- New contractual models for the on-call rota are required that reflect the intensity and frequency of shifts more appropriately than current methods. NHS Employers and professional bodies should allow more flexibility regarding non-standard arrangements to support very small or remote hospitals and the networks in which they sit.

- All of the international examples we have examined recognise that providing care in rural and remote locations incurs extra costs for ambulance services and hospitals. These costs arise from both sub-optimal economic scaling of services and the basic cost of travel. NHS England and NHS Improvement should examine whether there should be a financial premium for small-scale or remote sites.
- Regulators and clinical senates should take a more critical and innovative approach to the application of standards. At present many standards have a relatively low level of evidence underpinning them. Furthermore, these standards have generally been developed for large hospitals and carry an assumption that hospitals are close to each other, which compounds the problem for the cases discussed here.
- NHS Improvement and other national bodies need to invest in change management to create new models, build functional networks and allow space and permission to experiment.

## 2 Introduction

Across England, millions of people rely on smaller hospitals as their first recourse in an emergency, their first source of specialist expertise when chronic conditions worsen, and their first choice for planned operations (Monitor, 2014b). But these hospitals are facing increasing challenges in delivering effective acute medical services in the context of growing patient numbers (Appleby, 2016), an increasingly complex case mix (Soong and others, 2015), workforce shortages (Gordon, 2017), changing societal expectations (The King's Fund, 2013) and severe restrictions in funding growth (Gainsbury, 2017). They cannot replicate the approaches to service delivery in larger hospitals, particularly solutions reliant on significant numbers of specialist doctors delivering care (Monitor, 2014b).

One option would be to close smaller hospitals, or rather, to close even more of them, many in England having already been closed over the past two decades. A number of local areas are proposing further closures of smaller hospitals as the route to securing financial sustainability. Others are proposing substantial cuts to services that might quickly lead to closures (Edwards, 2016).

Even if this were acceptable to the public, there are no strong clinical or financial grounds for doing so. Putting aside some highly specialist care, for which patients are already going to larger hospitals, there is little evidence to suggest that sending patients to ever-larger hospitals would improve outcomes or increase efficiency (Imison and others, 2014). Moreover, previous work has found few, if any, cost savings from hospital mergers (Gaynor and others, 2012). This is not surprising, given that the expense, let alone the risks, for transferring more severely unwell patients is substantial – the transfer of an average of 20 patients a day (half the average number of inpatients in a small medical unit) would cost £1.6 million per year.

The services that smaller hospitals offer are just one part of the picture. In many cases, they also play a central role in sustaining the wider local health system: coordinating other services and supporting general practitioners (GPs), community nursing teams and care homes. They provide much-needed

economic activity, which spills over into other areas of local life. Closing a smaller hospital can deny local people hundreds or thousands of job opportunities, in some cases triggering a cycle of economic and social impoverishment that may never be reversed (Wisher and others, 2016).

If closures are undesirable, the NHS needs to develop operating models that allow smaller hospitals to maintain a broad range of essential general services of a high standard at a reasonable cost. In acute medicine,<sup>1</sup> this means developing staffing and care delivery models that not only promise high-quality and safe care in theory, but are also affordable and can be implemented in practice.

This report brings together what we have learnt from a high-level review of the literature (see Appendix A), discussions with experts from a number of health systems in other countries (see Appendix B) and interviews with senior clinicians and managers in England, Scotland and Wales, many of whom have already developed partial solutions to the problems associated with smaller and rural hospitals. We have also drawn on insights from other ongoing research at the Nuffield Trust: our ‘Models of Medical Generalism in Smaller Hospitals: An Exploratory Study’, funded by the National Institute for Health Research.<sup>2</sup> The solutions presented in this report were developed through a series of three workshops using an expert group of medical directors, clinical directors, representatives from the Royal Colleges, public representatives and other key stakeholders.

Chapter 3 gives a profile of smaller hospitals, in terms of population served, activity and case mix. Chapter 4 unpacks the problems that they face and Chapter 5 describes the components that can be used to develop viable solutions for acute and emergency medical services that our group of expert advisers identified using their local experience and which we gleaned from our international and other research. We would emphasise that what we have

1 Acute medicine is defined by the Society of Acute Medicine (2014) as ‘that part of general (internal) medicine concerned with the immediate and early specialist management of adult patients suffering from a wide range of medical conditions who present to, or from within hospitals requiring urgent or emergency care’.

2 Results from this study hereafter noted as ‘Medical Generalism Study’.

drawn together is neither a 'blueprint for action' nor guidance. But we hope that it will act as a stimulus for local innovation and dissuade the thought that the reconfiguration of services is the only solution to staffing and other challenges posed by running smaller hospitals in an increasingly complex health care landscape. A number of policy changes and actions are required within local systems, across wider regional areas and, crucially, at the national level to facilitate a number of the more radical proposals in this report. These are considered in Chapters 6 and 7.

## 3 A profile of smaller hospitals in England

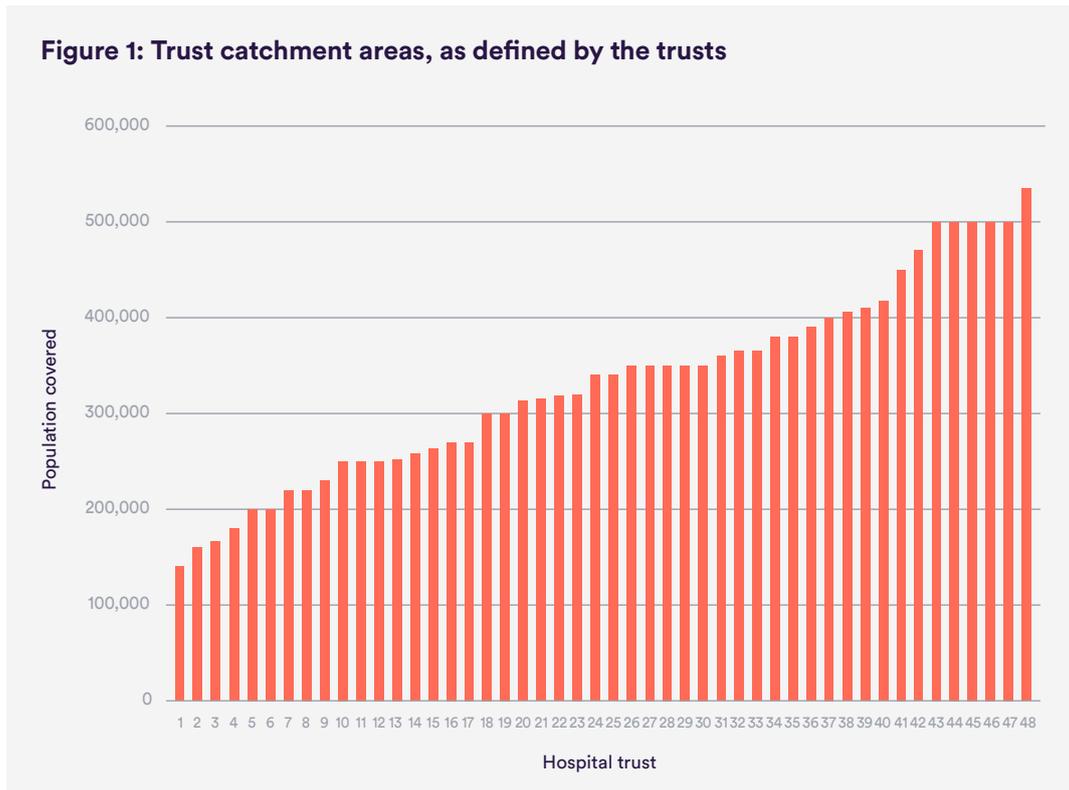
The average smaller hospital in England has around 400 beds (Monitor, 2014b). This is a large hospital by most international standards, with much hospital care across Europe (Paparella, 2016), North America (American Hospital Association, 2018; Statista, 2018) and the Antipodes (Australian Institute of Health and Welfare, 2017; Health Quality and Safety Commission New Zealand, 2017) being delivered by organisations with 100 to 150 beds.

The profile of smaller hospitals described in this chapter is derived from a recent Nuffield Trust survey of 48 of the 75 trusts that Monitor (2014b) classified as smaller in its review of smaller hospitals, as part of a larger piece of research funded by the National Institute for Health Research. It should be noted that our data were obtained largely from single-site trusts – involving 50 hospital sites as two trusts had two acute sites – and do not include the smaller hospitals that form part of many multi-site trusts.<sup>3</sup>

3 Monitor defined smaller organisations as having an operating revenue of under £300 million in 2012/13, with 75 trusts fitting this definition. This definition was updated for the purposes of the study to the same operating revenue in 2014/15, giving a sample of 69 trusts, most of which were single-site trusts.

## Catchment

The catchment populations for the surveyed trusts varies from 140,000 to just over 500,000 (see Figure 1). Of the trusts, 40% serve a catchment population of under 300,000.

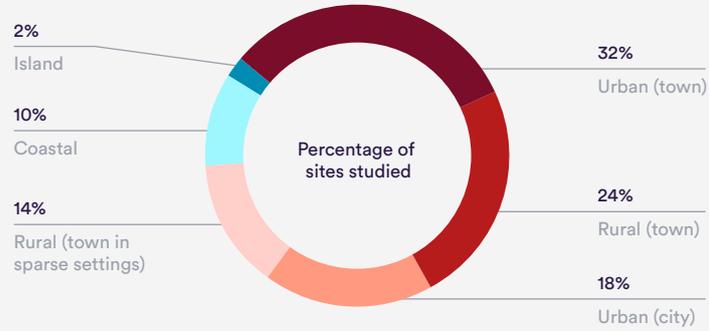


Source: Medical Generalism Study; trust websites

## Hospital setting and access

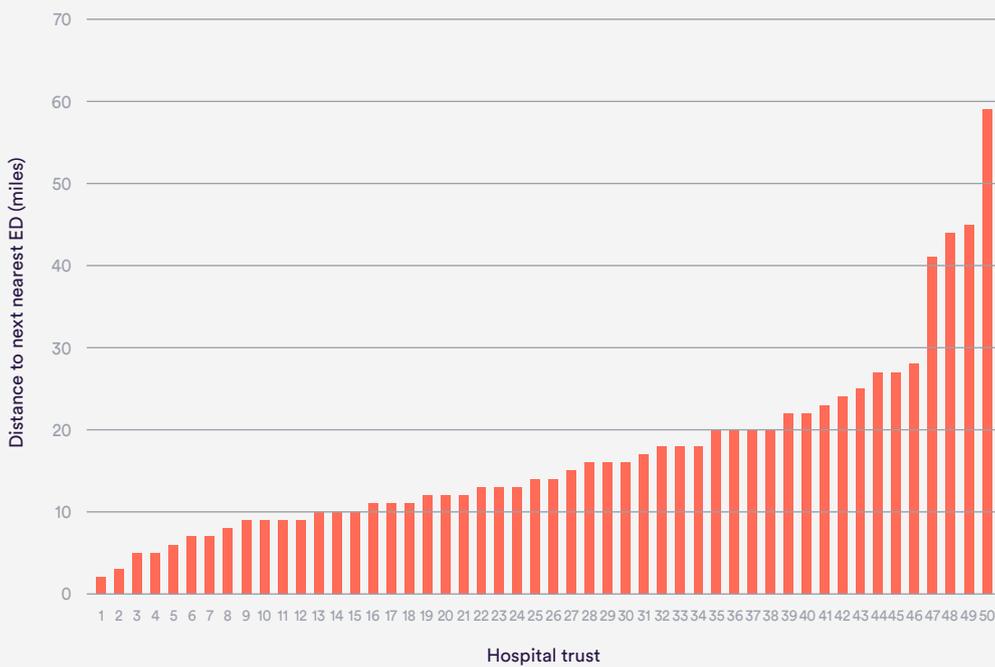
The acute hospitals surveyed serve a mix of urban and rural populations (see Figure 2). Meanwhile, the average distance from the acute hospital sites to the next closest emergency department (ED) is 17 miles. Half of the hospital sites are under 15 miles from their nearest ED (see Figure 3). Only four sites are more than 40 miles from their nearest ED.

**Figure 2: Hospital setting**



Source: Trust reports and Office for National Statistics

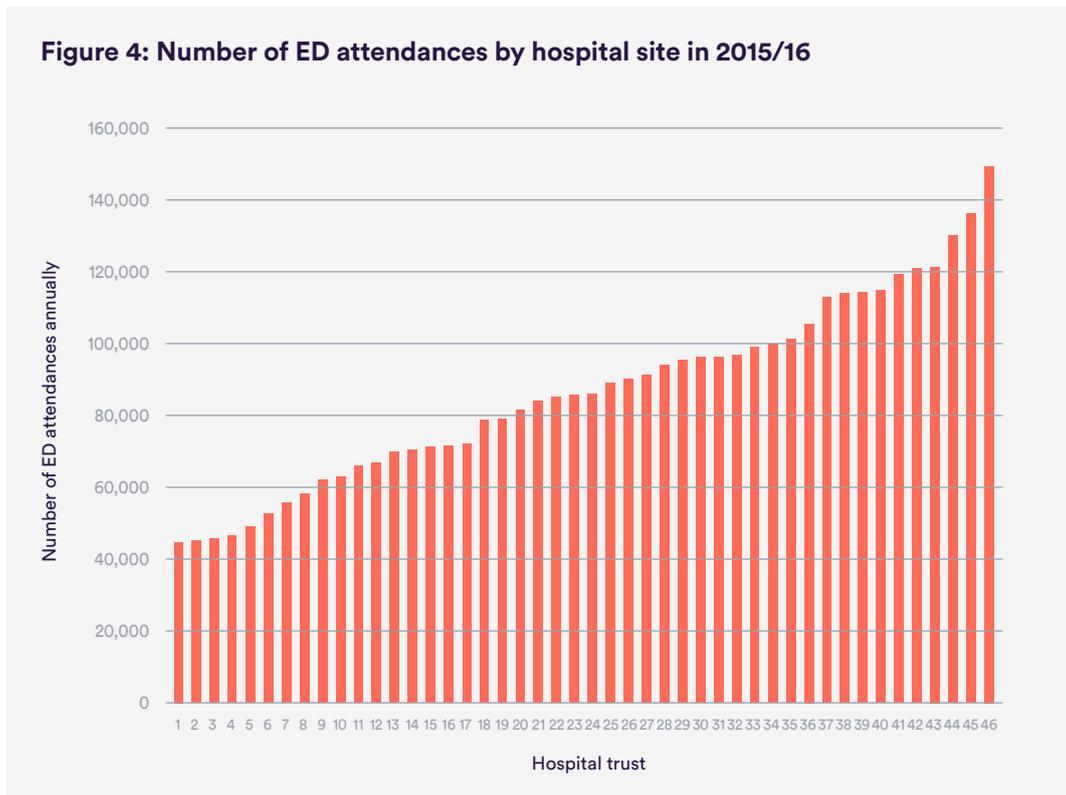
**Figure 3: Distance to next nearest ED**



Source: Monitor (2014b)

## Hospital activity

The level of ED activity in the hospitals varies, from just over 40,000 attendances a year to nearly 150,000 (see Figure 4).



Source: Medical Generalism Study; NHS Digital (2016)

On average, the hospitals have about 200 ED attendances a day and admit about 40 patients a day. Of these admissions, over 40% stay between zero and two days and very significant numbers, up to 45%, are seen and discharged on the same day they attend. Levels of admission as a result of GP referrals, as opposed to direct ED attendances, tend to be higher than the national average (Foot and others, 2010). There are relatively low levels of admissions at night. In common with our caseload analysis, their workload is dominated by the problems of old age and a significant proportion of respiratory problems.

## 4 Key problems

In interviews and workshops with senior clinicians and managers we explored the most pressing challenges facing smaller hospitals. There were several recurring themes:

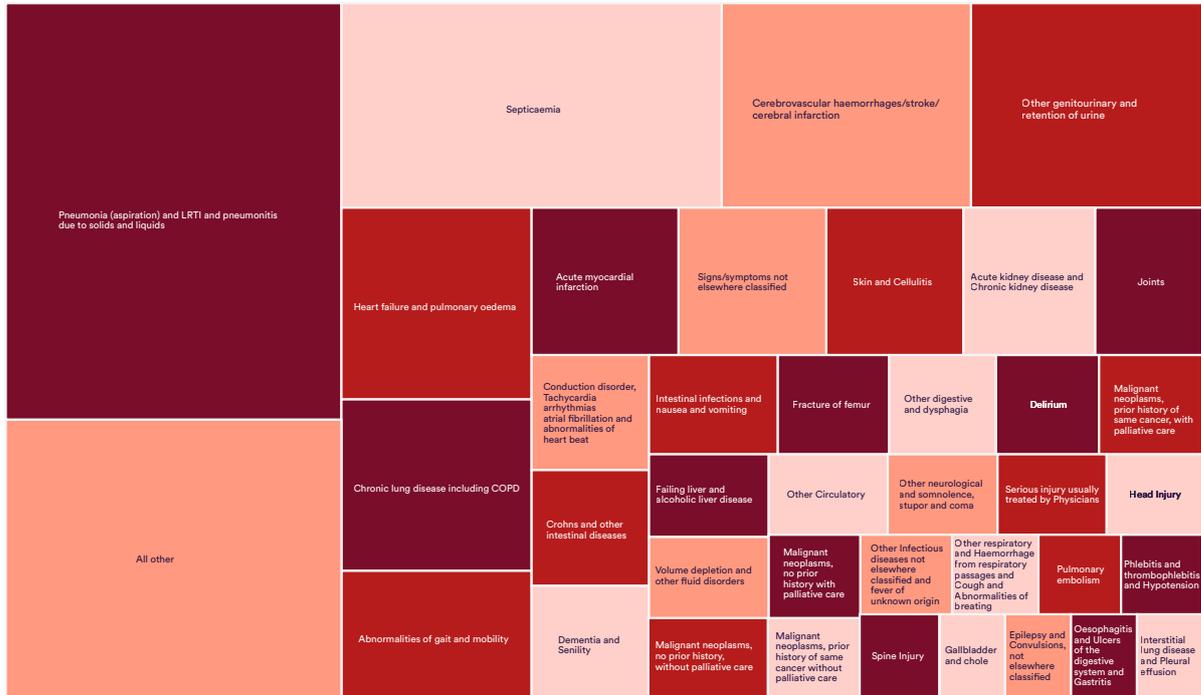
- a mismatch between patient need and acute service provision
- increasing service complexity
- insufficient staff with the right skill mix
- issues around the provision of safe services for patients with life-threatening conditions
- out-of-hours cover and the withdrawal of specialists from the provision of general medical cover
- changes to the role of clinical staff and job design
- delays in diagnosis.

Respondents consistently described how these factors combine to create a vicious cycle. Once hospitals become understaffed or models of care become fragile, work becomes more intense, and staff leave. This, in turn, leaves services dependent on locums and posts unattractive to potential applicants. The result is a toxic brew of chronic workforce shortages, deterioration in the quality of clinical services and spiralling costs.

### Patient need and service provision

Analysis of the workload of all 68 smaller hospitals in England found that over 40% of the acute medical workload in smaller hospitals is accounted for by just 10 diagnostic categories. Figure 5 maps out an analysis of patients in the acute medical beds of an average hospital. It is based on the 20 most common diagnoses among acute general medical patients in the 69 smaller hospitals in England (an average of approximately 240 occupied beds for acute medical care).

**Figure 5: Approximated use of occupied beds for acute emergency medical admissions (excluding short stay) for 2017/18**



Source: Medical Generalism Study; NHS Digital

Our analysis found that Figure 5 represents the case mix of many smaller organisations well. However, there is still substantial variation in case mix between the organisations we surveyed. In smaller hospitals in London, for example, 40% of acute presentations do not fall within the top 20 diagnostic categories, a likely result of differences in the age, ethnicity and patterns of hospital service use of their catchment populations.

However, descriptions of how services come to be set up suggested that the shape of acute hospital services tends not to be determined by the case mix of patient admissions at the system level – rather it is driven by service development at the departmental level, as well as a combination of other more complex financial and political imperatives. In more recent years, time-critical interventions for specific presentations (stroke, myocardial infarction and trauma) have led to a substantial reconfiguration of emergency services, even though patients with these represent only a small fraction (around 1 to 2%) of all ED presentations (Metcalf and others, 2016; NHS England, 2013b; Ramsay and others, 2015). Similarly, legitimate concerns about patient safety have led

to many services planning for ‘unusual’ emergencies rather than for the usual pattern of clinical work.

The delivery of clinical work within the hospital setting is complicated by the conflicting demands of routine ward work, with ward rounds conducted in the morning, and the pattern of emergency presentations, which increase from around noon to a peak during the evening. With the deployment of medical staff constrained by the working time restrictions, Health Education England and the current contracts, matching staffing to patient need is substantially more difficult in England than in other jurisdictions (Health Education England, 2016a; Independent Working Time Regulations Taskforce, 2014).

The nursing needs of inpatients have also changed substantially over recent years. Patients requiring hospital care are now older and have more complex conditions than ever before (Soong and others, 2015), while many patients who previously would have required inpatient care are now treated in so-called ‘ambulatory’ settings – settings where care is provided on an outpatient basis (Ambulatory Emergency Care Network, 2018). The substantial increase in the burden of nursing work has not been matched by an increase in the nursing establishment or by the provision of sufficient multidisciplinary services in many organisations (Nuffield Trust, 2017).

The inevitable result is a mismatch in most hospitals between the organisation of service delivery and the needs of patients across the entire care pathway.

## **Service complexity, variation and carve-out**

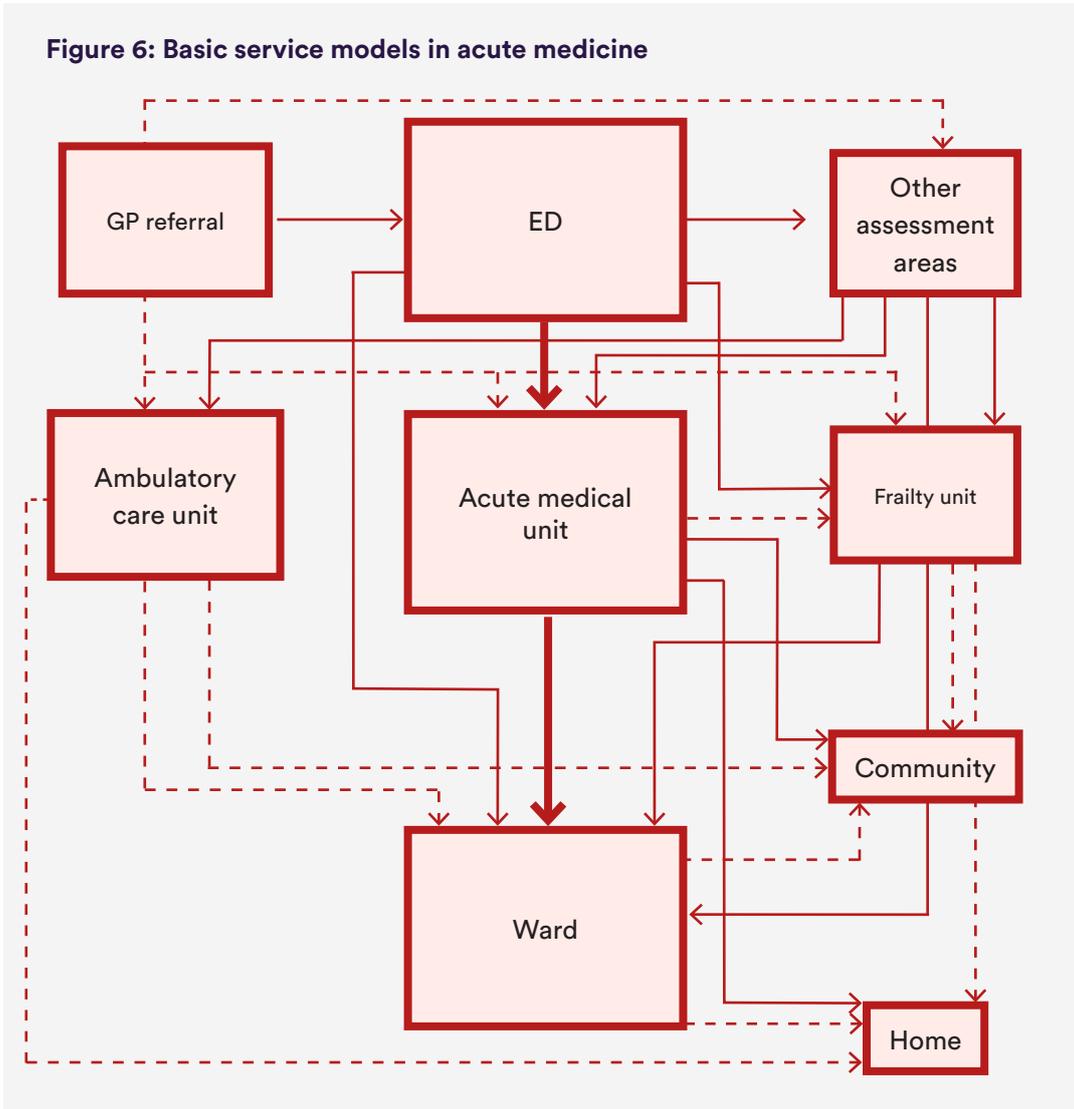
The hospital pathway for the acute medical patient has become increasingly complex over the past two decades, with services becoming fragmented into increasingly smaller delivery units – a process termed ‘carve-out’. The key reason for this has been the view that specialist services bring about better outcomes for patients, with service reconfigurations for conditions that require time-critical interventions, such as acute stroke and myocardial infarction, being considered as templates for all other hospital services (Imison and others, 2014). This assumption has neglected the fact that the vast majority of patients, while always benefiting from prompt treatment, do not have conditions that have a pressing need for care within a strict timeframe.

It has also ignored the fact that the tendency to segment patient flows may have unexpected negative consequences. For example, while the introduction of the acute medical unit (so-called AMUs) (Scott and others, 2009) – in which new acute medical emergency admissions are assessed and managed before being transferred to another ward, hospital or home – has led to improvements in patient safety, it has also increased the number of transfers between ward spaces and handovers between medical teams (a handover being the communication of essential information about the patient and the transfer of responsibility for patient care from one medical team to another). The picture has been further complicated with the introduction of ambulatory emergency care (often abbreviated to AEC) (Ambulatory Emergency Care Network, 2018) – same-day emergency care in hospital whereby patients are assessed, diagnosed, treated and able to go home on the same day – and frailty units (NHS England, 2014), both of which offer primary assessment (an initial assessment of a patient’s condition) and/or further care to pre-selected groups of patients.

Of the hospitals surveyed, no two have patient pathways that are alike. Moreover, pathways vary depending on the time of day and the availability of beds. There are significant differences in:

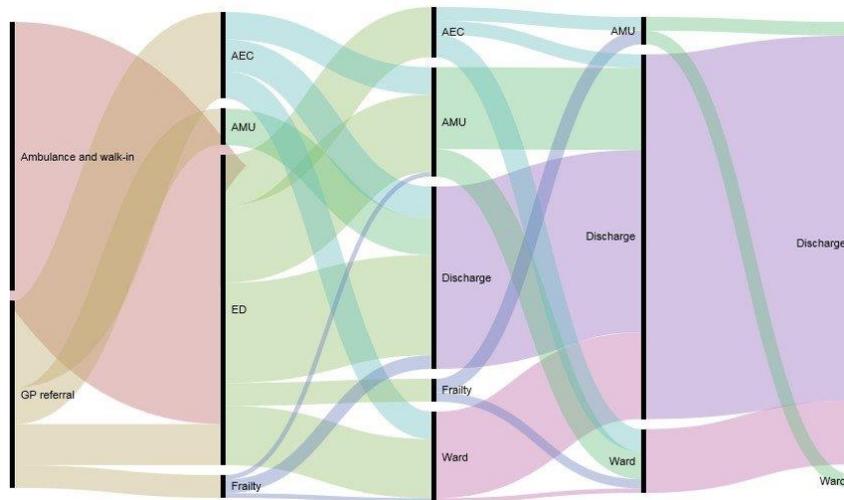
- where acute medical problems are assessed and treated
- the capacity to access a specialist opinion – at all points in the pathway.

Figure 6 sets out what a typical acute medicine service looks like and gives an indication of the extent to which services have been carved out and potentially fragmented. It appears that some of the processes, units and approaches that have been adopted have been driven by the requirements of the four-hour A&E waiting-time target – that 95% of patients attending the ED should be admitted, transferred or discharged within four hours – rather than by optimal patient flow and patient experience. The complexity introduced by having multiple, parallel places for initial patient assessment is shown in Figures 6 and 7.



Source: Medical Generalism Study

**Figure 7: Sankey diagram of patient flows in a medium-sized district general hospital**



Note: Sankey diagrams represent flows and transfers through complex systems. The width of the bars is proportionate to the flow quantity.

Source: Medical Generalism Study

In hospitals where patients flow through multiple sites of service provision, such as from the ED to the acute medical unit to the short-stay ward and then on to a so-called ‘downstream’ medical ward, there may be as many as five handovers during a single hospital stay .

Interviewees said that the problems relating to these increasingly complex patient flows were exacerbated by the maintenance of frequently unhelpful divisions between acute medical services and related services, such as the ED and critical care.

As well as fragmentation of the patient pathway, there is also considerable variation across hospital sites. For example, although every hospital in our study has an acute medical unit or equivalent, they vary substantially in almost every aspect of organisation and function:

- In terms of the number of beds, 10% of units have fewer than 20 beds, 52% have 20 to 40 beds and 38% have more than 40 beds.
- While all units have a primary assessment function, some incorporate a short-stay function; in others, this is delivered in a separate short-stay ward.

- The maximum length of stay varies from eight hours (in one site) to over 72 hours (in 50% of sites). Seven sites describe a length of stay of four to five days.
- Patient need determines length of stay in just over 70% of sites. Bed capacity in downstream wards is the key driver in 20% of sites.
- A combination of acute physicians and specialty physicians provide most consultant medical cover, with substantial variation in the level of specialist input into the acute take (the cohort of patients whose needs are such that they require acute medical care). In a small number of units, acute physicians provide cover on their own. Four organisations have no acute physicians, with all care of acute patients delivered by specialists acting as general physicians.

There is also substantial variation in the movement of patients from the acute medical unit to the downstream medical wards and how these patients are cared for once there:

- Of the sites, 70% try to allocate patients to a specialist ward that has the best fit with the patient's main problem.
- Meanwhile, 36% said that ward pressures mean that patients have to go to 'any available bed', regardless of operational intention.
- Only 12% of sites have patients being managed by a named consultant regardless of their location within the hospital.
- 'Consultant of the week' and 'consultant of the day' are the two main models of consultant cover on the 'downstream' medical wards. Only a handful of hospitals have consultants providing ward cover for periods longer than a week, meaning that discontinuity of care is the norm.
- Even within an individual hospital, ward cover arrangements are not consistent and vary by service.

Similarly, no two ambulatory emergency care services are set up in the same way, with wide variation in:

- cover (hours) – not all operate during evenings or weekends

- cover from whom – for example, nursing versus medical staff and the seniority of medical staff
- services offered – for example, whether offering ‘hot clinics’ (where appointments for review are available within 1–2 days) for particular specialties
- referral routes – for example, whether GPs or wards refer patients to these services.

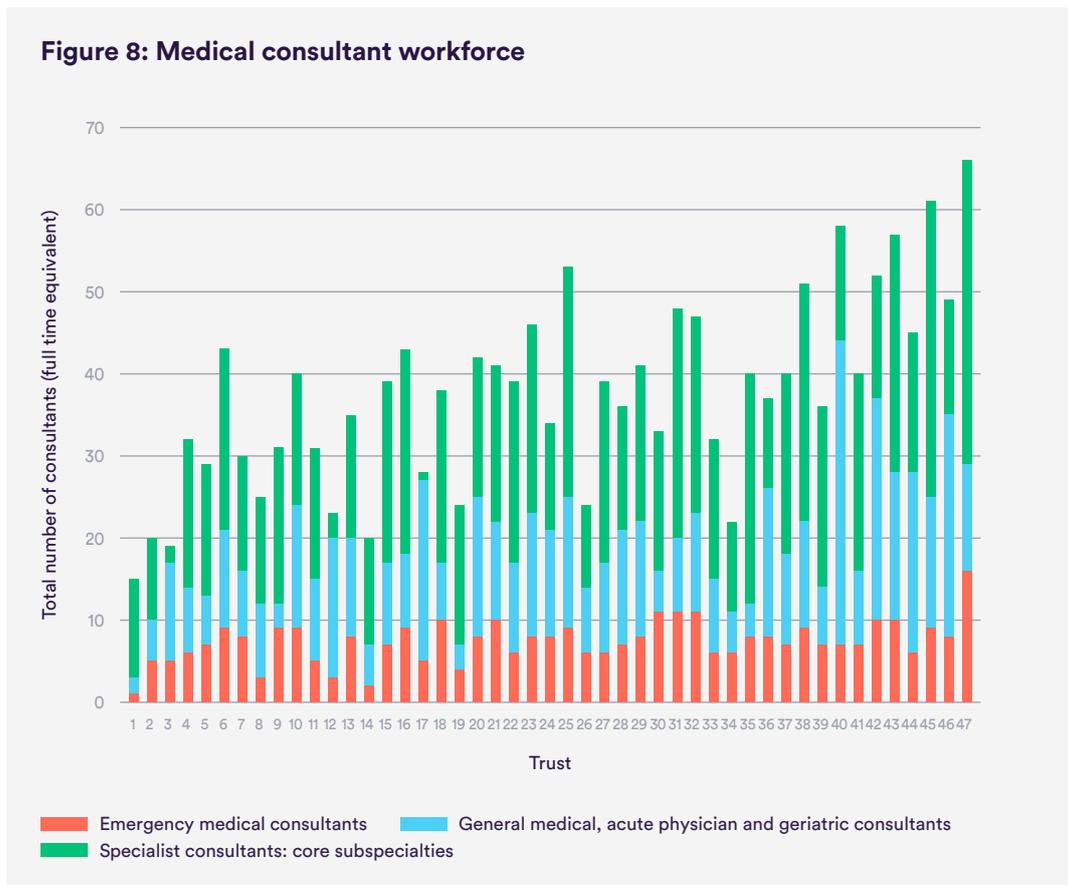
The same applies to frailty services, where there is little or no consistency in terms of how they were set up, oversight and whether there is any multidisciplinary team input.

When services are arranged in these ways, it becomes increasingly difficult for smaller hospitals to make efficient use of scarce doctors and nurses. Each individual service demands that staff need to be in work or on call, racking up costs and making roles unsustainable. With staff stuck in their silos, it is harder to deploy them flexibly when there are fluctuations in demand. Most astonishingly, an approach that has been developed specifically to ensure that particular patients receive specialist support often contrives to deny that. As soon as a small frailty unit is full, for example, older patients may have to be placed in other parts of the hospital without any access to frailty expertise. Niche services that appear to have benefit in larger organisations may backfire spectacularly in smaller hospitals, particularly when introduced without additional staff or resources.

The fact that service labels mask almost infinite variations in the hard reality of care provision makes the diagnosis of problems at the hospital system level difficult and the broad prescriptions at the policy level virtually impossible.

## Staffing challenges

The core disciplines that manage the flow of acute medical patients are the emergency physicians, acute physicians, general medicine consultants, geriatricians and the core medical sub-specialties. As NHS Digital data shows, for the hospitals we surveyed, there is a four-fold variation in the number of these consultants, from 15 to 66 (see Figure 8).

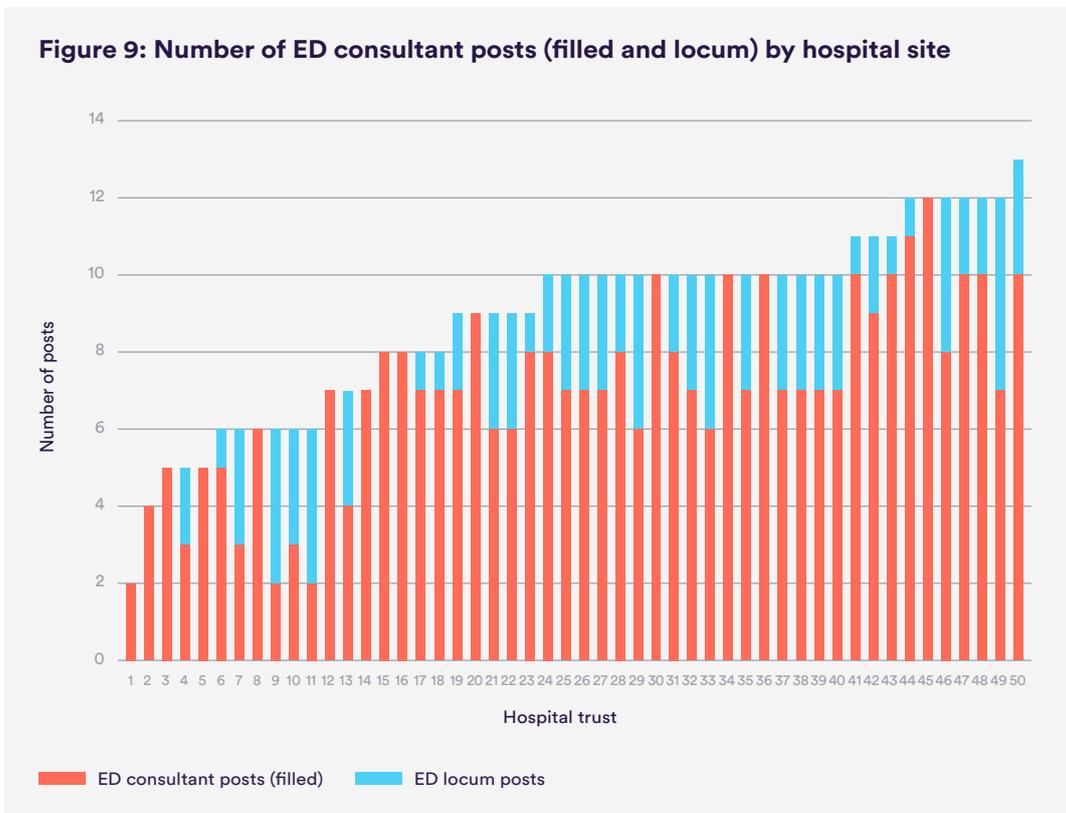


Source: Medical Generalism Study

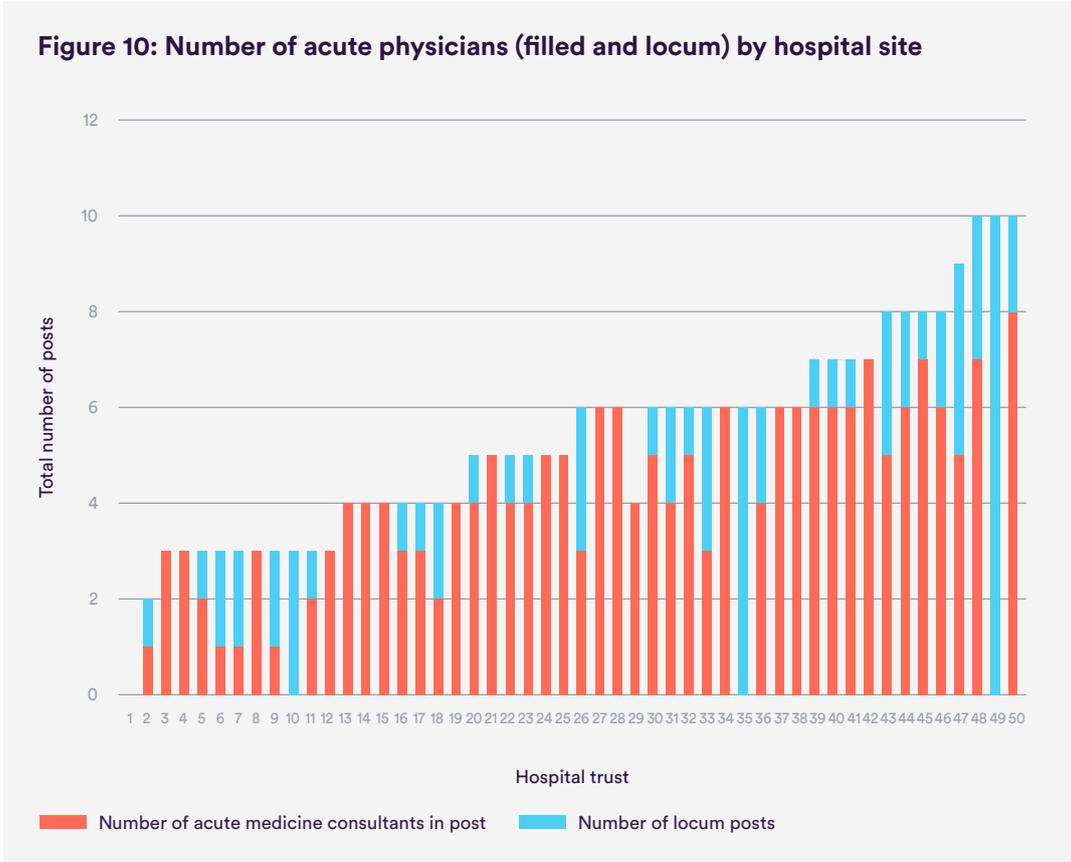
Interviewees and the literature both describe the particular difficulties that smaller hospitals face in attracting key staff, particularly consultants, which is even more of a problem when they are located in isolated or deprived parts of the country. Interviewees report that they are also last in the pecking order for trainee doctors. They face particular difficulties in meeting the staffing levels and separate rotas that external regulators require (NHS England, 2013a; The College of Emergency Medicine, 2015), especially given that they receive the

same funding per head for much smaller patient volumes (Monitor, 2014b). The staff they do have are working under high pressure, with the associated problems of burnout and rapid turnover, making recruitment and retention even harder. They also sometimes have problems accessing specialist support where needed from larger hospitals.

Smaller hospitals are highly reliant on locum staff (see Figure 9). In our study sample, two sites are entirely dependent on locum staff to fill their acute physician posts, with a further seven sites reporting that more than half of their acute physicians are locums (see Figure 10).



Source: Medical Generalism study



Source: Medical Generalism study

The problems faced in filling junior medical rotas are particularly acute. We found that 80% of sites are having difficulty ensuring junior doctor cover for the medical take, with middle-grade and sickness cover highlighted as particular problems:

---

**“There are three to four gaps in the middle-grade rota. We have had nights where there is no middle grade in the hospital.”**

---



---

**“It’s a nightmare. There’s been an imbalance of junior doctors from teaching hospitals and district general hospitals for a long time.”**

---

## Provision of safe services for patients with life-threatening conditions

The extent to which smaller hospitals are able to deal with conditions that may need urgent intervention (namely gastrointestinal bleeding, acute abdomen and vascular emergencies) creates substantial anxiety around patient safety. The reflex response has been to either substantially increase the number of staff to provide 24/7 coverage that is compliant with the European Working Time Directive – which reduces the number of hours that people can work to around 48 hours and sets out regulations on break periods and holiday entitlement – or to move services entirely to other hospital sites (Heart of England Foundation Trust, 2014; Imison, 2018). Both responses place considerable financial and other burdens on smaller hospitals because of higher staffing costs for the former and the expense of transfers combined with loss of income for the latter. Interviewees described how both of these strategies destabilise staffing arrangements, as specialists withdraw from the generalist rotas to provide 24/7 cover for their own services or support networked arrangements. As noted in the literature, the gains from this for some types of cases remain unclear and may not be beneficial in terms of costs (Imison, 2014). There has also been a reluctance to implement mixed systems, whereby interventions can be provided during extended working hours, with a switch to a networked model overnight (that is, midnight to 8am), due to concerns about patients becoming ‘stranded’ without access to appropriate care.

In the case of both emergency surgery and upper gastrointestinal bleeding, the number of patients who would require transfer to another hospital overnight and/or intervention is very small. In the case of emergency abdominal surgery, only 8.5% of patients in the last National Emergency Laparotomy Audit (NELA) arrived in theatre after midnight, meaning the proportion presenting acutely after midnight is well below this (National Emergency Laparotomy Audit, 2017). Further, only a small proportion of cases initially tagged as medical need to be transferred under the care of a surgeon and very few of these actually require a surgical intervention – less than 0.7% of acute medical admissions were transferred from medical specialities to general surgery. This suggests that a robust initial sorting process can be very effective. Similarly, although 19% of patients with acute

gastrointestinal bleeding presented after midnight in a national survey of emergency endoscopic provision, only 3% required immediate intervention (Hearnshaw and others, 2010). This means that for a catchment population of 250,000, only around 10 patients a year would be expected to need urgent endoscopy after midnight.

## **Models of out-of-hours cover and the withdrawal of specialists from the provision of general medical cover**

The expectation that specialists should provide dedicated 24/7 cover for their own specialty has led to their withdrawal from the acute general medical take, as noted above, and this has exacerbated problems with the complexity and fragmentation of services. The assumption was that the resulting gaps would be filled by acute physicians and/or geriatricians. However, with over half of all advertised consultant posts in acute medicine and geriatrics remaining unfilled due to a lack of suitable applicants (Gordon, 2017), fewer consultants are managing a workload that is growing relentlessly in size and complexity.

Among our study sample, the number of consultants on out-of-hours rotas for acute medical patients varies from fewer than 10 to more than 25. The main specialties contributing to this cover are respiratory (90% of sites), endocrinology (86%), geriatrics (84%), gastroenterology (65%) and acute medicine (65%). A significant number of sites have recently experienced specialties withdrawing from out-of-hours rotas. These include cardiology (40%), rheumatology (33%) and stroke (17%).

## **The role of clinical staff and job design**

The changes to the flow of patients through the hospital system have had a substantial impact on how consultants work in smaller hospitals. Historically, the majority of patients who were admitted to hospital remained under the care of the general medical consultant under whom they were admitted, regardless of their location within the hospital. Only a small proportion of

patients with particular needs were admitted to specialty-specific beds (such as coronary care), with their care transferred to the relevant specialty team.

The development of the acute medical unit as the preferred model for managing the acute medical take has meant that hospitals have had to rethink how patients' needs are met once they leave the unit and how the total burden of care is distributed among medical teams. Our study and interviews found that a dominant trend has been towards 'closed' specialty wards, whereby patients are sent to the ward that best fits with their primary medical condition and a single specialty team delivers care to all patients on that ward; for example, patients with a sudden worsening of chronic obstructive pulmonary disease (COPD) symptoms would be transferred to the respiratory ward. Where it is not possible to link patients' clinical needs with the disease of a single organ they tend to be termed 'general medical' patients and assigned to any medical ward, based on bed availability. This model effectively solves the problems created by having general medical patients in beds that are away from the nominated general medical base ward and distributes them on a relatively equitable basis throughout the hospital.

However, the closed specialty ward is generally coupled with a 'consultant of the week' model of providing consultant cover, which creates its own problems. First, interviewees described general medical patients as often being de-prioritised, or even ignored, in favour of patients with clearer specialty needs, driving up length of stay. Second, the model also implies that when a patient moves between wards, there is a change of medical team, leading to further discontinuities in care. Third, the work required by the incoming consultant on handover day (usually a Monday) to become familiar with a whole ward of patients they have not met before is considerable and appears to create disruption, confusion, dissatisfaction and protracted hospital stays where there is substantial variation between the approaches and practices of individual consultants. Finally, many hospitals bundle up other tasks, such as consultations, out-of-hours on-call cover and responsibility for teaching and training, into the on-call week, making the period of being 'on the ward' onerous and fuelling further disengagement from acute work.

These problems are exacerbated by the moves towards shift-working for all junior and middle-grade staff, meaning that patients are rarely cared

for by stable and consistent teams (Ahmed-Little, 2007; Chaudhuri and others, 2013).

The implications of these multiple handovers and lack of team stability are profound: the avoidance of responsibility, duplication of work and loss of accountability appear to contribute to chronic bed shortages for the hospital, less satisfying work for staff and poorer experiences and outcomes for patients.

## Delays in diagnosis

Interviewees identified some significant concerns relating to the initial assessment and diagnosis of patients. In many places, relatively junior staff are responsible for patients' initial assessment, leading to avoidable delays in reaching a diagnosis or developing a management plan and, in some cases, to lengthy detours before patients eventually reach the service that is appropriate for them.

Staff are often unable to order rapid diagnostic tests, obtain quick advice from specialist colleagues and access specialist support from other hospitals, leading to further delays. In some cases, patients wait in hospital for days before a senior doctor makes a decision about their care, before the appropriate diagnostic tests are ordered or before they are moved to the right ward.

# 5 Developing viable models of acute medicine – potential solutions

In this chapter, we consider potential solutions to the problems that acute medicine in smaller hospitals faces. We also describe some of the core principles that need to underpin any model of care. These include:

- creating services that match the needs of the local community
- bringing acute services closer together and eliminating carve-out
- improving access to diagnostics
- supporting non-medical staff to extend their skill set
- redesigning critical care
- making clinical networks and models of ‘treat and transfer’ more effective
- integrating with community services.

It is important to stress that the different layout and staffing of smaller hospitals, and the different imperatives to sustain patient access, mean that there is no one definitive model for a sustainable service and that specifying a single model is neither necessary nor helpful. A key message from our work is that there are a number of ways to construct a viable model and the main components of this are set out below.

## Matching services to the needs of the community

The core principle underpinning all of what follows is the imperative to create services that meet the needs of the local community. While this is not

a panacea, ‘right sizing’ services is critical to eliminating inefficiencies in the system, ensuring better care for patients and creating a better and less stressful working environment for staff.

This demands a deep understanding of the local patient population at many levels to best deploy potential solutions. This may include, for example, a review of:

- the local population’s use of hospital versus GP services to determine whether GP services should be included in the ED’s footprint
- who the most frequent users of the ED are to plan case management strategies
- ED presentations over 24/7/365 to determine staffing levels
- the occurrence of life-threatening conditions to plan interventional provision
- ED and medical admissions to plan acute hub provision
- overnight activity to determine ‘Hospital at Night’ provision
- the resources required to make a primary diagnosis
- the resources required: either to identify whether patients are at a high, medium or low risk of an adverse event and prioritise the management of their care to prevent poorer outcomes (called ‘risk stratification’); or to complete the diagnostic process, for example, echocardiography, coronary angiography for patients presenting with non-ST-elevation myocardial infarction (NSTEMI) or computerised tomography coronary angiography (CTCA), allowing patients to be discharged with a final diagnosis as quickly as possible
- the generalist versus specialist needs of medical inpatients to plan consultant patterns of working
- the nursing needs of inpatients to plan nursing staffing
- the rehabilitation and other social requirements of patients to plan ‘allied health’ provision, which is distinct from medicine, nursing and pharmacy – for example, occupational therapy, physiotherapy and speech and language

- problems underpinning delayed transfers of care
- critical care provision.

While many hospitals are vigorously looking at these in a data-driven fashion, this is almost always done at the service level, rather than at the hospital level, further contributing to problems with carve-outs and unintended consequences. It is only by taking a whole-systems approach that coherent services that meet patients' needs and make the best use of staff can be developed.

---

### Case study example based on data from one site

- On average, 38 patients are transferred to medical specialties a day.
  - There are 1.7 or more critical care admissions a day.
  - There are nine or more occupied critical care beds a day. This is higher than the average as the hospital has more critical beds than a number of others, the latter therefore managing these patients in other ways.
  - Up to four patients a day admitted to medicine are transferred to other hospitals. The most common reason for this is neurosurgical diagnoses.
- 

## The acute care hub

Our expert stakeholders strongly supported the vision of an acute care hub that the Future Hospital Commission (2013) has laid out. Hospitals should aim to establish an acute care hub that would bring together the clinical areas of the medical division that focus on the initial assessment and stabilisation of acutely ill medical patients. These include the acute medical unit, the ambulatory care centre, short-stay beds, the intensive care unit and, depending on local circumstances, the ED. The hub would focus on patients likely to stay in hospital for less than 48 hours, and patients in need of enhanced, high-dependency or intensive care. It should be sized, staffed and resourced in accordance with the population served in terms of demand, case

mix and emergency provision of relevant services. The ambulatory care centre should be designed as a sophisticated outpatient department with seated waiting areas, consulting rooms and facilities for procedures.

The physical layout of the hospital may impose constraints. Ideally, close proximity to or the blurring of physical boundaries with the ED is desirable as this would allow the assessment area to flex during peak periods. As noted below, smaller hospitals might be advised to treat ambulatory care as a process rather than a separate physical location or team.

To make the best use of limited staffing resources and to reduce the number of moves that patients have to make, patients should ideally remain in the initial assessment area until a diagnosis has been established and/or the patient is clinically stable enough for transfer. Patients with a clear need for specialist care would benefit from going directly to the appropriate specialist ward. Patients whose presentation and/or need for specialist care remains ‘undifferentiated’ after an initial period of assessment (i.e. a formal diagnosis has not been made and the cause of presentation remains unclear) as well as patients who need a concentration of resources (for example, rapid access to diagnostics, higher levels of monitoring or greater intensity of multidisciplinary team input) would benefit from being grouped together. Many of these patients will have a length of stay of fewer than two to three days. For patients with a longer length of stay, disruptions to continuity should be minimised and moves should be based on patient need. Such a system would improve continuity of care, reduce harms and minimise the disruptions associated with frequent patient moves.

Hospitals may also consider incorporating acute surgery into the acute care hub. The investigative pathways and care needs of many acute surgical patients are similar to those of medical patients. In smaller organisations, the number of acute surgical presentations is fewer than five a day (National Emergency Laparotomy Audit, 2017) and having acute medicine and acute surgery located in the same place is likely to be more efficient than establishing a separate acute surgical unit.

## Initial patient assessment and rapid streaming

At all times, a thorough, single initial patient assessment and formulation of a formal management plan should be carried out as this will reduce delays and avoid unnecessary duplication (The Health Foundation, 2013). The management plan should ideally include:

- the patient’s provisional diagnosis and/or a comprehensive problems list
- a formal assessment of the patient’s risk of having an adverse event
- a clear indication of what needs to be done to ensure patient safety
- an indication of the level of monitoring required
- an escalation plan if the patient deteriorates.

Care is enhanced if essential treatments are initiated as soon as possible and any additional tests are ordered immediately, rather than deferred (Levy and others, 2010; Strömberg and others, 2007). This should then be followed by a review by a senior clinician (but not necessarily a consultant) to confirm the care plan.

Particularly at peak times, patients may also benefit from a ‘streaming’ assessment – where patients rapidly have their needs assessed before being allocated to appropriate ‘flow’ for further assessment – within minutes of arrival, undertaken by a senior decision-maker (Abdulwahid and others, 2016). This may be a doctor, nurse or other advanced practitioner, but staff undertaking the assessment will require appropriate training and sufficient clinical experience. Streaming should include the rapid ordering of initial investigations and access to those tests that will help improve the management of the patient. Problems with access to CT (computerised tomography) scanning is often a significant constraint (Rogg and others, 2017).

While 24/7 streaming is the ideal, it should be noted that it may be less useful in organisations that are not particularly busy overnight. For example, in very small hospitals, where an average of one to two patients present each hour between midnight and 6am, assigning a staff member solely to a streaming role may not be efficient. That being said, working to avoid unnecessary delays to patient care overnight remains critical to healthy departmental functioning.

## Ambulatory care

There has been a trend recently to create separate areas and staffing models for ambulatory treatment (NHS Improvement, 2018b). While there is strong support for the concept of providing ambulatory care for appropriate patients, the creation of physically distinct units in relatively small hospitals can be problematic.

Our expert stakeholders were clear that ambulatory care needs to be considered as a set of *processes* focused around the delivery of timely patient-centred care, rather than the development of a service with tight boundaries. This means that in smaller organisations that do not have sufficient staff to provide identical assessments in three separate places (ED, the acute medical unit and ambulatory emergency care), they can still carry out ambulatory care processes within the ED and/or the acute medical unit. The development of pathways for specific conditions that incorporate rapid access to diagnostics, prompt treatment and mechanisms for safety-netting patients with back-up plans that are applicable regardless of the care setting would be useful.

In larger organisations, ambulatory care can be an ideal environment for the development of the extended skill set of non-medical staff (see below), particularly when there has been investment in the development of patient care pathways (Chan and others, 2018). This can further free up medical staff to concentrate on more unwell patients.

## Frailty

There has been a similar drive to create separate frailty services (NHS Improvement, 2018a), creating further carve-outs at the front door of the hospital. Moreover, our interviews and study suggest that many frailty services are too small – for staffing or space reasons – to be able to provide services to all those who need them. The incorporation of multidisciplinary team assessment and comprehensive geriatric assessment into a unified assessment process within the ED/acute medical unit to create a service that is frailty-friendly would be a better solution than separate frailty assessment units. When combined with rapid access to social services, patients who are able

to be cared for in places other than the acute hospital could be transferred there rapidly, while patients who require longer-term inpatient care could be admitted directly to the appropriate ward (for example, a general medical, specialty or geriatric rehabilitation ward). The provision of adequate multidisciplinary and social services in *all* downstream medical wards is essential to preventing loss of patient function and ensuring timely discharge. In hospitals where the medical take is very heavily dominated by older and/or frail patients, ensuring that the whole patient pathway is geared towards meeting the needs of these patients is likely to be the most effective approach. As with ambulatory care, avoiding carve-out and pooling staff resources helps to create systems that are more robust.

## Cover for ‘front-door’ medical services

‘Front-door’ medical services are currently provided by four groups of clinicians: emergency physicians, acute physicians, general physicians and geriatricians. In most places, the provision of care to acutely unwell patients is also supported by intensivists (working in intensive care units) and surgeons. Despite professional boundaries, these doctors have a common ability to offer appropriate immediate treatment and management to the acutely unwell patient (Album and others, 2008). However, the prevailing norm is for each specialty to create rosters independent of any other team. Rosters are also often structured around the ‘standard’ working day, rather than looking to match times when there is patient demand. This means that even hospitals that are staffed relatively well overall can still find it difficult to manage the front door, especially during the busy evening period (Subbe and others, 2015).

In smaller hospitals that are struggling with limited numbers of consultant staff, one solution is to pool clinician capacity and adopt a more interdisciplinary approach to the front door. Our expert group suggested two possible options:

- the merger of acute medicine, ED and/or geriatric rosters to provide medical assessment cover during extended hours
- the merger of ED, intensive care unit, trauma (+/-acute medicine) rosters to cover out-of-hours emergencies (midnight to 8am).

The success of any workforce reconfiguration along these lines would be heavily dependent on having cover arranged by task/job rather than by specialty. This, in turn, would require:

- a deep understanding of the requirements of local service provision
- looking at the skills, expertise and limitations of individual clinicians
- support from other professional groups with key skills, such as GPs, advanced nurse practitioners and physician associates
- drawing up rosters – which may be highly complex – that make sure that practitioners with the necessary skills are available at all times to ensure patient safety, alongside robust systems for accessing expertise
- increasing the skills of existing staff rather than hiring additional staff (see below)
- negotiating best practice/pathways for common and/or life-threatening conditions, reducing variability between individual clinicians
- easy access to specialist advice from local consultants during standard hours and networked/centralised support out of hours.

Where possible the service should be designed on the basis of:

- the creation of stable teams
- maximising patient contact time for senior staff (the thinker:doer ratio)
- balancing the intensity and the frequency of on-call care
- sharing on-call care with neighbouring organisations.

Consultant working would need to be supported by appropriate input from multidisciplinary staff, access to comprehensive geriatric assessment, and social care and mental health services. This would require some ‘cross-training’ of staff (whereby staff learn skills for tasks that are beyond the remit of their current professional role) and the development of a cadre of specialists with extended skills. Such a model would also rely on acutely unwell patients being grouped together, as outlined in the Future Hospital Commission’s (2013) report.

## Gastrointestinal bleeding, acute abdomen and vascular emergencies

Smaller hospitals should continue to provide 24/7 interventional services wherever possible. Where they cannot, we propose that mixed models – a combination of ‘traditional’ on-call care during extended hours and ‘treat and transfer’ care overnight (midnight to 8am) – should be explored and supported. Out of hours, the assessment of patients presenting with symptoms suggesting that their condition may require intervention could be initially managed and investigated by a senior clinician, supported by ready access to a CT scan and remote specialist advice. Patients who need an intervention would then be transferred as quickly as possible.

Concerns around alternatives to 24/7 emergency surgery cover relate to the possibility of incorrect diagnoses and the safety of networked arrangements (Kaplan and others, 2007; Royal College of Surgeons, 2011). However, the number of patients presenting to a medical specialty who then require surgical management is relatively low. Nationally, we calculate that the proportion of patients transferred to general surgery after emergency admission to a medical specialty is less than 1% and the number of these patients subsequently having an operative procedure is very low (NHS Digital data). This suggests that decision making at admission with regard to diagnosis and disposition is very accurate.

Also, the findings of the National Emergency Laparotomy Audit (2017) suggest that networked arrangements can provide high-quality care for patients, so long as pathways both within and between hospitals are sufficiently integrated and robust and healthy working relationships are fostered (Royal College of Surgeons, 2013). Moreover, the impact of transferring all patients requiring a certain intervention from a smaller hospital to a larger one is rarely considered. For example, transferring all patients with abdominal pain would threaten the long-term viability of the smaller hospital, as well as creating significant issues for the receiving unit and the ambulance service (Mansha and others, 2012; Mohr and others, 2016; Rural Health Advisory Committee, 2011).

A key challenge to staffing smaller organisations is the relative mismatch between the number of consultants required for routine daytime work and the demands of providing 24/7 cover for key life-saving interventions (Royal College of Surgeons, 2007). If more distinction were to be made between the frequency and the intensity of on-call arrangements, this may create more flexibility (Royal College of Physicians and Surgeons of Canada, 2013). Smaller hospitals are likely to benefit from arrangements where specialists are frequently on call but the overall number of call-outs is relatively low. Mechanisms should also be sought that would encourage consultants, especially interventionists and subspecialists, to be on more than one on-call or on-take rota. This would ensure the provision of high-quality networked services across hospitals, bolster acute/generalist services within hospitals and reduce reliance on locums. Current payment models do not support these types of arrangements and alternatives need to be explored urgently.

## Inpatient care: supporting continuity

The importance of the continuity of care (Pereira Gray and others, 2018), particularly at consultant level, emerged in the workshops our expert group took part in and in our international interviews as being integral to the delivery of high-quality care and maintaining patient flow.

As yet, there is little research to suggest which models of consultant working might deliver better results for both patients and staff than others (Sabin and others, 2014).

However, there was support from the workshops for two potential models of consultant working:

- **A return to generalism.** In this model, the general medical consultant of the day would retain ownership of *most* patients, with the exception of those with clearly specialist needs. Downstream wards would be reconfigured as predominantly general medical wards. Because of the risks posed by a team's patients being distributed across multiple wards, such a system would be more likely to be successful in hospitals with a smaller bed base and/or those that are spread out over a smaller geographical area. The risks posed by having outlying patients (Lepage and others,

2009; Stowell and others, 2013) could be minimised by highly active bed management, clear agreements about the ownership of patients on outlying wards and ‘buddy systems’, where medical teams share junior staff during particularly busy times. Arrangements where junior doctors are assigned to wards, rather than to consultant teams, would also be worth considering. The success of this model would also be based on specialists providing highly responsive consultant services (same day) and specialists contributing blocks of time to general medicine.

- **Maximising specialism.** In this model, patients with clearly specialist needs would be triaged and referred to the appropriate team as quickly as possible, regardless of their predicted length of stay. While this would increase the number of patients cared for by any individual team, the burden of work would be markedly offset by the involvement of more than one consultant on a daily basis, as the consultant:patient ratio would be lowered from 1:30–40 to 1:10–15. The need for senior input on a seven-day basis could be met by focusing attention on new patients and those who are very unwell; other patients could be managed by other clinical staff according to an agreed plan. Concerns about the impact of this model on outpatient work could be mitigated by starting ward rounds at 8am and marginally shifting the start times of clinics/interventional lists to accommodate short morning rounds.

Which model is better in any given organisation, however, likely depends on a whole range of factors, including:

- the current model of care (wholesale change in ways of working being harder to deliver)
- the number, specialty mix and interests of the consultants
- performance against targets for interventional procedures
- the skill mix of nurses on existing wards
- hospital geography.

While the evidence on the benefits of specialist care for specific patient presentations is not disputed (Ayanian and others, 1994; Kitahata and others, 1996; Ward and others, 1993), we would argue that extracting maximum benefit from specialist staff is only possible with a deep understanding of local demand. This is particularly the case with out-of-hours work, where

expensive and resource-intensive rosters have frequently been drawn up to manage a very small number of patients, whose needs could possibly be met in other ways.

In the first instance, the model of ward care should match the capacity of the specialist team. Where a single consultant is balancing both ward and outpatient interventional work, it may be more efficient and safer to have these patients under the care of a generalist, with the specialist providing a responsive consultation service.

Larger teams are amenable to more innovative ways of working. Many consultants are already familiar with yearly job plans created around rotating 'blocks' of work (Baraheni and others, 2014), with most smaller hospitals operating a 'consultant of the week' model for specialty inpatient and on-call cover. Unpublished research has found that increasing inpatient blocks to a minimum of a month substantially reduces delayed transfers of care and has a positive impact on patient and staff satisfaction. The intensity of inpatient work could be lessened in two ways: either redistributing certain tasks (such as consultations) to other 'blocks' or increasing the number of consultants on the wards at any one time. The latter would still enable consultants to contribute to outpatient work, with logistical difficulties being overcome by starting ward rounds at 8am and adjusting clinic/list times.

## Putting the hospital to bed

Despite the concept of 'Hospital at Night' being introduced into the NHS over a decade ago (Hamilton-Fairley and others, 2014), many hospitals still fail to provide robust cover at night, with junior staff being deployed by specialty and/or geography. Changeover to night working tends to occur during the busiest part of the evening (8pm–9pm), with the consequence of the hospital struggling to meet demand in the late evening. Where hospitals do provide additional night staff to cover the late evening, it often results in relative overstaffing overnight. The various day teams also tend to hand over at different times, compounding problems with meeting evening demand.

Again, we would recommend looking at both ED and inpatient demand to help determine the minimum number of staff needed to keep patients safe overnight and deal with the small number of emergency patients that present after midnight – an average of one to two an hour in small hospitals (Lim and others, 2013).

Among our expert group, there was support for:

- strengthening the basic tenets of Hospital at Night by having a single unified team to provide *all* cover at night
- the team being formed according to considerations of skill mix, expertise and experience and actively using non-medical staff with essential skills (such as technicians for intubation and phlebotomists for blood taking and cannulation)
- the team being based in the ED or the intensive care unit, with support from the medical registrar
- senior nursing staff delegating centralised tasks, supported by the use of electronic systems that track work and reduce unnecessary calls
- handover to the night team being done systematically and occurring after the evening work peak (likely to be between 11pm and midnight)
- *all* medical and surgical teams providing junior staff for the Hospital at Night pool of staff
- any unnecessary or non-value-adding work left undone by the day teams not being undertaken by the night team and/or use of non-medical staff to undertake tasks such as phlebotomy and low-risk prescribing.

This may mean that twilight shifts for the medical and other teams will need to be introduced. While this is frequently resisted on the grounds of increasing the demands on a limited resource (that is, junior and middle-grade staff), pooling capacity at night should release junior staff for twilight cover. Two shorter shifts (day and twilight) with an overlap between shifts has the additional advantage of increasing the number of staff on the ‘shop floor’ at peak times and offsets the problem of decreasing capacity for work as shift length increases (Ball and others, 2017).

It has been suggested that overnight consultant presence is likely to improve patient outcomes (Academy of Medical Royal Colleges, 2012). There is little hard evidence linking better outcomes with patterns of consultant working (Aldridge and others, 2016; Henderson and others, 2017; Meacock and others, 2018). However, our interviewees thought that nearby on-call systems, where staff are expected to be on site quickly, safeguard patients. In keeping with the general principle of pooling capacity and rationalising services, we would suggest that those clinicians with advanced resuscitation and life-support skills be put onto a single ‘first on call’ roster for patients with marked physiological deterioration, regardless of their specialty, with clinicians expected to be on site within 15 minutes of a call. Back-up would be provided by standard specialty consultant rosters and remote advice. This may require a move towards locally negotiated payments, with a supplement for the inconvenience of being on call, coupled with substantial payments for the actual provision of services.

## Better jobs for all staff

Smoothing the completion of necessary tasks and eliminating non-value-adding tasks have been shown to save time and money and improve patient care (Antinaho and others, 2015; Park and others, 2013). Marked additional benefits have been found by enabling and empowering staff to practise for more time at the ‘top of their licence’ (Institute of Medicine, 2010; Loversidge and others, 2018).

Australia, Canada and New Zealand have put significant investment into promoting practice at the top of medical licences and developing frameworks so that clinicians in smaller hospitals gain and maintain key skills (Australian College of Rural and Remote Medicine, 2013; Nixon and others, 2017; Royal College of Physicians and Surgeons of Canada, 2016). Similar frameworks for the wider multidisciplinary team are currently being developed in Australia. It is notable that these frameworks are highly flexible, being just as applicable to single advanced skills (such as intubation) as to key aspects of specialty disciplines (such as obstetrics). This gives hospitals the ability to identify gaps in skill mix and personalise further education for interested clinicians, rather than enrolling staff on lengthy and often expensive training courses.

At the individual hospital level, the following strategies are pivotal in supporting nursing and allied health professionals to practise at the top of their licence:

- reviewing the scope of practice
- clearly defining roles
- standardising job descriptions across departments
- training support staff to help with necessary and non-value-adding tasks
- streamlining documentation and data-entry systems
- improving the matching of staff capabilities with patient needs
- emphasising the importance of direct patient contact, especially for tasks that staff incorrectly perceive to be of low value (such as taking observations)
- developing high-quality training to meet local population needs and fill skills gaps.

Similar practices are appropriate for medical staff, with an emphasis on the following as well:

- exploring the skills and capabilities of individual consultants at team, service and whole-hospital levels
- encouraging staff to gain the extra technical and cognitive skills needed to meet local health needs
- providing adequate resources so that staff can gain and retain new skills
- developing local mentoring systems to support new skills
- extending audit and governance processes to ensure patient safety.

Strong multidisciplinary team working is important for all staff. Staff who work with the same people every day in well-constructed, stable teams and have developed strong and collaborative working relationships tend to produce better results. Staff who work in such teams are also more engaged with their work and more likely to stay in post (West and Dawson, 2012).

There are other aspects of care provision that foster clinical engagement and are likely to improve patient outcomes that should be incorporated into any model of care. These include:

- a manageable number of patients per consultant – 25 is the recommended maximum (Royal College of Physicians, 2010) and 10 to 15 appears preferable if consultants are to have daily input (Michtalik and others, 2013)
- an equal distribution of work across the whole consultant body
- tolerable levels of pressure to create flow (either small numbers of patients distributed regularly to teams or peaks and troughs of work with sufficient time for recovery)
- flexible working to accommodate conflicting service demands.

Aspects of models of care that appear to hinder clinical engagement include:

- a large number of patients per consultant (Bell and others, 2013)
- ringfenced services due to geography or overly strict criteria for acceptance to a service
- patterns of working and patient care that are overly rigid.

### **Middle grades**

Most smaller hospitals in our research felt that the lack of middle-grade staff is an even greater challenge to patient care and safety than the lack of consultant staff. Some hospitals reported that over 50% of slots in out-of-hours rosters are unfilled, creating a reliance on expensive locum staff. The frustration of many hospitals appeared to stem from the gaps being beyond their immediate control, being the result of a combination of a failure to attract many trainees into acute specialties, especially acute and emergency medicine, and the perceived preferential allocation of trainees, especially those more senior, to larger teaching institutions by local deaneries. The knock-on effect is a perception of the smaller hospital as the poor relation of the larger hospital when it comes to training, reinforcing problems with recruitment and retention (Health Education England, 2016b).

A possible solution would be to ‘flip’ the allocation of medical trainees, with trainees in years one to three of their training (ST1–3) remaining in larger hospitals and more senior trainees in their sixth and seventh year of training (ST6–7) going to smaller hospitals as they will be able to work with less supervision. This should be coupled with putting appropriately trained advanced practitioner staff to work alongside more junior trainees on the take and out-of-hours rosters. Shifting some of the burden of clerking (writing out patient history and examination findings), decision making around less complex patients and out-of-hours cover to non-medical staff would free up the more senior trainees to act in a more consultant-like capacity, with a focus on the coordination of the broader medical team and care of the sicker patients. In some circumstances, it may be feasible for senior trainees to be included as a ‘first on call’ on the consultant roster (especially those involving high-frequency, low-intensity work), provided consultant back-up can be provided.

As well as this, smaller hospitals would need to improve the conditions they have for training staff, with an emphasis on the creation of an environment that balances autonomy with oversight, and adequate opportunities for non-clinical activity, such as management and leadership, governance and research. They would need to have high-quality educational infrastructure in place, such as libraries and access to online journals, and regular teaching activities such as journal clubs and grand rounds. Conferencing facilities and links with other organisations can also improve the educational offer significantly.

The quality of training experiences within an organisation is a critical factor when newly fledged consultants apply for consultant posts: they are substantially more likely to return to work in places they enjoyed as a trainee. Hospitals should therefore look at factors that improve the life of their junior staff (Chaudhuri and others, 2013). These include:

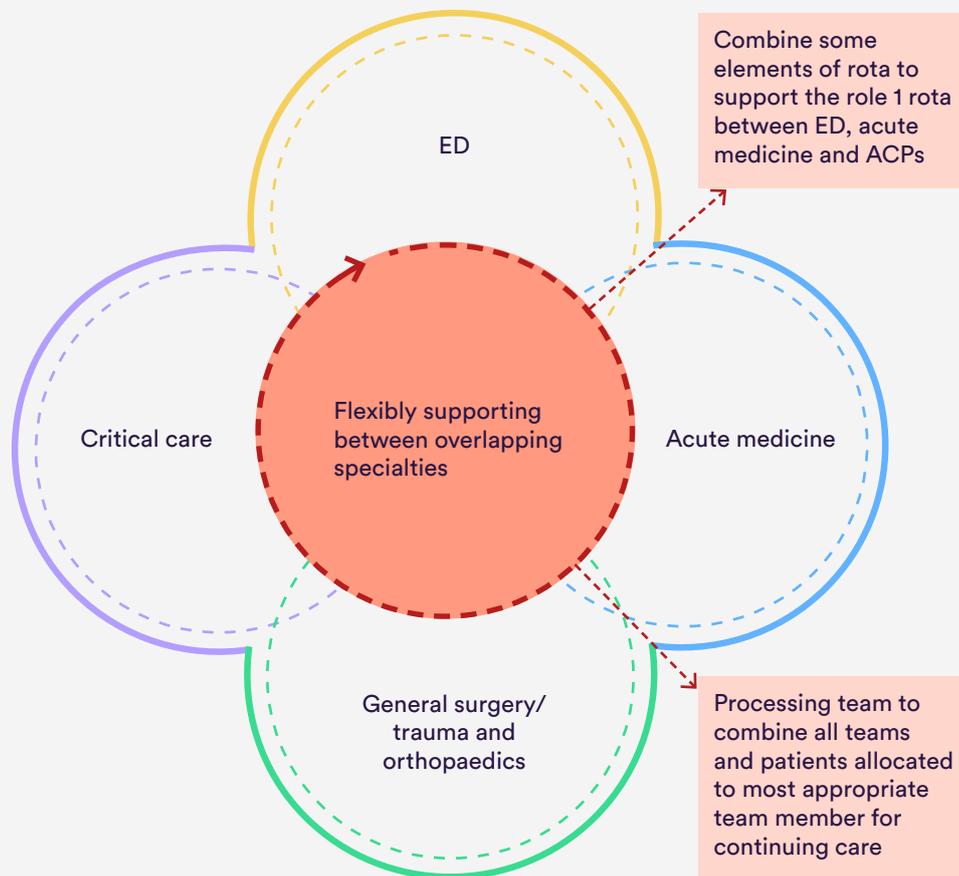
- high-quality induction
- the quality of on-call rooms
- the presence of a doctors’ mess
- the availability of food both generally and out of hours
- the provision of transport after unsociable shifts
- rosters provided ahead of time.

## New types of staff

Even with changes in policy on the allocation of trainees, the reality is that many small hospitals will have significant rota gaps at junior and middle-grade doctor levels that will remain unfilled. Appointing non-training-grade doctors may help with this but a more positive and sustainable solution would be to train new types of workers who can take over many of the tasks that medical staff currently do (Imison and others, 2016a). The experience of many of the participants in our workshops indicate that there is great potential to train staff from a range of clinical disciplines to take on a wide range of tasks.

Figure 11 shows how one of the trusts advising us envisages the setting up of a multidisciplinary ‘front-door’ service to maximise the use of the skills available. Note that it is using advanced care practitioners as a core part of the team.

Figure 11: Representation of a multidisciplinary 'front-door' service



Crossover/supporting roles on rotas for middle grades with some replacement of specialty rotas in favour of organisation based on matching skills to demand

## Diagnostics

Delays in accessing key diagnostics are common in many hospitals, impeding the delivery of high-quality patient care and slowing the flow of patients through the system. Speeding the diagnostic process, particularly over the weekend, is therefore a key step in improving efficiency and effectiveness. Also, in networked systems, the burden on the receiving hospital is reduced when transfers are accepted only for urgent treatment, rather than investigation and onward management (Bergeron and others, 2017).

Such an approach requires that key diagnostic services are readily available. Our expert group thought that in addition to 24/7 provision of standard sets of emergency pathology tests, there also needs to be 24/7 access to CT scans and seven-day in-hours availability of MRI (magnetic resonance imaging). In the small number of cases where an immediate MRI is indicated (for example, spinal cord compression or cauda equina syndrome), then either there needs to be a method to make the service available or the patient will need to be transferred.

Getting investigations done quickly, especially in the out-of-hours setting, is not without cost implications. However, these may be mitigated through:

- the use of point-of-care testing rather than keeping laboratories open for standard blood tests (St John and Price, 2013)
- clear protocols for requesting radiological tests coupled with radiographer, rather than medical, approval (Brkljačić and Donosos, 2013)
- the use of networked or remote systems for reporting (Royal College of Radiologists, 2014).

Other gains will be unlocked by the faster flow of patients through the system and a reduction in the number of patient transfers.

## Critical care

All acute medical and surgical services require an intensive care unit. Smaller hospitals need support from intensivists for everyday emergency decision making but also strategic support to ensure that there are appropriate systems in place particularly to recognise and respond to deteriorating patients, develop patient transfer systems and so on (Fackler and others, 2009).

The argument has been made in the UK that intensive care units should be staffed by intensivists only (Faculty for Intensive Care Medicine, 2013). However, research on complex teams, including those based in intensive care, has noted that there is very little difference in patient outcomes (if any) if ‘tasks’ (such as the stabilisation of the unwell patient) are managed by non-specialists (Baker and others, 2005; Fackler and others, 2009). This fits with international standards for intensive care, which allow for smaller units to be

covered by two to three intensivists to provide the bulk of daytime services, as well as the ‘strategic’ running of the unit, with reliance on other appropriately accredited specialists (anaesthetists, physicians and so on) to support out-of-hours cover (Marshall and others, 2017). A study of UK service provision found that outcomes for units with such arrangements are not inferior to those with 24/7 intensivist cover (Wilcox and others, 2014).

An electronic intensive care unit is a promising technology, where nursing and medical staff are supported by electronic surveillance and monitoring, with real-time input delivered remotely by an intensivist off site (Scurlock and Becker, 2016). Most units in the UK in smaller hospitals are still sufficiently large for on-site intensivist presence to be needed. However, networked arrangements with larger units, combined with aspects of the electronic intensive care unit, would allow for the burden of senior clinicians’ decision making to be spread. Also, many out-of-hours calls to senior clinicians are for advice rather than a summons for physical presence.

## Clinical networks and models of ‘treat and transfer’

A key part of whatever variant of the ‘treat and transfer’ model is created will be ensuring that small- and medium-sized acute hospitals are part of wider clinical networks that function well, have strong governance and that can enforce decisions. Unfortunately, the record of networks operating in the NHS has shown mixed results in terms of their effectiveness (Fulop and others, 2015). Some quite different systems, processes and behaviours will be required if these networks are to provide an adequate level of support to smaller hospitals. Our expert group had many stories to tell of the difficulties of obtaining support from specialist providers, some resulting in poor outcomes for patients.

We asked the expert group if there were cases that would need to be thought about in the design of the model because they might present diagnostic or treatment challenges or other risks. They highlighted stroke and STEMI as two of the most important, but recent system reconfiguration means that these patients are now readily identifiable and have clear pathways into specialist

centres. They said that the other more common risky presentations that are considered to require explicit planning and potential networked solutions are acute abdomen, neurosurgical presentations (for example, subarachnoid haemorrhage), major haemorrhage (particularly upper gastrointestinal bleeding) and vascular emergencies (for example, ruptured aortic aneurysm). Most organisations already have pathways for spinal cord compression. Beyond this, participants in the group commented that other conditions that might require immediate transfer to a specialist centre were rarer and that many of these could be dealt with on a case-by-case basis rather than requiring the development of individual care pathways.

The group considered it too difficult and potentially risky to expect ambulance staff to reliably distinguish between patients who could safely have all their care provided in a smaller hospital and those that may benefit from specialist care. Hence, they thought that the identification and primary management of all acutely unwell patients should be within the capability of all smaller hospitals. The key is speed, access to appropriate diagnostics, reliable processes and access to senior decision making and highly specialist input.

Smaller hospitals will need specialist advice and help with transfers and on occasion they may need a specialist from another hospital to visit. Rather than this being continuously negotiated, often fractiously between busy middle-grade staff, we suggest that the control centre model from Australia (described in Appendix B) offers a workable solution when combined with a robust governance structure, rules of behaviour and appropriate incentives. The control centre would take a call for assistance from smaller hospitals in the network and arrange for beds, specialist advice or other help as required. There would need to be a very clear expectation that the control centre is to be held to account for performance and for the clinical outcomes of patients referred through this system. The key principle is that the supporting centre should always say yes to the request, whether this is to give immediate advice or organise an appropriate transfer. The reciprocal part of the deal is the referring hospital's unconditional acceptance of patients returning from the centre. A 'send then call' model should be considered, with real-time oversight of regional bed availability and ambulance activity used to allocate beds to patients needing transfer. This avoids lengthy waits for beds to become available while also preventing the larger hospitals from being overburdened.

This is not to suggest an ‘all or nothing’ approach to the care of the unwell patient, but rather that service provision should be more ‘modular’, with hospitals differentiated by their ability to undertake the various components of a specific pathway of care, from stabilisation to rehabilitation. This would allow for better planning and provision of services at both hospital and regional levels, with work focused on ensuring that patients experience transitions of care seamlessly.

Teleconsultation has been shown to improve patient care and reduce costs (Ward and others, 2015). Although the infrastructure for real-time teleconferencing and the remote assessment of patients is expensive to install, it can markedly improve the quality of interactions between the control centre and local staff (Graves and Doucet, 2016). As such, it is too important to be allowed to develop on an *ad hoc* basis and should be systematically planned, implemented and resourced (Turner and others, 2014).

The burden to staff in smaller hospitals in preparing patients for transfer, accompanying them during the transfer and then returning to base is usually substantially underestimated (Avtgis and others, 2010; Iwashyna, 2012). The stabilisation and transfer of a critically unwell patient may involve two to three staff members for anything up to 12 hours (Whiteley and others, 2011), essentially stripping the hospital of key staff during that time. This is a particular problem overnight. Retrieval teams – who do the transferring themselves – are one way of substantially reducing this burden (Gray, 2004; Ramnarayan and others, 2010). Another option is to increase the number of paramedics who rotate between hospital and ambulance services to provide some additional expertise and capacity to support these models and reduce the need for patient escorts. A further option being considered is to take the specialist and possibly the team to the patient to perform interventions (such as endoscopy) at the local hospital, although this would require work to be done to standardise equipment and operating procedures between sites.

Our expert group and interviewees thought that stringent governance, both locally and at the system level, is essential to safeguard both clinicians and patients. Clear rules are required for where the burden of decision making sits, the distribution of responsibility for patient

outcomes and the functioning of mechanisms to identify, investigate and manage problems/complaints. Single, shared databases should be used rather than a plethora of locally developed tools, as should templates for audit and the tracking of patient outcomes. Clarity and transparency are also needed around the funding of patient transfers – funding schemes that penalise smaller hospitals for patient transfers are likely to deter clinicians from providing appropriate care (Iwashyna, 2012; Pietz and others, 2007).

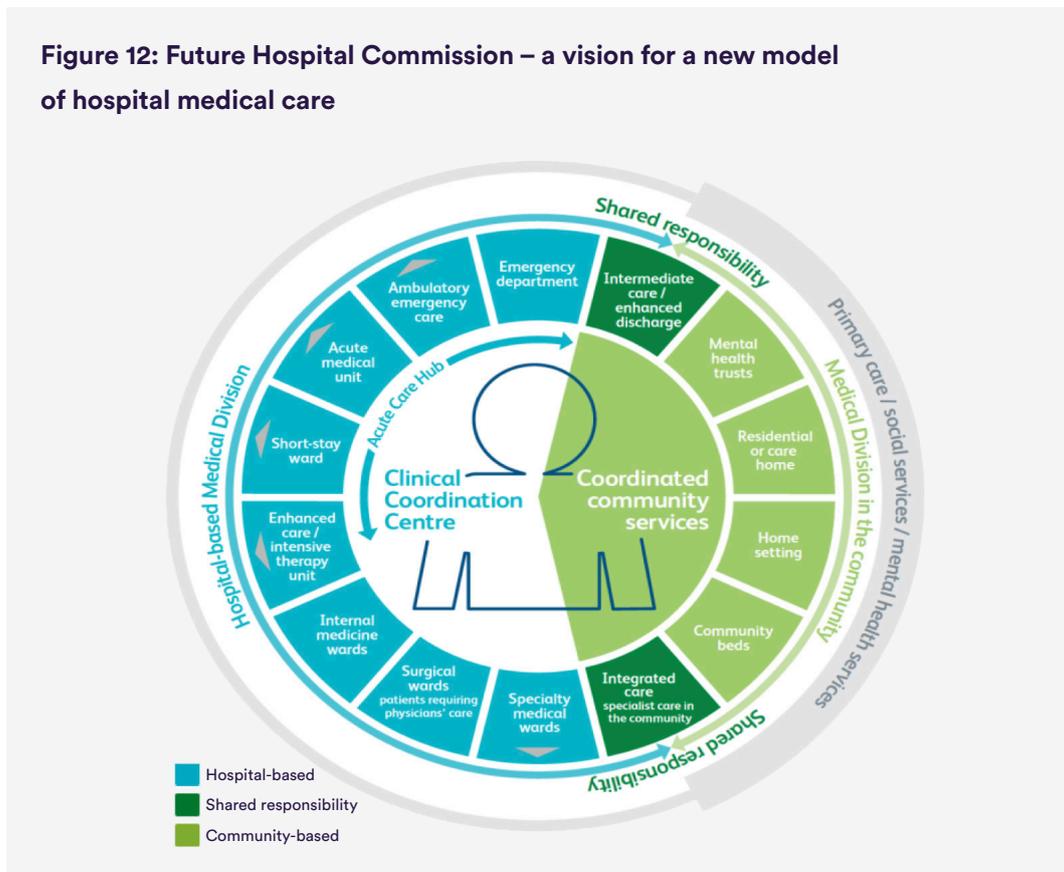
Other important factors in the development of network models include a high degree of trust between participants, an understanding of the differing capacities and capabilities of the individual elements of the system and familiarity with local infrastructure. The experience of our international experts suggests that these elements are facilitated by team building across the network, high-quality feedback and peer review.

The patient representative who took part in our expert group gave a strong message about the serious impact of long journey times on patients and relatives and the difficulties faced when patients are returned home late at night, particularly over long distances (Mattson, 2010). This and the risks and costs associated with transfers mean that, where possible, they should be confined to situations where it is not possible to bring the expertise to the patient or provide it remotely.

## The hospital and the community

As articulated by the Future Hospital Commission (2013) (see Figure 12), any model of hospital medical care needs to be closely integrated with community services.

**Figure 12: Future Hospital Commission – a vision for a new model of hospital medical care**



Source: Future Hospital Commission, 2013

The goal of treating patients as close to home as possible has led to a wide range of community services (Care Quality Commission, 2017). However, these vary substantially from area to area and often have inconsistent and restrictive criteria for accepting patients. To maximise the benefit of such community services, there needs to be a robust system to organise and coordinate them. A ‘control centre’ model, such as that used on the Isle of Wight, offers one solution. To make this work, there needs to be a reliable directory of services and ways of accessing them need to be simplified. Integration of community services with GP out-of-hours and ambulance services, social care and the voluntary sector is also desirable. Professionals within these configurations need to take responsibility for dealing with requests for help rather than simply directing callers to other services.

Systems of rapid access to advice from senior staff (acute physicians, geriatricians, ED consultants, nurse practitioners and so on) help to direct patients to the most appropriate care and frontline providers value them

highly (Westall and others, 2015). However, accessing the right person in the current system is dependent on a degree of local knowledge about which services are provided at which hospital and who to ask for at the hospital's switchboard. Internationally, moves are being made to consolidate call centres at regional or national levels (Trauma Victoria, 2018). When the senior clinician on duty cannot give appropriate advice, it becomes the responsibility of the call centre to find the appropriate person. This means that the community practitioner does not have to 'ring around' several clinicians. Such a system could be incorporated into the 'control centre' or be provided at the network level.

It has been suggested that more could be done to 'pre-sort' patients, with ambulance crews diverting those patients considered to be sicker or with specific medical conditions away from smaller hospitals (O'Hara and others, 2015). Beyond the well-established examples of stroke, STEMI and obvious gastrointestinal bleeds, our expert group did not think that there is much scope to improve the sensitivity of decisions about which hospital patients should be taken to. There is more to do, however, to reduce the overall hospital transfer rate; again a control centre model would support this.

# 6 Conclusions

The different layout and staffing models of smaller hospitals means that there is no one definitive set of solutions for a sustainable service and that specifying a single model is neither necessary nor helpful. Instead, there are a number of ways to solve the problems that smaller hospitals face, as we have described in Chapter 5. Many of the threats to the viability of the solutions are a consequence of decisions that are within the control of the system either nationally or locally.

There are eight core design principles that should drive all the solutions we have described, as set out below.

## Core design principles

- 1 Smaller hospitals need to be part of a wider system with strong links to local services and support from other hospitals – in particular, specialist centres. This needs to be formalised and much more reliable than is often the case at present.
- 2 Smaller hospitals need to be able to deal with all types of emergency medical cases. Within this, systems and processes should be designed for the ‘usual’, but also plan and allow for the unusual. All acute hospitals need to be able to deal safely, quickly and expertly with all patients for at least the first two to three hours of care. Advice from main centres needs to be provided rapidly and effectively to support this.
- 3 There needs to be a shift from the ‘all or nothing’ approach to acute service provision to one that is more ‘modular’, with hospitals differentiated by their capacity to undertake the different elements of a pathway of care, from stabilisation to rehabilitation. This may be further refined through differences between in- and out-of-hours models of care.

- 4 Working arrangements should be interdisciplinary, team-based and calibrated at ‘whole-hospital level’ to meet the needs of the local population. Models of care within smaller hospitals need to shift from the current ones – arranged around professional boundaries – to ones built around skills, expertise and experience.
- 5 The benefits of specialisation need to be set against the increased costs, fragmentation of services and threats to viability that can result and that can reduce hospitals’ ability to effectively deal with the patient with several conditions (‘multi-morbid’) and presenting with uncertain and undiagnosed symptoms (‘undifferentiated’). Policy and training models need to recognise the importance of generalist skills. Proposals that allow further opting out of acute medical on-call care in smaller hospitals require very careful thought.
- 6 Systems and processes within hospitals should be organised, as far as possible, with the intention of delivering the appropriate care to the patient as quickly as possible – ‘doing today’s work today’.
- 7 Each step in the patient’s care pathway should add value; and movement along the pathway should be determined by need, rather than artificial time constraints. Many current models have a significant element of duplicated work (such as double clerkings) and unnecessary delays in the time taken to reach a diagnosis. Smaller hospitals need a model that removes all duplication and where possible ensures that critical tests are done rapidly to allow patients to be routed to the correct pathway.
- 8 Improved continuity should be a key objective. This will improve patient flow, reduce length of stay, reduce workloads and improve job satisfaction.

Many of the ideas and solutions discussed in this report have already been explored or proposed in the Future Hospital Commission’s (2013) report. While these were not specifically targeted at smaller and more remote hospitals, many of the ideas are particularly relevant for them.

# 7 Recommendations

## Regional clinical networks

A model in which the care of some of the sickest patients is dependent on and often delayed by fractious negotiation between medical staff and managers is not fit for purpose and is probably doing harm.

Sustainability and transformation partnerships (STPs) working with NHS England and NHS Improvement regions should create the types of cross-system networks we found in operation in systems in Australia – where a ‘send and call’ model operates and where a regional control centre locates where the capacity is to deal with urgent transfers. We recommend developing well managed networks so that hospitals can be more effectively connected to primary care, out-of-hours services, ambulances, care homes, mental health care, social care and other services and the model can be used to manage capacity across systems and mobilise support to support patients at home and services in the smaller hospitals.

Incentives and accountability systems are required to support this and to ensure that smaller hospitals keep their side of the deal and ensure that patients are able to return to them rapidly if they have been transferred elsewhere for specialist treatment and this treatment has finished.

## Workforce planning, training and regulation

The success and viability of many smaller and remote hospitals is going to require action from workforce planners, trainers and regulators on a number of fronts. Despite the aspirations in the current draft health and care workforce strategy (Public Health England, 2017) to align workforce, service and financial planning, the challenges faced by smaller hospitals are a stark example of their current separation.

Our expert stakeholders identified the following areas as requiring action:

- Health Education England (2016b) has produced a report called *Training in Smaller Places*. This contains useful recommendations, which represent a good start in addressing some of the issues that smaller hospitals face. But implementation seems to be slow and urgent progress needs to be made.
- The models proposed here and other workforce solutions to the challenges that smaller hospitals face mean that systems must be established to allow staff to extend their scope of practice within a clear framework. Health Education England, the General Medical Council and the professional bodies need to facilitate and support this urgently.
- In other countries, there is an expectation that senior trainees capable of more autonomous practice are preferentially allocated to smaller hospitals. This not only supports the hospital, but also provides high-quality training experience for the trainee as they move to a consultant role. Health Education England needs to take positive steps to enable senior trainees to work in smaller hospitals. This is likely to require extra investment and support.
- Broad-based training and specialist training for rural settings that equip emergency medicine, acute medicine and other physicians with a wider range of skills for the particular demands of rural medicine are available in Scotland. Health Education England should develop similar programmes with hospitals in England. Australia has already developed a high-quality approach that could be easily adapted.
- The development of physician associates and other types of advanced practitioners to help support middle-grade doctor roles is also required. Health Education England needs to do more to support this.
- New curricula will mean that more trainees will undertake the general medicine training required to support acute medicine across all types of hospital. This will take time to come online, however. In the meantime, remedial action will be required, including a review of visa restrictions.

## Revalidation and credentialing

‘Credentialing’, peer review and value-based assessments have been successfully introduced overseas and appear to support the development and maintenance of a broadly skilled medical workforce. The General Medical Council in the UK has explored the introduction of credentialing, through which clinicians gain approval and training support to expand their scope of practice and ensure skills are maintained (General Medical Council, 2015). However, this has stalled in the face of concerns that the medical profession has raised. The General Medical Council’s original proposals should be reviewed to ensure that they align with the needs of smaller organisations as it is suggested that smaller organisations would make a suitable test-bed for the introduction of credentialing. The introduction of peer review as a mechanism to support consultants who work in relative isolation in smaller organisations should also be explored.

## Payment and contractual arrangements for consultants

The current consultant contract distinguishes poorly between the frequency of on-call work and the intensity of work when on call, resulting in consultants receiving the same pay for an overnight call regardless of whether they were required to return to work or not. The provision of specialist support to smaller hospitals may require some consultants to be on call very frequently, although the work may not necessarily be particularly intense. The payment model needs to be reviewed to ensure that the system appropriately rewards consultants returning to the hospital overnight. Restrictions on payments for being on more than one on-call roster need to be removed, allowing consultants on low-intensity on-call rosters to continue to support generalist services.

More flexibility is needed to allow non-standard arrangements to support very small or remote hospitals and the networks in which they sit. This should go beyond individualised contracts for doctors providing complex services. We came across several clinicians with unusual working arrangements who related stories of unwarranted organisational and contractual issues.

Removing such obstacles may make part-time working in smaller hospitals more attractive, particularly to older consultants.

## Trust financial support

All of the international examples we have examined recognise that providing care in rural and remote locations imposes costs on ambulance services and hospitals, reflecting both sub-optimal scale and the cost of travel. The question of whether there should be a premium for small scale and/or remoteness needs serious examination. It is not easy to see a relationship between costs and small scale in UK data but there are a number of issues about unavoidable fixed and semi-variable costs and relatively low rates of activity over which these can be spread, which suggest that this needs further examination. These issues will also have an impact on the costs of transfer or retrieval for ambulance services. NHS England and NHS Improvement need to decide what the appropriate premium for supporting these services should be. Given the heavy use of locum staff and the high costs of centralisation, the choice may not be whether a premium should be paid, but how it is going to be paid.

## Quality regulation

The clinical arguments for closing small acute hospitals on the grounds of quality and safety are not compelling. Some of the guidance that regulators use to assess the current models is based on standards for which the evidence is equivocal or standards that are based on expert opinion, often derived from models in large urban centres. Moreover, many guidelines developed by specialist bodies are based on input standards and reflect ideal care in tertiary centres, meaning that smaller hospitals tend to be judged on *how* they provide care, rather than by patient and hospital outcomes. Regulators need to be more challenging about proposals to reconfigure services based on some of these standards. The Care Quality Commission needs to ensure that it is open to the types of innovative models that will need to be developed to better meet the needs of local populations and that it is not expecting tertiary service provision in secondary centres.

## Change management

Implementing these ideas will require a mix of workforce and service redesign methodologies. We think that there may be particular value in using the Calderdale Framework for the elements of workforce redesign (see [www.calderdaleframework.com](http://www.calderdaleframework.com)). This framework provides a clear and systematic way of reviewing skill mix and roles within a service. The process of applying the framework leads to the development of a detailed competency training document, based on tasks and functions.

Our experts thought that local services need to make a significant investment in change management and service redesign, including the backfill of clinical leaders. This should include:

- looking at the processes of current acute hospital systems and analysing problems and opportunities for improvement, with a focus on the interfaces of care
- using continuous improvement approaches for system redesign
- involving frontline staff who have been employed in the system for a reasonable length of time
- monitoring meaningful patient and staff outcomes
- developing robust clinical governance structures, if not already in place
- ensuring that there are regular opportunities for feedback and learning for all staff affected by change
- creating a culture of 'radical honesty'
- making the redesign of acute/emergency pathways a priority at board level.

## Developing alternative approaches

Local systems need to take suggestions and start to develop their own analysis of the solutions available to them. As noted above, the extraordinary diversity of different staffing, geography and physical layout of hospitals and the absence of research on different models mean that there is no one answer. Local solutions will be required.

The first step is an examination of the case mix, severity and timing of emergency work based on the presenting condition of the patient as well as an

understanding of the eventual specialty disposition and discharge diagnosis. This needs to be followed by a detailed analysis of how the available set of skills and staffing resources matches this workload. Furthermore, a detailed review should be undertaken of the gaps and opportunities for reconfiguring this workforce to provide as integrated a front door service as possible.

A similar exercise is then required to determine the configuration and operation of 'downstream' wards and the model of staffing required to make this work. As noted, there are a number of different ways of doing this that would conform with the design principles set out above. As part of all of this, a major rethink of specialty on-call arrangements may be required, allowing for models that permit high frequency/ low intensity approaches, including multi-site cover.

Work will also be required with the wider system to strengthen the arrangements for remote support and advice. As noted above, this may require support from the STP/integrated care system, or from regional representatives of NHS England and NHS Improvement. This should include transfer and retrieval, the provision of advice, rotations and educational support.

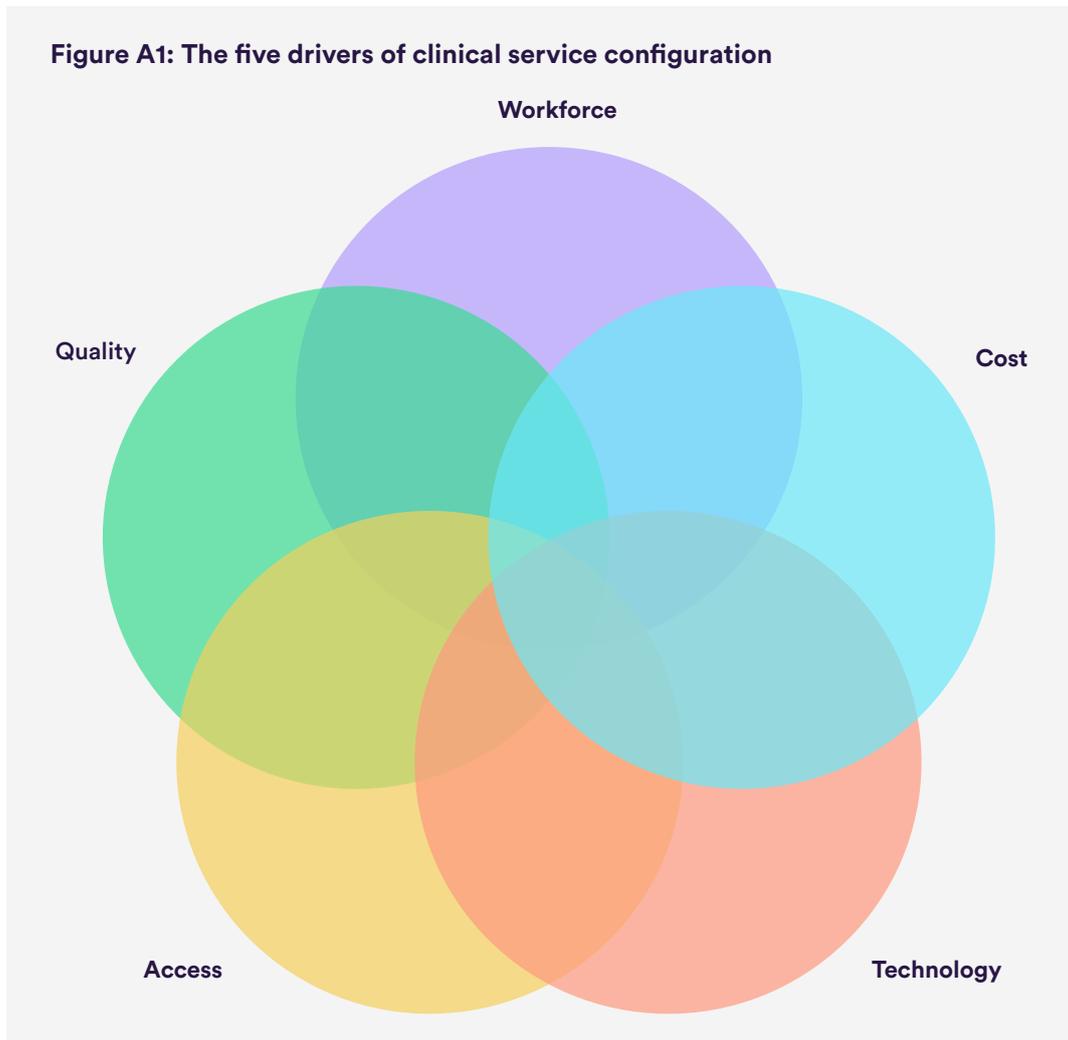
Finally, there needs to be an acceptance that smaller hospitals cannot simply be mini-versions of large tertiary institutions, with the same expectations of service provision and staffing requirements. Smaller hospitals cannot do it all on their own. They need a fairer allocation of junior doctors, a big commitment from larger hospitals to support smaller ones and a more reasonable system for paying for hospital services. Most of all, they need permission to test alternative approaches and regulation that better reflects the differences between larger and smaller hospitals, rather than people assuming that the practice developed in our largest hospitals can or should be applied across all of them.

# Appendix A: The configuration of acute medical services – a high-level review of the evidence

## Introduction

Overall, there is little evidence to guide the configuration of hospital services. In this appendix we draw on a recent major review of the evidence (Imison and others, 2014), as well as other evidence, touching on rural health care as well as care in smaller hospitals.

All configurations of a service are a trade-off between five major factors: workforce, cost, technology, access and quality (see Figure A1) (Imison and others, 2014). The evidence we review below shows that the balance between these factors will play out differently for patients with different levels of clinical risk and complexity.



## Is bigger better? What is the link between volume and patient outcomes?

The association between volume and patient outcomes for medical conditions has been found to be disease-specific, including for acute myocardial infarction, heart failure and pneumonia, and the benefits are exhausted at relatively low activity thresholds – 610 patients a year for those with acute myocardial infarction, 500 patients a year for those with heart failure and 210 patients a year for those with pneumonia (Ross and others, 2010). Also, the link between volume and outcomes does not necessarily demonstrate a causal relationship (given the variation that exists in outcomes across units, whatever their size) and cannot be used in isolation as a justification for centralising care (Harrison, 2012).

Large studies of ‘critical access hospitals’ (which have 25 beds or less and serve rural populations) in the United States also show that it is not the volume of care that is the key determinant of outcomes but a lack of access to critical care and poor clinical processes (Joynt and others, 2011). Meanwhile, Ibrahim and others (2016) found that, for low-risk surgical procedures, the outcomes at critical access hospitals are the same as those for other hospitals (Ibrahim and others, 2016).

### **The impact of staffing levels on outcomes**

The National Confidential Enquiry into Patient Outcome and Death (NCEPOD) has consistently identified a lack of consultant input as a contributor to poor-quality care (Cooper and others, 2009; Findlay and others, 2012; Martin and others, 2007; National Confidential Enquiry into Patient Outcome and Death, 2005). It recommends active consultant engagement at all stages of the care pathway, stipulating that patients admitted as an emergency should be seen by a consultant within 12 hours (Martin and others, 2007). Studies of conditions potentially requiring interventions, such as acute coronary syndrome, have shown reductions in all-cause mortality with moves to 24/7 consultant-led services (Ng Kam Chuen and others, 2012). However, studies on consultant presence more generally have had more mixed results. Having a continuous admitting consultant presence on the acute medical unit is associated with reduced adjusted-case fatality rates in hospital (Bell and others, 2013). This association is most apparent with early death (within three days) in hospital. However, Aldridge and others’ (2016) more recent national study found no association between the level of consultant staffing and mortality risk for emergency admissions.

It is also important to consider the impact of non-medical staffing. There is strong evidence that a richer skill mix among nursing staff is linked to better patient outcomes (Aiken and others, 2014; 2017; Ball and others, 2017; Rafferty and others, 2007), while intensity of nurse staffing at weekends has had a bigger impact on stroke outcomes than additional consultant ward rounds (Bray and others, 2014). Different specialties and levels of clinical need will require a different balance of senior medical and nursing staff, which will affect the level of senior input needed throughout the day and night. Overall, there is little published data to define a methodology to determine the minimum number of physicians and skill mix that would assure safety in acute medicine (Sabin and others, 2014).

## The weekend effect and seven-day working

There has been increasing concern about observed higher levels of mortality for patients admitted to hospital at weekends, with this being attributed to reduced staffing levels, in particular consultant input (Bell and others, 2013) and some studies have shown better outcomes after the introduction of seven-day consultant working (Leong and others, 2015). Other work has suggested that the weekday-weekend variation in mortality rates may be more likely to be due to differences in case mix (Meacock and others, 2017) and higher thresholds for admissions during the weekend (Han and others, 2017), the conclusion being that patients admitted over the weekend, although fewer in number, are sicker than those admitted during the week. Two other studies have investigated the impact of the implementation of 24/7 consultant working on outcome. Meacock and Sutton (2018) found no association between the introduction of the four clinical standards identified as a priority for seven-day services and trust performance (including mortality), while another study found that the London Quality Standards, which were based around seven-day working, had little impact on patient outcomes in comparison with the rest of England (Vaughan and others, 2017). The cost of introducing 24/7 working has been estimated to be in excess of £1 billion a year, resulting in a cost per potentially avoidable death per quality-adjusted life year (QALY) exceeding the limit set by the National Institute for Health and Care Excellence by a factor of 1.5 to 2.4 (Meacock and others, 2015).

The mixed nature of these findings has led to the suggestion that while more consultant presence is to be welcomed, improvements in key aspects of service provision, such as diagnostics and critical care, may be more productive than wholesale system change.

## Clinical co-dependencies

In 2014, the South East Coast Clinical Senate undertook a literature review of the evidence on the clinical co-dependencies of acute hospital services for major hospital reconfigurations. It identified that the following support services should ideally be in place for acute and general medicine (South East Coast Clinical Senate, 2014, pp. 37-8):

- **diagnostic services** – pathology, plain radiology and CT scanning 24/7, with immediate reporting to enable rapid diagnosis and improved outcomes, for acute stroke and acute abdomen

- **critical care services** – to safely manage acutely sick or deteriorating medical inpatients
- **endoscopy** – early endoscopy after acute upper gastrointestinal bleeding, which reduces re-bleeding and the need for surgery
- **acute surgery (on site or as part of network-based support)** – to enable rapid diagnosis and improved outcomes especially for conditions such as acute abdomen and obstructed renal tract (which may present with alternative or indistinct symptoms in older patients or patients with a suppressed immune system)
- **geriatric expertise** – to provide immediate, effective and comprehensive geriatric assessment within 24 hours of admission to reduce length of stay and improve outcomes in frail older patients
- **seven-day therapy services** – to support active rehabilitation and reduce length of stay
- **seven-day pharmacy services** – to reduce drug errors
- **accessible liaison psychiatry (within two hours)** – to reduce both admission and re-admission rates among people with mental health problems
- support from relevant sub-specialties – including acute stroke, diabetes and endocrinology, nephrology, rheumatology, dermatology and acute cardiology, which could be delivered via a networked arrangement providing there was a safe, extended, skilled and consistent consultant-led acute medicine service seven days a week.

## Ways to sustain local access to services

### Clinical networks and tiered models of care

Active participation in clinical networks can help to ensure that patients receive the best quality of care as close to where they live as possible, while at the same time addressing workforce pressures. Networks offer a way of making the best use of scarce specialist expertise, standardising care, improving access and reducing any ‘distance decay’ effects that can result from the concentration of specialist services in large centres (Edwards, 2002).

Managed clinical networks often require the creation of ‘hub and spoke’ models encompassing a number of provider organisations. Higher volumes of more complex procedures are carried out at the hubs, while widespread access to more routine services is maintained via the spokes. An extension of this is the tiered model of care in which hospital units are categorised according to the level of clinical risk of the patient that they are able to accept (Monitor, 2014a).

Setting up a managed clinical network can help to address operational issues such as a lack of support from other services; bed occupancy and patient flow; the interface with primary care; and disputes between clinicians (Brown and others, 2016; Edwards, 2002; Grosse and others, 2009). If particular types of work are concentrated at fewer sites, it becomes easier to ensure that the right facilities are in place to deliver services in line with agreed protocols and pathways. Regardless of the structure of the network, it is vital to recognise the need for robust and timely transfer arrangements for emergency patients, to prevent harmful delays.

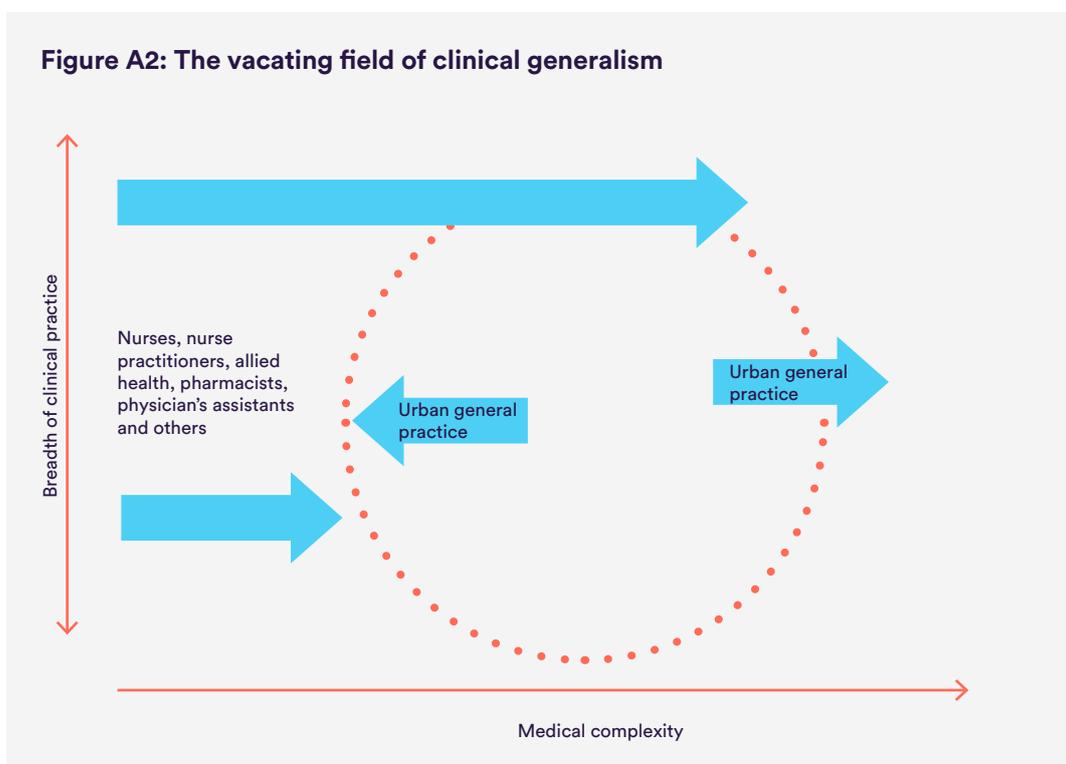
Consolidating some procedures at ‘hub’ units through a network can also lessen the need for certain staff groups to be present at some locations, generating more efficient ways to achieve 24/7 cover for different roles. Consolidation can also increase the number of procedures that clinical staff undertake in individual fields, reducing concerns over low volumes for complex procedures. This can also mean that for trainees working at hub sites, there should be enough exposure to provide effective learning.

In spite of a growing body of evidence about the benefits that networks offer, network-based approaches can prove difficult to implement. Challenges to be overcome may include insufficient focus at the board level to network principles, insufficiently developed relationships between potential network members, and a tendency to view network arrangements as a threat to the integrity of individual organisations (Watson and others, 2016).

### **New ways of working and meeting changing patient needs**

An ageing population, the rise in the number of people with chronic health conditions, the increasing sophistication and cost of care and a trend towards

shorter professional working hours – against a background of increasing medical sub-specialisation and length of training pathways – have left a deficit in ‘generalist care’ (see Figure A2). The gap is progressively being filled by non-medical staff such as physician associates and nurse practitioners who can complement the skills of doctors and enable clinical teams to become more flexible and offer an extended range of services to patients. This is becoming increasingly important in local generalist care but also in hospital care, where these roles can effectively substitute for junior doctors and support greater team continuity (Imison and others, 2016a).



Source: Pashen and others, 2007, p.14

## New technology

Technology is an important facilitator both of clinical networks and new ways of working. Shared electronic records and decision support tools can help to ensure ‘informational’ continuity across a clinical pathway spanning several organisations and compliance network protocols. They also enable staff to work to the ‘top of their licence’, maximising the potential of new roles (Imison and others, 2016b).

A large evidence review to support a strategy for rural health care in Australia concluded: ‘Rural practice can safely deliver a wide range of low volume specialised services providing that staff are properly trained. Skills for rare conditions can and should be practiced in simulated environments and facilities audited. These services may be enhanced by telemedicine support’ (Pashen and others, 2007, p. 52).

### **Training for rural and remote settings**

Training for rural and remote settings has been shown to be very different from that required for the urban environment, as underlined by the major changes to medical education in Australia, Canada and New Zealand (Strasser and others, 2016; Tesson and others, 2005). Both Australia and Canada have rural medical schools with generalist-based curricula (James Cook University and the University of Northern Ontario, respectively), while New Zealand’s undergraduate programmes have taken on a more generalist hue. Although the focus tends to be on preparing medical students for or exposing them to ruralist-general practice, the generalist approach extends across the core medical disciplines, particularly medicine, surgery and paediatrics.

Pedagogic methods used to promote both medical generalist and remote/rural training include:

- ‘distributed’ education, with multiple campuses including smaller hospitals (Hogenbirk and others, 2015a; Solarsh and others, 2012)
- ‘longitudinal integrated clerkships’, where students are placed with GPs for six to 12 months (Bing-You and others, 2014; Latessa and others, 2015) – selected patients are followed beyond the GP practice into the community and the hospital setting
- ‘flipped’ medical education, where contact with traditional tertiary teaching hospitals is limited to the final year only (Hogenbirk and others, 2015a).

At postgraduate level, Australia has developed substantial graduate-orientated educational infrastructure, with all states having rural training programmes, it has founded the Australian College of Rural and Remote Medicine (ACRRM) and it plans to establish imminently a national Rural General Training Pathway (Gillespie, 2017; Nichols and others, 2008).

The ACRRM training pathway is heavily orientated around ruralist general practice. However, the advanced part of the pathway asks trainees to choose one of the 11 specific areas of expertise, which includes hospital-based disciplines, such as adult internal medicine, emergency medicine, obstetrics and gynaecology, and surgery (Australian College of Rural and Remote Medicine, 2017). The programme has been so successful that specialist trainees in these disciplines who envisage a career in a provincial town are able to rotate into the ACRRM programme for a time to expand their skill set.

### **Credentialing for extended practice**

Australia, Canada and New Zealand have all introduced credentialing to ensure that doctors in all settings, not just rural/remote ones, are appropriately trained to provide care within specified scopes of practice (Australian Commission on Safety and Quality in Health Care, 2015; Ministry of Health, New Zealand Government, 2010; Royal College of Physicians and Surgeons of Canada, 2016). It applies where doctors wish to work in a scope of practice or provide procedures not covered by standard sub-specialty training. The three countries vary substantially in the development and boundaries of credentialing. In Canada, for example, credentials are granted only to those who have undertaken a diploma in one of a number of specified 'areas of focused competence' (Royal College of Physicians and Surgeons of Canada, 2016). By contrast, credentialing in Australia and New Zealand is undertaken at organisational or jurisdictional level and is tailored to the individual clinician (Australian Commission on Safety and Quality in Health Care, 2015; Ministry of Health, New Zealand Government, 2010).

Of the three countries, New Zealand has the most established and widely used programme of credentialing. Overseen by the Medical Council, credentialing essentially has three components for vocationally registered clinicians in the country (that is, those belonging to a specialist college). The first component is the establishment of a scope of practice for each clinician at each organisation in which they practise. This includes a review of all previous training and continuous professional development. The second component is an extension of the scope of practice, whereby the organisation defines, in conjunction with the clinician, which new skills are to be gained and how this might be verified (such as through the completion of a specified training course). Doctors undertaking work that falls within the vocational scope of another college are

required to form a ‘collegial relationship’ with a member of that college who can provide additional oversight and mentorship. Third and finally, in addition to fulfilling all the requirements of the college’s continuous professional development programme (discussed below), doctors are required to undergo a review of their practice each year before they can be certified to practise. The review covers all aspects of practice and performance. New Zealand has been working towards a data-rich environment to drive quality improvement and so clinicians should expect to have their comparative performance with regard to both patient volumes and outcomes presented both within their own department and at regional and/or national levels. The review also covers behavioural and pastoral issues.

### **Continuous professional development**

Australia and New Zealand see robust continuous professional development processes as going hand-in-hand with credentialing (Medical Board of Australia, 2016; Medical Council of New Zealand, 2018). Both countries insist, in a manner similar to the UK, on a minimum number of hours spent in educational activities, such as conferences and grand rounds. However, they also mandate additional time spent in quality improvement activities, while New Zealand also includes a minimum of 10 hours of peer review.

The basic building blocks of peer review in New Zealand are similar to those found elsewhere – morbidity and mortality meetings, clinical audit and so on. However, it differs in that a clinician’s whole practice is meant to be explored in some detail each year, including comparison with and by peers. In larger hospitals, this can be achieved within departments. Specialists in smaller organisations instead participate in regional peer review networks. The agendas of individual peer review meetings vary – some are structured around morbidity and mortality, while others focus on outcomes for specific diseases or interventions, or on a review of a single clinician’s entire practice.

Credentialed skills are also supported by continuous professional development processes in Australia and New Zealand. Highly complex, risky or rarely performed skills usually require yearly updates and/or training to ensure continuing competency, while others may only require further training every three to five years.

## Incentives to recruit and retain clinical staff in rural settings

Experience from Australia shows that considerable benefits can be gained from the introduction of specific rural teaching and training programmes – including actively recruiting students from rural areas, as rural-origin students are more likely to be rural practitioners – and increasing training opportunities in rural areas (Greenhill and others, 2015). A recent review by the Organisation for Economic Co-operation and Development (2016) identified a range of other measures that could be used to sustain a rural workforce, including financial incentives for staff, implementing regulations to restrict choice of practice location and promoting innovations in health service delivery. These innovations include the transfer of competences from doctors to other health care professionals and the use of technology including telemedicine to connect patients and doctors in remote settings. Preliminary findings from the Making it Work: Recruit & Retain project (<http://rrmakingitwork.eu>) emphasise the importance of the following (see Figure A3):

- aligning the service model with local patient need
- creating stable teams and robust networks
- supporting families and investing staff training and skills
- creating regularly reviewed governance structures.

**Figure A3. Making it work framework for remote and rural recruitment and retention**



Source: Making it Work, [http://rrmakingitwork.eu/?page\\_id=287](http://rrmakingitwork.eu/?page_id=287)

## Conclusion

The local context and the specialty-specific balance between the workforce, cost, technology, access and quality need to be the deciding factors in determining how local services are configured, recognising that there is no ‘optimal design’. It is important to note that different stakeholders may make different trade-offs. In particular the public, clinicians and managers are likely to have different priorities and this underlines the need for significant stakeholder engagement in any proposed service changes (Imison, 2011).

A key issue for planning is whether a facility has the relevant expertise to treat and/or safely transfer the patients presenting to it. Does skill mix match the case mix? Alongside this is the need to optimise technical capacity and ensure that clinical staff can access the necessary diagnostic and other equipment they need to achieve the best clinical outcomes for patients. Clinical networks, supported by robust transfer protocols and shared information systems, will be critical to sustaining local access while optimising quality.

# Appendix B: International models of acute medical care – interviews with international experts

## Introduction

For nearly three decades, the NHS has pursued an explicit policy of centralisation and specialisation (Department of Health, 2000), with the subsequent closure of many acute care hospitals in England. This, combined with the ‘perfect storm’ of pressures outlined in Chapter 2, has led to a prevailing belief that smaller hospitals in England are not financially sustainable and that they are not capable of delivering consistent high-quality care to their local population (Edwards, 2016).

This belief stands despite the evidence. The reality is that the average smaller hospital in England has around 400 beds (Monitor, 2014b). This is a large hospital by most international standards, with much care across the Antipodes, Europe and North America being delivered by organisations with 100 to 150 beds (American Hospital Association, 2018; Australian Institute of Health and Welfare, 2017; Health Quality and Safety Commission New Zealand, 2017; Paparella, 2016; Statista, 2018). In the United States, critical access hospitals, which have fewer than 25 beds, are considered capable of delivering acute services 24/7 (Reif and Ricketts, 1999). While there is evidence that certain specialist procedures are better delivered in high-volume centres (Cossec and others, 2017; Kontos and others, 2013; Marx and others,

2011), there is very little evidence that outcomes are worse for the bulk of patients cared for in smaller organisations (Coburn and others, 2004; Ibrahim and others, 2016; Kozhimannil and others, 2014). In England, Monitor (2014b) did find some correlation between hospital size and financial performance, but no link between size and other measures of performance, including clinical outcomes.

Our survey and interviews suggest that while smaller hospitals are vigorously pursuing solutions to the problems they face, particularly those relating to the workforce and patient flow, the spectrum of interventions they carry out – that is, role substitution, GP streaming, frailty services and ambulatory care – is limited and follows from national policy initiatives. Moreover, many of these interventions were developed in larger organisations less constrained by space and staffing levels, with their effectiveness in smaller hospitals untested in any systematic way. Our survey respondents and interviewees frequently saw them as failing to address the ‘real’ problem of smaller hospitals – not enough staff and not enough money.

A recent international comparison of nine high-income countries found novel policies that had been developed specifically to support smaller hospitals (Rechel and others, 2016). This, alongside our literature review, suggests that understanding better how smaller hospitals in other countries deliver services and what policies underpin this, will provide potential solutions for struggling hospitals in England.

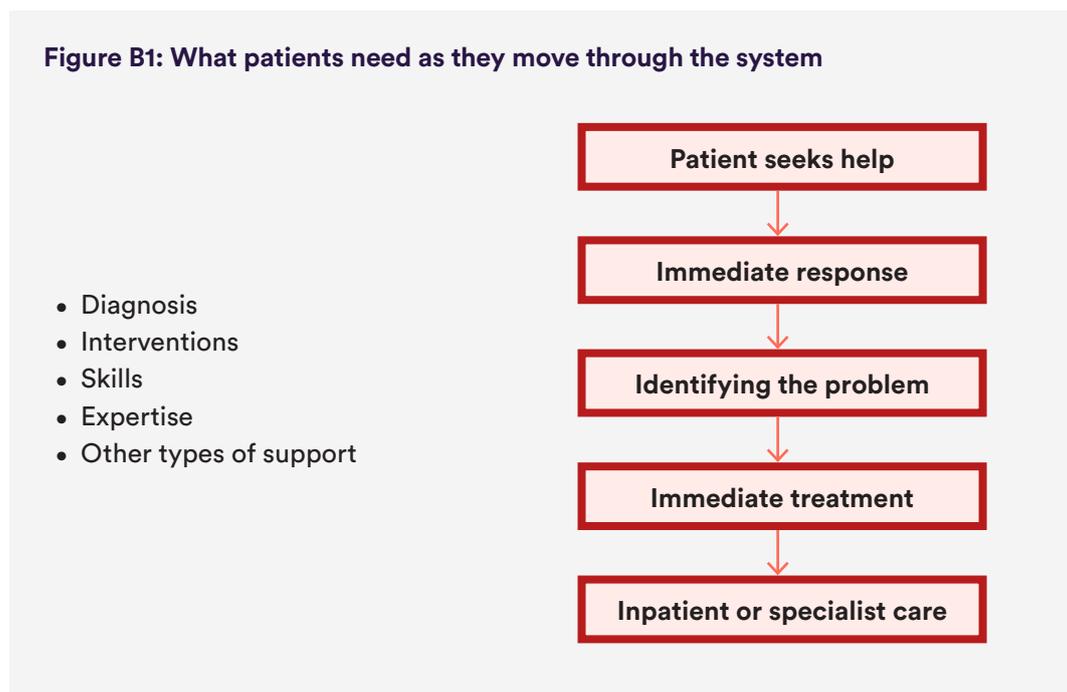
We now set out our own research on international models of care.

## Methodology

A higher level overview of rural and remote services in smaller hospitals in nine different countries has already been undertaken (Rechel and others, 2016). In order to challenge thinking in the NHS, we decided to concentrate on countries with extremes of rurality, that is, Australia, Canada and New Zealand. We chose the Netherlands as a European comparator, given that health care there is predominantly provided by hospitals with fewer than 300 beds (Picker Institute, 2016).

We selected interviewees in two ways. First, we contacted international researchers and/or policy-makers with a strong interest in rural/remote working. Second, we selected hospitals in Australia, Canada and New Zealand with a similar number of beds and catchment population to a smaller English district general hospital (150 to 250 beds serving a population of 150,000–200,000) and we made contact with senior clinical managers in those hospitals.

Two researchers (LV, BC) conducted the interviews using a semi-structured interview schedule. To avoid assumptions, data regarding the model of care used were extracted using a ‘functional’ matrix based on the needs of the acutely unwell patient (see Figure B1).



Interviews were analysed thematically, with a particular emphasis on the theoretical, cultural and regulatory aspects of individual hospitals and the wider health care system that enable the delivery of high-quality care.

## The common problems of smaller hospitals

All interviewees were clear that smaller hospitals face a series of common problems, irrespective of country:

- difficulties in maintaining the skills of staff in the recognition and treatment of rare conditions
- lack of access to certain diagnostic tools
- resistance of larger organisations to the transfer of patients who have not been stabilised
- problems in attracting and retaining staff
- difficulties in maintaining a cohesive and cooperative workforce
- limited infrastructure
- frequently poorer resources.

However, some jurisdictions have paid substantially more attention to the problems of smaller hospitals, particularly in countries where rurality is a concern. While coherent national policies are rare, federal levers are frequently used to promote access, with often quite sophisticated policies or structural developments in play at state/provincial level (Rechel and others, 2016).

What is presented here, then, is not a dissection of all aspects of care in smaller hospitals in other countries, but rather a presentation of those policies and developments that might better inform change in the English context. It should certainly not be interpreted as a wish to impose any other national system, especially given that all health care systems are flawed in their own ways.

## International models of care

Before we look at models in the other countries, we first set out the basic model of care in the UK.

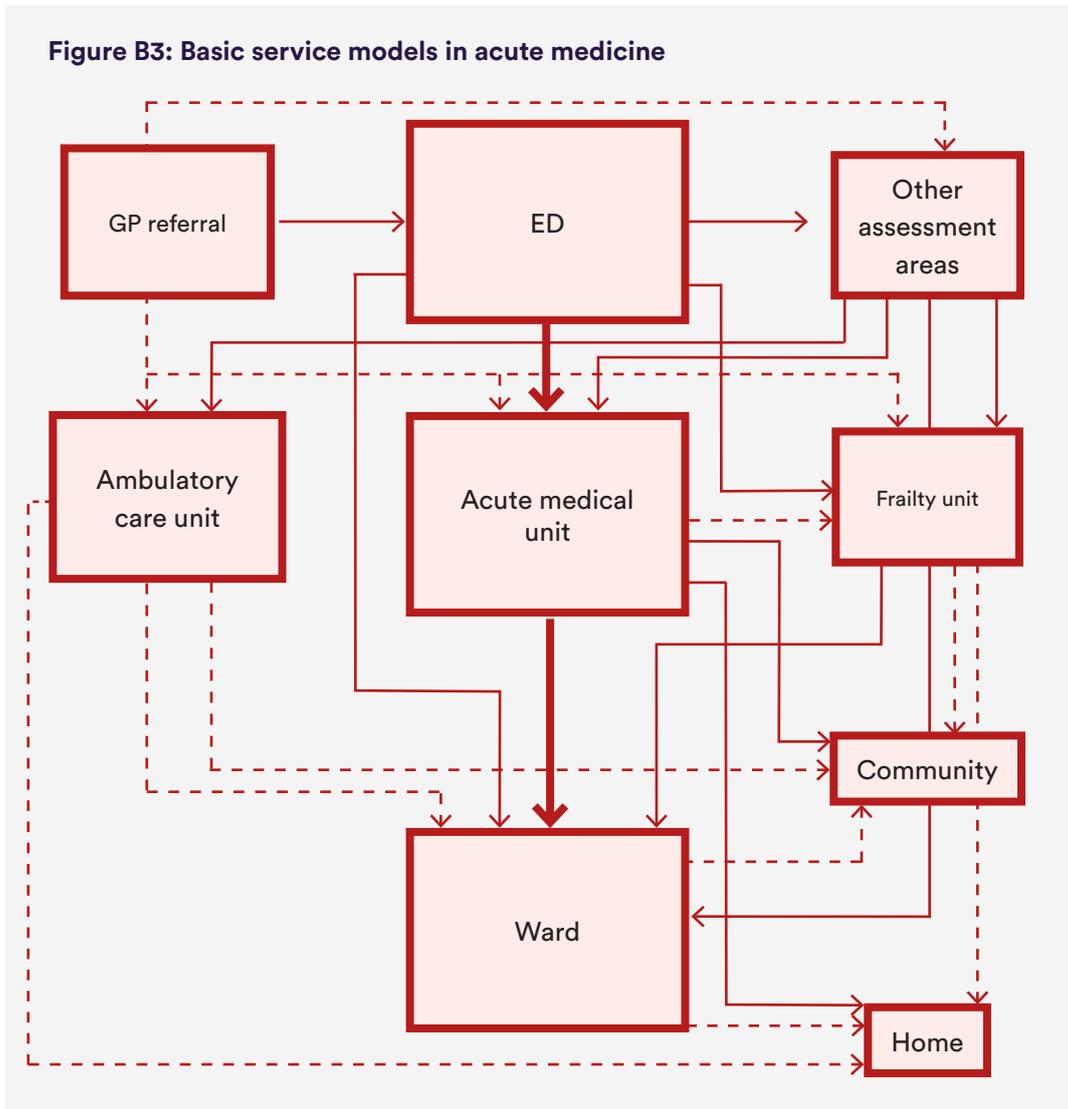
### The basic UK model of care

The basic UK model of care has undergone major evolution over the past 15 years with the introduction of the acute medical unit (Royal College of Physicians, 2007). This has rapidly become the dominant model, with at least 95% of hospitals having one, through which virtually all acutely unwell medical patients are channelled (see Figure B2).

**Figure B2: Basic UK pathway from the ED to the ward**



More recently, hospitals have been encouraged to develop on-site GP services, ambulatory emergency care and frailty services (Ambulatory Emergency Care Network, 2018; NHS England, 2014; The College of Emergency Medicine, 2015). The result is a system of marked complexity, where clinicians and managers in one part of the system are frequently unaware of the mechanics of care delivery in other parts of the system (see Figure 2).



Source: Medical Generalism Study

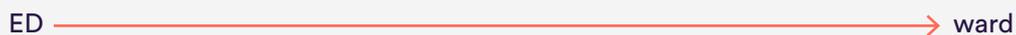
Our work also found that most hospitals have been developing new acute services within the footprint of existing services, that is, ambulatory emergency care and, to a lesser extent, frailty services being located within the acute medical unit and/or led by acute physicians. In a number of hospitals, however, ambulatory emergency care, frailty and other assessment services have been developed as geographically and managerially distinct from the ED/acute medical unit. The consequence of this is that there are multiple points of access to a plethora of services with highly similar functions, that is, the initial assessment and management of the acutely unwell patient. This has changed the function of many EDs, with an increased emphasis on brief

assessment and then sending patients on to other parallel services. A smaller number of hospitals have been working towards the ‘acute care hub model’, as suggested by the Future Hospital Commission (2013), where the distinctions between different acute and/or assessment services are blurred or even removed. To our knowledge, no hospital has as yet fully implemented this model of care.

### Overview of international models

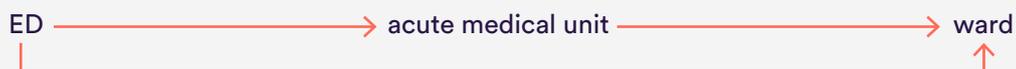
By contrast, models of care in Australia, Canada and New Zealand remain remarkably simple, with virtually all patients moving in a linear fashion between the ED and the downstream medical wards (see Figure B4).

**Figure B4: Basic international pathway from ED to the ward**



While the acute medical unit model has become more common in Australia to a certain extent (McNeill and others, 2011), the units there rarely take more than 50% of the acute take and tend to be the preserve of either patients expected to need only an overnight stay or sicker/undifferentiated patients likely to benefit from a higher level of care (see Figure B5).

**Figure B5: Basic pathway from the ED to the ward in Australia**



The Australian, Canadian and New Zealand models tend to vary more on the detail of the deployment of different types of staff in the ED and the way consultant cover of the downstream medical wards is arranged.

Acute medical units are also appearing in the Netherlands, but to a lesser degree than in Australia and predominantly in larger teaching hospitals. Many smaller hospitals in the Netherlands employ a distinct model, consisting of a first aid centre, a ward area catering for patients with a predicted stay of fewer than 48 hours, an intensive care unit and a facilitated outpatients department, with rapid access to diagnostics.

Immediate response to the patient’s presentation at the hospital

**Table B1: Immediate response to the patient’s presentation at the acute hospital – internationally**

|                       | Canada  | Australia   | New Zealand   | Elsewhere  |
|-----------------------|---|---|---|--|
| Primary place of care | <ul style="list-style-type: none"> <li>• ED</li> </ul>  | <ul style="list-style-type: none"> <li>• ED</li> </ul>  | <ul style="list-style-type: none"> <li>• ED</li> </ul>  | <ul style="list-style-type: none"> <li>• ED</li> <li>• First aid centre (the Netherlands)</li> </ul>     |
| Diagnostics           | <ul style="list-style-type: none"> <li>• Easy access to CT</li> <li>• Poor access to MRI</li> </ul>                             | <ul style="list-style-type: none"> <li>• Easy access to CT</li> <li>• MRI 24/7 where available</li> </ul>                       | <ul style="list-style-type: none"> <li>• Easy access to CT</li> <li>• MRI 24/7 where available</li> </ul>                           | <ul style="list-style-type: none"> <li>• Facilitated outpatients department (the Netherlands)</li> </ul> |
| Interventions         | <ul style="list-style-type: none"> <li>• Predominantly delivered in ED</li> <li>• Unlimited on-call for specialities</li> </ul> | <ul style="list-style-type: none"> <li>• Predominantly delivered in ED</li> <li>• Unlimited on-call for specialities</li> </ul> | <ul style="list-style-type: none"> <li>• Predominantly delivered in ED</li> <li>• Moves to limit on-call for specialties</li> </ul> | <ul style="list-style-type: none"> <li>• Stabilise and T/F (the Netherlands)</li> </ul>                  |
| Skills                | <ul style="list-style-type: none"> <li>• Concentrated in ED</li> <li>• All work at top of skill set</li> </ul>                  | <ul style="list-style-type: none"> <li>• Concentrated in ED</li> <li>• Dom work at top of skill set</li> </ul>                  | <ul style="list-style-type: none"> <li>• Concentrated in ED</li> <li>• Dom work at top of skill set</li> </ul>                      |  |
| Expertise             | <ul style="list-style-type: none"> <li>• Specialty-specific networks</li> <li>• All-in mentality</li> </ul>                     | <ul style="list-style-type: none"> <li>• Single networks</li> <li>• All-in mentality</li> </ul>                                 | <ul style="list-style-type: none"> <li>• Specialty-specific networks</li> </ul>   |  |
| Other support         | <ul style="list-style-type: none"> <li>• Heavy GP/other input</li> <li>• Often only sole ED doctor</li> </ul>                   | <ul style="list-style-type: none"> <li>• Spec regs based in ED</li> <li>• Specialist GPs in ED</li> </ul>                       | <ul style="list-style-type: none"> <li>• Universal emergency calls</li> <li>• Shared space with the intensive care unit</li> </ul>  | <ul style="list-style-type: none"> <li>• Cross-trained GPs (Spain)</li> </ul>                            |

### Primary place of care

In our international work we found that routine entry to the acute hospital is almost universally via the ED. Exceptions are patients identified as needing admission in an outpatient department (all countries) and where GPs have direct admitting rights to hospital beds (Canada and the United States).

Despite a version of the four-hour waiting time target recently having been introduced in Australia (the National Emergency Access Target or NEAT) (Council of Australian Governments, 2011), our interviewees all saw EDs as the primary place of work for the initial assessment, diagnosis and management of the patient. Patients are rarely transferred out of the ED until a primary diagnosis has been made and the patient is stabilised. The ED is therefore viewed as the critical place for the concentration of resources – staff, skills, expertise, technology and so on.

### Diagnostics

A common feature is the relative ease of access to diagnostic CT scanning, which is located either within or directly beside the ED. Interviewees commented on the necessity of rapidly securing a firm diagnosis, so that patients can be accurately triaged and appropriately managed at the earliest possible opportunity. Hospitals in Australia and New Zealand have substantially better access to MRI scanning than their Canadian counterparts. One hospital in Australia reported having access to three MRI scanners, including a dedicated acute scanner, while many smaller Canadian hospitals have no on-site MRI. Notably, where MRI is available, it is almost always accessible 24/7/365.

Access to ultrasound is mixed. We were told that a combination of easy access to CT scanning and widespread training of ED staff in very simple ultrasound techniques, such as bladder scanning, virtually removed the need for access to ultrasound out of hours.

Access to laboratory diagnostics is more limited, although most interviewees reported laboratory turnaround times of under two hours.

### Skills and expertise

Interviewees considered extended skill sets to be the norm for all staff in the ED setting. There is a stronger emphasis on consistently working at the top of

the skill set for staff in Canada, due to the relative shortage of medical staff at junior and middle-grade levels.

ED consultants are expected to be able to competently deliver almost all life-saving interventions for common presentations, such as thrombolysis for myocardial infarction and stroke, with the exception of procedures requiring interventional radiological support. Interviewees commented on the substantial support given to ED staff of all grades to obtain and then maintain competencies through both formal and informal mechanisms. They also thought that by having the ED as the primary place for the conduct of emergency interventions, this supported the broadest possible range of high-level skills.

Ways of accessing additional skills and expertise vary between countries. All hospitals described considerable work at both national and local levels to ensure the ready availability of staff with the necessary skills to deal with life-threatening emergencies. All hospitals also described high-frequency/low-intensity rosters for specialist staff, although the make-up of the consultant workforce, and hence the range of skills available, are highly dependent on the local hospital context.

Interviewees were clear that access to specialist skills is highly dependent on supporting contractual arrangements. Australia and Canada do not curtail the number of hours spent on call, with low numeration for the inconvenience of being on call coupled with generous payments for call-ins. New Zealand is currently moving to a medical contract that restricts doctors' working hours; medical directors reported concerns about the potential impact of this on sustaining on-call services for urgent interventions.

#### Other support

Professional and geographical boundaries between the ED and the rest of the hospital are always permeable and in many cases blurred. In some places, this is due to a relative lack of ED physicians, in which case the ED is supported by GPs with extended skill sets (Canada and Spain). However, the presence of both consultants and specialty registrars from other disciplines is routine, with specialty reviews of newly admitted patients regularly being conducted in the ED. The blurring of geographical boundaries is most visible in one New Zealand hospital, where the very small intensive care unit is geographically next to and sometimes shared staff with the ED.

All countries described ‘all-in’ policies with regard to emergencies within the hospital – the needs of the unwell patient invariably trumping professional and geographical boundaries. One smaller hospital in New Zealand described specifically having a code for any/all available doctors, with staff at home out of hours also expected to respond.

The policy of ‘putting the hospital to bed’ late at night (11pm to midnight) and delegating the main responsibility of ‘running the hospital’ to the ED is common, although in some hospitals responsibility switches to the intensive care unit.

### Early care and inpatient specialist care

**Table B2: Early care – internationally**

|                       | Canada   | Australia   | New Zealand   | Elsewhere  |
|-----------------------|--|---|---|--|
| Primary place of care | <ul style="list-style-type: none"> <li>• General wards</li> </ul>  | <ul style="list-style-type: none"> <li>• 50–75% general wards</li> <li>• 25–50% acute medical unit</li> </ul>                 | <ul style="list-style-type: none"> <li>• General wards</li> </ul>   | <ul style="list-style-type: none"> <li>• Mixed medical/surgical wards (the Netherlands)</li> </ul> |
| Diagnostics           | <ul style="list-style-type: none"> <li>• As for ED</li> </ul>  | <ul style="list-style-type: none"> <li>• As for ED</li> </ul>   | <ul style="list-style-type: none"> <li>• As for ED</li> </ul>   |  |
| Interventions         | <ul style="list-style-type: none"> <li>• As for ED</li> </ul>  | <ul style="list-style-type: none"> <li>• As for ED</li> </ul>   | <ul style="list-style-type: none"> <li>• As for ED</li> </ul>   |  |
| Skills                | <ul style="list-style-type: none"> <li>• Some specific rural training</li> </ul>   | <ul style="list-style-type: none"> <li>• Some specific rural training</li> </ul>  | <ul style="list-style-type: none"> <li>• Expect cross-skilling</li> </ul>                                       |  |
| Expertise             | <ul style="list-style-type: none"> <li>• Flexible approach – GPs, permanent specialists, rotating specialists</li> </ul> | <ul style="list-style-type: none"> <li>• Acute medical unit – ‘consultant of the week’</li> <li>• Wards – variable</li> </ul> | <ul style="list-style-type: none"> <li>• ‘Doctor of the day’</li> <li>• Some attempts at team models</li> </ul> |  |

**Table B3: Inpatient/specialist care – internationally**

|                       | Canada  | Australia   | New Zealand   | Elsewhere  |
|-----------------------|---|---|---|--|
| Primary place of care | <ul style="list-style-type: none"> <li>• Specialist beds rare</li> </ul>  | <ul style="list-style-type: none"> <li>• Specialist beds on general medical wards</li> </ul>  | <ul style="list-style-type: none"> <li>• Specialist beds on general medical wards</li> </ul>  | <ul style="list-style-type: none"> <li>• Mixed medical/surgical wards (the Netherlands)</li> </ul> |
| Primary care          | <ul style="list-style-type: none"> <li>• GPs</li> <li>• Rotating staff</li> </ul>   | <ul style="list-style-type: none"> <li>• General doctors</li> </ul>   | <ul style="list-style-type: none"> <li>• General doctors</li> </ul>   |  |
| Weekend cover         | <ul style="list-style-type: none"> <li>• Variable</li> </ul>  | <ul style="list-style-type: none"> <li>• Specialists – cover own patients</li> <li>• General medicine – rotating and ‘pop past’ the hospital</li> </ul> | <ul style="list-style-type: none"> <li>• Specialists – cover own patients</li> <li>• General medicine – rotating and ‘pop past’ the hospital</li> </ul> |  |
| Additional expertise  | <ul style="list-style-type: none"> <li>• Internists provide oversight</li> <li>• Some rotating specialists on a periodic basis</li> </ul> | <ul style="list-style-type: none"> <li>• Specialist consultant model</li> </ul>   | <ul style="list-style-type: none"> <li>• Specialist consultant model</li> </ul>   |  |
| Other support         | <ul style="list-style-type: none"> <li>• Junior doctor role often delivered by nurses</li> </ul>  | <ul style="list-style-type: none"> <li>• Excellent junior doctor cover</li> <li>• Stable team structure</li> </ul>                                      | <ul style="list-style-type: none"> <li>• Reasonable junior doctor cover</li> <li>• Stable team structure</li> </ul>                                     |  |

**Primary place of care**

The main place of early care in all hospitals is the general medical ward, with the majority of patients being transferred directly there from the ED. While most hospitals have some provision for specialist input, they rarely have dedicated specialist beds outside of high-dependency areas. Notably, in the Netherlands care is regularly provided with medical and surgical patients on the same ward.

Although acute medical units have become increasingly popular, they are not common in the smaller hospitals in our Medical Generalism study. Only in Australia did interviewees report having such a unit and these function as higher dependency areas for patients with undifferentiated illnesses or physiological instability. Some units are also able to provide intense multidisciplinary team input into patients with a short expected length of stay.

#### Diagnostics

Although it is expected that the bulk of the diagnostic process is completed before transfer out of the ED, patients in ward areas still receive very good access to diagnostics, with delays being recognised as a threat to high-quality care.

Where present, acute medical units have similar access to diagnostics as the ED.

#### Provision of care

Arrangements for the provision of medical care on the wards vary substantially, although there is universal emphasis on the provision of care by generalists.

In Canada, local GPs provide most of the daily oversight of patient management, with appropriate funding mechanisms in place. This is often supplemented by one or two general physicians who are either permanent staff or come out from a larger hospital. Some hospitals also benefit from visiting specialty consultants. Australia described parallel systems for the cover of the acute medical unit and the wards, with the acute medical unit having its own separate team (consultant/registrar/junior medical officer).

Approaches to teams tend to follow the 'firm' model, with an emphasis on stable medical teams delivering consistent care to a defined group of patients. However, cover on the Australian and New Zealand wards is split between the on-call and ward teams, with often complex working arrangements: in one hospital, medical admissions are reviewed by the on-call registrar, but care is transferred to the ward team as soon as the patient is moved out of the ED. Another described a more traditional 'consultant/registrar of the take' model.

In Australia and New Zealand, it is uncommon for specialist consultants to be responsible for the hospital management of more than three to five inpatients. Instead, a ‘consult’ model is almost universally used, with an expectation that specialist opinions are delivered in a timely fashion and include a highly detailed plan at consultant-to-consultant level. The consult model is also common in Canada and the United States, although the consult tends to be delivered by visiting specialists rather than hospital staff.

#### Weekend cover

Weekend cover is variable, with some places having a ‘pop past’ model of consultant review, where consultant staff ‘pop past’ the hospital to review the patients in lieu of a formal ward round. Others operate a ‘consultant of the weekend’ model, where a single consultant is responsible for both new admissions and the review of any unwell patients at the weekend.

#### Expertise and skill

There was a consensus that working as a general physician (or a specialist for that matter) in rural/remote settings demands a different skill set from that needed for working in a tertiary urban hospital.

Both Australia and Canada have gone some way in developing specific postgraduate training programmes for working in rural/remote areas (Canadian Collaborative Taskforce, 2017; Australian College of Rural and Remote Medicine, 2013). Beyond this, virtually all interviewees spoke of the need for general physicians to acquire and maintain extended skill sets.

Extended skill sets/cross-skilling are considered to be particularly important for non-medical staff in Canada, where the paucity of doctors in rural/remote areas has led to a reliance on other clinical staff groups. While Australian interviewees considered themselves to be adequately supplied with junior staff, they acknowledged that the rural/remote setting posed similar challenges to all staff groups, with the development of training programmes for allied health and nursing staff.

## Examples of staffing at international hospitals

### An average smaller Canadian hospital

#### Demographics and service provision

- 100 beds
- 18,000 ED presentations a year (50 a day)
- Thrombolysis for stroke and myocardial infarction delivered by ED staff.

#### All consultant staff

- 1 ED consultant
- 5–8 GPs (ED and inpatient input)
- 3–5 anaesthetists
- 3–5 surgeons
- 1–2 internists
- 1–2 additional consultants on longer rotations
- Regular ‘fly-in’ sessional consultants.

### Whanganui Hospital, New Zealand

#### Demographics and service provision

- Approximately 200 beds
- Serves a population of approximately 70,000
- Transfer for primary coronary intervention, stroke thrombolysis run by ED staff, on-call bleed service.

#### Medical consultant staff

- 8 ED consultants
- 6 general physicians
- 4 intensivists
- 3 cardiologists
- 3 gastroenterologists
- “One of everything else”

### Launceston Hospital, Australia

#### Demographics and service provision

- Approximately 300 beds
- Serves a population of 250,000
- Does not have neurosurgery, cardiac surgery or complex paediatric surgery
- Full service for everything else.

### Medical consultant staff

- 10.5 full-time equivalent (FTE ED consultants – 5 staff, remainders locum)
- 1 FTE director
- Acute and general medicine: 7 FTE spread over a head count of 11 people
- Geriatrics and rehabilitation: 2 FTE with a head count of 3
- Cardiology: 5.5 FTE with a head count of 7
- Respiratory: 2.5 FTE with a head count of 4
- Endocrine: 1.5 FTE with a head count of 3
- Gastroenterology: 3 FTE with a head of count of 6
- Nephrology: 2.5 FTE with a head count of 3
- Neurology: 1.1 FTE with a head count of 1 plus visiting service
- Dermatology: 0.1 as 2 visitors
- Haematology: 3.2 FTE including of pathology with a head count of 5
- Medical oncology: 4 FTE with a head count of 4
- Radiation oncology: 1 FTE with a head count of 2
- Intensive care unit physicians: 4.5 FTE with a head count of 5.

### Treat and transfer

Almost all interviewees commented on the critical importance of robust mechanisms for ‘treat and transfer’ for both emergency presentations and deteriorating inpatients. They described two main models:

- tiered, where patients are transferred to the closest unit with appropriate services
- straight to the centre, where all patients are transferred to a nominated unit, regardless of the originating hospital and bypassing other hospitals *en route*.

Interviewees heavily involved in supporting treat and transfer put forward positives and negatives for both models – both have been demonstrated to have improved patient outcomes, but both risk patients ending up in the wrong place. They thought that transferring patients to the centre likely produced better results for more unwell patients, as it minimised the number of patient moves, but that it is potentially damaging to smaller hospitals over the longer term. The flow of cash following the patient back to the centre is problematic and interviewees also observed that once the challenge of caring for very unwell patients is removed from smaller organisations, so they become less attractive places to work for certain groups of staff, particularly surgeons and those with an interest in critical care.

Regardless of which model of treat and transfer was in use, interviewees were consistent in describing underpinning principles that are essential in making systems successful. They emphasised the paramount importance of high-quality local delivery of care to critically unwell patients. They thought that hospitals, rather than individual staff, should be able to deliver appropriate care for the first four to six hours after presentation. For even very rare conditions, the hospital should be able to respond “like riding a bike”.

Interviewees said that high-quality infrastructure, at both the sending and receiving organisations, is critical. Investment in telemedicine – particularly of the types that allow patients to be seen remotely, access to real-time investigations and ‘hands-free’ phone discussions – is seen as especially important.

Ease of access to advice and elimination of the need to ‘ring around’ were considered to be the main way of reducing many of the frustrations attached to the transfer process. In Queensland, there is now a single number for any physician in remote areas seeking advice, which connects to a control room in Brisbane, which is staffed 24/7 by consultants. When questions cannot be handled immediately, it is the responsibility of the receiving consultant in Brisbane to contact an appropriate specialist for advice. Where the decision is that a patient needs to be transferred, the onus for finding an appropriate bed and initial liaison with the appropriate specialty receiving team rests with the control room.

Interviewees thought that control rooms are desirable because of the accompanying centralised oversight of assets (that is, staff, different types of transport and available beds) across whole geographical regions. The ability to make decisions about competing patient priorities, as well as individual patients, and to mobilise diverse resources was considered not only to be highly efficient, but also to relieve individual clinicians and ambulance staff of considerable logistical and ethical burdens.

Particularly if centralised control systems were in place, interviewees said that the response of receiving hospitals should be ‘yes, not no’ to all requests for patient transfer. They thought that it is not moral or reasonable if large teaching hospitals refuse transfers from much more poorly resourced organisations. Moreover, they said that the hours between the notification of a

transfer and the arrival of the patient are sufficient for any larger organisation to manage any logistical issues. In the United States, the ability of receiving hospitals to refuse transfers was removed as part of the federal Emergency Medical Treatment and Active Labor Act 1986 (EMTALA) (American College of Emergency Physicians, 2013).

Although not essential to the safe transfer of patients, retrieval teams were considered highly desirable when patients require intervention before transfer or where transfer times are particularly long.

While there was no argument that the onus of responsibility for accepting and facilitating transfer should rest on the receiving hospital/centralised control, clear demarcation around the boundaries of clinical responsibility was considered necessary, along with robust patient handovers. Rigorous audit and feedback around patient transfers were thought essential at hospital (sending and receiving) and whole-system levels.

Interviewees thought that, due to the complexity and resource-intensive nature of transfers, it is not always the best solution for hospitals or patients. Stabilising patients, arranging transfers and then making the transfers usually equates to many hours of staff time. Requiring staff to accompany patients on out-of-hours transfers also potentially jeopardises already fragile cover. Hence, other solutions (such as waiting for staff to come to patients) may actually be preferable to transfer, particularly when transfers are delayed.

Despite the insistence on high-quality local care, interviewees were clear that hard thresholds for transfers are not desirable, as the need for transfers is often dependent on the treating clinician's level of skill.

## Creating success in smaller hospitals – key themes

### The hospital and the community

Interviewees were united in their view that smaller hospitals must be viewed as an integral part of their local communities and essential to their collective survival. Hospitals have an obligation to provide services tailored to meet the needs of the local population.

Strong ties with other civic institutions, such as the town council, schools and civil services, were thought to not only improve the provision of population health initiatives, but also foster a community in which hospital staff wish to continue to live and invest. Mobilising local networks to support new doctors, their spouses and family to settle into the community have been found to be a highly effective way of attracting and retaining skilled medical staff.

### Skills versus expertise

Interviewees felt that recognising and managing the distinction between ‘skills’, which are task-orientated, and ‘expertise’, which is about decision making, is an essential component in making smaller hospitals function safely and effectively.

Upskilling all staff is an essential factor in improving patient safety and hospital efficiency. It also allows more creative approaches particularly to the problem of out-of-hours cover. This should be matched by easy access to appropriate expertise to support complex decision making through informal mechanisms (for example, ‘phone a friend’) and formal mechanisms (for example, networks, virtual clinics and telemedicine).

Almost universally, interviewees thought that the ED and the intensive care unit are the prime reservoirs of skill, being the only places where ‘the lights are always on’ and mostly assigned the responsibility for the hospital out of hours. As such, they expected that the ED and the intensive care unit should support the management of acutely unwell patients, regardless of their location within the hospital. Ensuring that these areas are appropriately staffed is a priority.

## Team working

Interviewees thought that team-based approaches are important at every level – ward, department, hospital and region. Stable team structures are considered ideal, but the size constraints of smaller organisations mean that the ability to work smoothly across and between teams is often more desirable. Collaboration and cooperation should be the default position of both individuals and organisations.

## Consultant working and culture

Interviewees emphasised that it is critical to acknowledge that emergency work is, by its nature, unpredictable. Flexible approaches to work, especially in the out-of-hours setting, are therefore required on the part of both the hospital and its staff. This needs to be matched by appropriate reimbursement mechanisms.

Consultants in smaller hospitals tended to appreciate the high degree of autonomy over their working arrangements and this was frequently seen as a motivation for working in a smaller hospital. This autonomy, however, needs to be balanced by stringent governance and expectations of accountability.

The ‘Cycles of Doom and Virtue’ were described as being amplified in smaller organisations. Good behaviour and cooperation across the workforce tends to be self-reinforcing. However, problems with disaffection can spread rapidly and the loss of a single member of staff can represent a substantial burden to colleagues. Creating and maintaining a happy, united workforce is considered therefore to be a primary organisational aim. Poor behaviour and staff shortfalls also need to be rapidly addressed.

Other countries were more sympathetic to consultants working across multiple organisations. Although this stemmed from some systems having a substantial private component, working in two or more public hospitals, either on a sessional or rotating-block basis, is not uncommon. This is seen to have benefits for smaller organisations, as it helps to maintain skills, enhances job diversity and makes consultants less inclined to leave.

## Approach to the education and training of junior doctors

Interviewees in Australia, Canada, New Zealand and the United States shared similar views on the key elements needed to support the training of undergraduate and postgraduate doctors in medical generalism:

- ‘Get them early’ – the earlier the exposure to the remote/rural environment, the more likely the student/doctor is to report a positive experience.
- ‘Going country’ should be the expectation of all medical students and junior doctors. Hence, education should equip doctors with the basic skills required to make decisions in relatively resource-poor environments.
- ‘A doctor is a doctor’ – *all* medical staff have skills and experiences that are of benefit in smaller hospitals and all should be expected to function at the top of their licence.
- Role models are highly influential. Care should be taken to select mentors and supervisors for ‘excellence’.
- Smaller hospitals represent an ideal opportunity for very junior doctors to become competent in a wide range of practical skills, while also providing a near-ideal environment for senior trainees looking to move into consultant practice. Supervision should therefore be tailored to the needs of the individual trainee.
- Engagement with the local community is essential, as it reveals the needs of the population, demonstrates how the different non-hospital facets of health and social care are delivered and fosters understanding of the complex relationships between the hospital and the people it serves.
- The successful delivery of medical education to learners in remote sites requires substantial investment in infrastructure, especially technology to support ‘virtual classrooms’, online learning communities and access to electronic libraries. The benefits of this go beyond supporting students and extend to the wider hospital.

## Credentialing and continuous professional development

Given that the quality and safety of care in smaller hospitals is dependent on staff having extended skill sets, respondents from all countries emphasised the importance of supporting continuing education. Almost all reported

that highly liberal training budgets are a necessity, rather than a luxury. One medical director from New Zealand commented that his training budget is “uncapped”.

Interviewees thought that investment in external training has benefits beyond its educational value. Isolation from specialist colleagues and the development of idiosyncratic practice were felt to be a risk for clinicians in smaller organisations, which is mitigated by attendance at external meetings and participation in professional organisations.

Credentialing and continuous professional development programmes differ across jurisdictions, with New Zealand having the most sophisticated approach (see Appendix A). Respondents from New Zealand were extremely positive about credentialing at the organisational level. A number of medical directors spoke of the ability to ‘value base’ aspects of credentialing. This allowed them, for example, either to not hire or to constructively dismiss specialists who performed clinically well but did not have attitudes or exhibit behaviours that chimed with the organisation’s ethos. It also allowed clinicians across all services to develop and maintain the skills necessary for interdisciplinary working and created more interesting job plans. The requirement for collegial relationships also served to strengthen relationships between departments.

That the New Zealand Medical Council requires hospitals to benchmark performance against similar hospitals, rather than insisting that smaller hospitals achieve the same standards as their much larger counterparts, was seen as entirely positive, rather than an admission of the existence of a two-tier system. This was supported by the Medical Council’s strong focus on generalism at the national level and the existing concentration of very specialist services in a small number of units (New Zealand has, for example, only one specialist paediatric hospital).

Interviewees considered the process of credentialing and the mandatory peer-review component of New Zealand’s continuous professional development as pivotal to promoting mature discussions with individual clinicians and with teams about what services should be provided to the local population and addressing dips in performance. They were also seen as being potentially protective of clinicians by acting as a brake on what organisations can demand

from clinicians (for example, protection from overworking and acting outside of a defined scope to meet targets).

Respondents from Australia and New Zealand also noted the move towards the use of performance-based frameworks by the Australasian Royal Colleges. Pioneered by the Royal Australasian College of Surgeons, the frameworks cover both technical and non-technical aspects of medical work and examine behaviours and attitudes. It was considered that while such a framework is more labour intensive both for the individual clinician and administratively, it is likely to give a better perspective of clinician performance and begin to tease out the interpersonal and behavioural issues that are important to address in the smaller hospital setting.

### **Specialist versus generalist patient care**

There was consensus that a generalist approach to patient care is essential. Most models focus on a larger pool of generalist staff with a ‘plus one of each’ approach to specialist recruitment. Specialists were considered a valuable resource – to be used sparingly to add to a patient’s care.

## **The return of generalism**

The continued survival of rural and remote hospitals in Australia, New Zealand and some parts of Canada was consistently attributed to a resurgence of interest in general medicine.<sup>4</sup> Several interviewees spoke at length about their involvement in driving this particular agenda.<sup>5</sup>

In all three countries, the revival of generalism was sparked at the grassroots level, rather than being led from the top down. In each case, a willingness to embrace ‘radical honesty’ about the quality of care in smaller communities, which frequently have poorer access to health care, was the starting point for often quite difficult conversations about how patient and population outcomes could be improved.

4 A discussion of the American hospitalist movement is beyond the scope of this report.

5 Where interviewees have published on particular issues, references have been added.

The case for change was consistently framed around the critical importance of hospitals in smaller communities – ‘no hospital, no town’. Not only do such hospitals provide a substantial proportion of urgent care, they also form a hub for the provision of a host of other services and act as an attractor for general practice. Their economic importance was also emphasised. Hospitals are usually one of the largest employers in any district, as well as being a major trading partner for other businesses. Conversely, poor access to health care is a major deterrent for people looking to relocate and a particular problem for countries heavily dependent on primary industries that sit in remote and rural locations, such as mining, farming and adventure tourism (Allen and others, 2015; Davis and Allen, 2014). The economic discourse was linked with broader discussions around social justice and political accountability (Strasser and others, 2013). The failure to support smaller hospitals was translated into governments’ failure to secure citizens’ fundamental rights to equitable access to health care (Chater, 2008; Fleet and others, 2013).

These powerful narratives were harnessed to agendas around research, medical education and training at all levels, funding mechanisms and regulation to reinvigorate generalist practice in rural and remote hospitals (Hogenbirk and others, 2015b; Pashen and others, 2007).

Although the revival of generalism initially focused on ruralist practice, it has since infiltrated into other disciplines. In Australia and New Zealand, for example, the general medicine programme now attracts the second greatest number of physician trainees (only cardiology attracts more), while the number of trainees in general internal medicine in Canada continues to rise from an all-time low in 2007. Rural generalist programmes are being developed in Australia and Canada to support nurses, physiotherapists and other allied health professionals (Services for Australian Remote and Rural Allied Health, 2017).

Respondents also pointed to the research around the positive impact of generalist programmes. In Australia and Canada, rural medical schools have acted as a magnet to attract and retain medical students and trainees, with traditional workforce shortages in certain locations either disappearing or being substantially reduced (Strasser and others, 2013; Greenhill and others, 2015). More importantly, the provision of rural training programmes has been

found to have unexpected socioeconomic benefits, through the expansion of rural health care provision, the development of community capacity and opportunities for innovation (Hogenbirk and others, 2015b).

## Conclusions

In summary, there are a number of important lessons to be drawn from international experience:

- There are benefits to simpler ‘front-door’ systems with more pooling of medical resources.
- Models ensure that there are broadly skilled medical staff able to work at the top of their licence.
- Other countries have on-call arrangements that are more flexible and recognise the difference between frequency and intensity.
- There are high levels of early access to diagnostics, especially CT.
- Professional and geographical boundaries between the ED and the rest of the hospital are always permeable and in many cases blurred.
- Both Australia and Canada have gone some way in developing specific postgraduate training programmes for working in rural/remote areas. Beyond this, virtually all respondents spoke of the need for the acquisition and maintenance of extended skill sets for general physicians and in some countries for other clinicians as well.
- Almost all interviewees commented on the critical importance of robust mechanisms for ‘treat and transfer’ for both emergency presentations and deteriorating inpatients.
- Upskilling all staff was considered an essential factor in improving patient safety and hospital efficiency. It also allows for more creative approaches particularly to the problem of out-of-hours cover.
- The ED and the intensive care unit were almost universally considered to be the prime reservoirs of skill, being the only places where ‘the lights are always on’ and mostly assigned the responsibility for the hospital out of hours. Interviewees expected that the ED and the intensive care unit

should support the management of acutely unwell patients, regardless of their location within the hospital. Ensuring that these areas are appropriately staffed was considered a priority.

- There was consensus that a generalist approach to patient care is essential. Specialists should be considered a valuable resource – they are to be used sparingly and they must add value to a patient’s care.
- Training, credentialing and continuous professional development look quite different in Australia, New Zealand and Canada and an important part of supporting their models of care.

# References

- Abdulwahid MA, Booth A, Kuczawski M and Mason SM (2016) 'The impact of senior doctor assessment at triage on emergency department performance measures: systematic review and meta-analysis of comparative studies', *Emergency Medicine Journal* 33(7), 504–13.
- Academy of Medical Royal Colleges (2012) 'The benefits of consultant-delivered care'. [www.aomrc.org.uk/wp-content/uploads/2016/05/Benefits\\_consultant\\_delivered\\_care\\_1112.pdf](http://www.aomrc.org.uk/wp-content/uploads/2016/05/Benefits_consultant_delivered_care_1112.pdf). Accessed 20 July 2018.
- Ahmed-Little Y (2007) 'Implications of shift work for junior doctors', *British Medical Journal* 334(7597), 777–8.
- Aiken LH, Sloane D, Griffiths P, Rafferty AM, Bruyneel L, McHugh M and others (2017) 'Nursing skill mix in European hospitals: cross-sectional study of the association with mortality, patient ratings, and quality of care', *BMJ Quality & Safety* 26(7), 559–68.
- Aiken LH, Sloane DM, Bruyneel L, Van den Heede K, Griffiths P, Busse R and others (2014) 'Nurse staffing and education and hospital mortality in nine European countries: a retrospective observational study', *The Lancet* 383(9931), 1824–30.
- Album D and Westin S (2008) 'Do diseases have a prestige hierarchy? A survey among physicians and medical students', *Social Science & Medicine* 66(1), 182–8.
- Aldridge C, Bion J, Boyal A, Chen Y-F, Clancy M, Evans T and others (2016) 'Weekend specialist intensity and admission mortality in acute hospital trusts in England: a cross-sectional study', *The Lancet* 388(10040), 178–86.
- Allen JE, Davis AF, Hu W and Owusu-Amankwah E (2015) 'Residents' willingness-to-pay for attributes of rural health care facilities', *Journal of Rural Health* 31(1), 7–18.
- Ambulatory Emergency Care Network (2018) 'Directory of ambulatory emergency care for adults'. [www.ambulatoryemergencycare.org.uk/uploads/files/1/AEC-Directory%206th%20edition%20February%202018.pdf](http://www.ambulatoryemergencycare.org.uk/uploads/files/1/AEC-Directory%206th%20edition%20February%202018.pdf)

- American College of Emergency Physicians (2013) 'EMTALA and on-call responsibility for emergency department patients', *Annals of Emergency Medicine* 62(4), 441-2.
- American Hospital Association (2018) 'AHA hospital statistics 2018'. [www.aha.org/statistics/2016-12-27-aha-hospital-statistics-2018-edition](http://www.aha.org/statistics/2016-12-27-aha-hospital-statistics-2018-edition). Accessed 20 July 2018.
- Antinaho T, Kivinen T, Turunen H and Partanen P (2015) 'Nurses' working time use - how value adding it is?', *Journal of Nursing Management* 23(8), 1094-105.
- Appleby J (2016) 'Nuffield winter insight briefing 1: winter bed pressures'. [www.nuffieldtrust.org.uk/files/2017-01/winter-beds-pressures-final.pdf](http://www.nuffieldtrust.org.uk/files/2017-01/winter-beds-pressures-final.pdf)
- Australian College of Rural and Remote Medicine (2013) *Primary Curriculum* (4th edn). Australian College of Rural and Remote Medicine.
- Australian College of Rural and Remote Medicine (2017) 'Advanced specialised training adult internal medicine: curriculum'. [www.acrrm.org.au/docs/default-source/documents/training-towards-fellowship/curriculum-ast-adult-internal-medicine.pdf?sfvrsn=2](http://www.acrrm.org.au/docs/default-source/documents/training-towards-fellowship/curriculum-ast-adult-internal-medicine.pdf?sfvrsn=2). Accessed 20 July 2018.
- Australian Commission on Safety and Quality in Health Care (2015) 'Credentialing health practitioners and defining their scope of clinical practice: a guide for managers and practitioners'. [www.safetyandquality.gov.au/wp-content/uploads/2016/02/Credentialing-health-practitioners-and-defining-their-scope-of-clinical-practice-A-guide-for-managers-and-practitioners-December-2015.pdf](http://www.safetyandquality.gov.au/wp-content/uploads/2016/02/Credentialing-health-practitioners-and-defining-their-scope-of-clinical-practice-A-guide-for-managers-and-practitioners-December-2015.pdf)
- Australian Institute of Health and Welfare (2017) 'Hospital resources 2015-16: Australian hospital statistics'. [www.aihw.gov.au/reports/hospitals/ahs-2015-16-hospital-resources/contents/table-of-contents](http://www.aihw.gov.au/reports/hospitals/ahs-2015-16-hospital-resources/contents/table-of-contents). Accessed 20 July 2018.
- Avtgis TA, Polack EP, Martin MM and Rossi D (2010) 'Improve the communication, decrease the distance: the investigation into problematic communication and delays in inter-hospital transfer of rural trauma patients', *Communication Education* 59(3), 282-93.

- Ayanian JZ, Hauptman PJ, Guadagnoli E, Antman EM, Pashos CL and McNeil BJ (1994) 'Knowledge and practices of generalist and specialist physicians regarding drug therapy for acute myocardial infarction', *New England Journal of Medicine* 331(17), 1136–42.
- Baker D, Gustafson S, Beaubien J, Salas E and Barach P (2005) 'Medical teamwork and patient safety: the evidence-based relation: literature review'. <https://archive.ahrq.gov/research/findings/final-reports/medteam>. Accessed 20 July 2018.
- Ball J, Day T, Murrells T, Dall'Ora C, Rafferty AM, Griffiths P and Maben J (2017) 'Cross-sectional examination of the association between shift length and hospital nurses job satisfaction and nurse reported quality measures', *BMC Nursing* 16(1). <http://bmcnurs.biomedcentral.com/articles/10.1186/s12912-017-0221-7>. Accessed 20 July 2018.
- Baraheni N, Gamal-Eldeen H and Gupta D (2014) 'Annualisation: an approach to consultant job planning', *British Journal of Healthcare Management* 20(5), 228–33.
- Bell D, Lambourne A, Percival F, Lavery AA and Ward DK (2013) 'Consultant input in acute medical admissions and patient outcomes in hospitals in England: a multivariate analysis', *PLOS ONE* 8(4), e61476.
- Bergeron C, Fleet R, Tounkara FK, Lavallée-Bourget I and Turgeon-Pelchat C (2017) 'Lack of CT scanner in a rural emergency department increases inter-facility transfers: a pilot study', *BMC Research Notes* 10(1), 772.
- Bing-You RG, Trowbridge RL, Kruihoff C and Daggett JL (2014) 'Unfreezing the flexnerian model: introducing longitudinal integrated clerkships in rural communities', *Rural Remote Health* 14(3), 2944.
- Bray BD, Ayis S, Campbell J, Cloud GC, James M, Hoffman A and others (2014) 'Associations between stroke mortality and weekend working by stroke specialist physicians and registered nurses: prospective multicentre cohort study', *PLoS Medicine* 11(8), e1001705.
- Brown BB, Patel C, McInnes E, Mays N, Young J and Haines M (2016) 'The effectiveness of clinical networks in improving quality of care and patient outcomes: a systematic review of quantitative and qualitative studies', *BMC Health Services Research* 16(1). <http://bmchealthservres.biomedcentral.com/articles/10.1186/s12913-016-1615-z>. Accessed 20 July 2018.

- Care Quality Commission (2017) 'The state of health care and adult social care in England 2016/2017'. [www.cqc.org.uk/sites/default/files/20171123\\_stateofcare1617\\_report.pdf](http://www.cqc.org.uk/sites/default/files/20171123_stateofcare1617_report.pdf)
- Chan RJ, Marx W, Bradford N, Gordon L, Bonner A, Douglas C, Schmalkuche D and Yates P (2018) 'Clinical and economic outcomes of nurse-led services in the ambulatory care setting: a systematic review', *International Journal of Nursing Studies* 81, 61–80.
- Chater AB (2008) 'Looking after health care in the bush', *Australian Health Review* 32(2), 313–18.
- Chaudhuri E, Mason N, Logan S, Newbery N and Goddard A (2013) 'The medical registrar: empowering the unsung heroes of patient care'. [www.rcplondon.ac.uk/file/1793/ad](http://www.rcplondon.ac.uk/file/1793/ad). Accessed 20 July 2018.
- Coburn AF, Wakefield M, Casey M, Moscovice I, Payne S and Loux S (2004) 'Assuring rural hospital patient safety: what should be the priorities?', *Journal of Rural Health* 20(4), 314–26.
- Cooper H, Findlay G, Goodwin A, Gough M, Lucas S, Mason D, Martin IC, Stewart JAD and Wilkinson K (2009) 'Caring to the end? A review of the care of patients who died in hospital within four days of admission'. [www.ncepod.org.uk/2009report2/Downloads/DAH\\_report.pdf](http://www.ncepod.org.uk/2009report2/Downloads/DAH_report.pdf)
- Cossec CL, Colas S and Zureik M (2017) 'Relative impact of hospital and surgeon procedure volumes on primary total hip arthroplasty revision: a nationwide cohort study in France', *Arthroplasty Today* 3(3), 176–82.
- Council of Australian Governments (2011) 'The National Health Reform Agreement - National Partnership Agreement on Improving Public Hospital Services'. [www.federalfinancialrelations.gov.au/content/npa/health/\\_archive/national-workforce-reform/national\\_partnership.pdf](http://www.federalfinancialrelations.gov.au/content/npa/health/_archive/national-workforce-reform/national_partnership.pdf)
- Davis A and Allen J (2014) *The Value of Access to Rural Hospitals*. National Rural Health Association.
- Department of Health (2000) 'The NHS plan: a plan for investment: a plan for reform'. [http://webarchive.nationalarchives.gov.uk/+/www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH\\_4002960](http://webarchive.nationalarchives.gov.uk/+/www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_4002960). Accessed 20 July 2018.

- Edwards N (2002) 'Clinical networks: advantages include flexibility, strength, speed, and focus on clinical issues', *British Medical Journal* 324(7329), 63.
- Edwards N (2016) 'What do we know about STPs so far?'. [www.nuffieldtrust.org.uk/news-item/what-do-we-know-about-stps-so-far#more-radical-plans](http://www.nuffieldtrust.org.uk/news-item/what-do-we-know-about-stps-so-far#more-radical-plans). Accessed 20 July 2018.
- Fackler JC, Watts C, Grome A, Miller T, Crandall B and Pronovost P (2009) 'Critical care physician cognitive task analysis: an exploratory study', *Critical Care* 13(2), R33.
- Faculty for Intensive Care Medicine (2013) 'Core standards for intensive care units'. [www.ficm.ac.uk/sites/default/files/Core%20Standards%20for%20ICUs%20Ed.1%20\(2013\).pdf](http://www.ficm.ac.uk/sites/default/files/Core%20Standards%20for%20ICUs%20Ed.1%20(2013).pdf)
- Findlay G, Shotton H, Kelly K and Mason M (2012) 'Time to intervene? A review of patients who underwent cardiopulmonary resuscitation as a result of an in-hospital cardiorespiratory arrest'. [www.ncepod.org.uk/2012cap.html](http://www.ncepod.org.uk/2012cap.html). Accessed 20 July 2018.
- Fleet R, Archambault P, Plant J and Poitras J (2013) 'Access to emergency care in rural Canada: should we be concerned?', *Canadian Journal of Emergency Medicine* 15(4), 191-3.
- Foot C, Naylor C and Imison C (2010) 'The quality of GP diagnosis and referral'. [www.kingsfund.org.uk/sites/default/files/Diagnosis%20and%20referral.pdf](http://www.kingsfund.org.uk/sites/default/files/Diagnosis%20and%20referral.pdf)
- Fulop NJ, Ramsay AIG, Perry C, Boaden RJ, McKeivitt C, Rudd AG, Turner SJ, Tyrrell PJ, Wolfe CDA and Morris S (2015) 'Explaining outcomes in major system change: a qualitative study of implementing centralised acute stroke services in two large metropolitan regions in England', *Implementation Science* 11(1), 80. <http://implementationscience.biomedcentral.com/articles/10.1186/s13012-016-0445-z>. Accessed 20 July 2018.
- Future Hospital Commission (2013) 'Future hospital: caring for medical patients: a report from the Future Hospital Commission to the Royal College of Physicians'. [www.rcplondon.ac.uk/projects/outputs/future-hospital-commission](http://www.rcplondon.ac.uk/projects/outputs/future-hospital-commission). Accessed 20 July 2018.

- Gainsbury S (2017) 'The bottom line: understanding the NHS deficit and why it won't go away'. [www.nuffieldtrust.org.uk/research/the-bottom-line-understanding-the-nhs-deficit-and-why-it-won-t-go-away](http://www.nuffieldtrust.org.uk/research/the-bottom-line-understanding-the-nhs-deficit-and-why-it-won-t-go-away). Accessed 20 July 2018.
- Gaynor M, Laudicella M and Propper C (2012) 'Can governments do it better? Merger mania and hospital outcomes in the English NHS', *Journal of Health Economics* 31(3), 528–43.
- General Medical Council (2015) 'Introducing regulated credentials'. [www.gmc-uk.org/-/media/documents/introducing-regulated-credentials-consultation-w-form-final-distributed\\_pdf-61589419.pdf](http://www.gmc-uk.org/-/media/documents/introducing-regulated-credentials-consultation-w-form-final-distributed_pdf-61589419.pdf). Accessed 26 July 2018.
- Gillespie D (2017) 'Government announces improvements to Australian general practice training as part of health workforce reforms'. Media release. [www.health.gov.au/internet/ministers/publishing.nsf/Content/45E3E1BED9069569CA2580B7007B0A2E/\\$File/DG003.pdf](http://www.health.gov.au/internet/ministers/publishing.nsf/Content/45E3E1BED9069569CA2580B7007B0A2E/$File/DG003.pdf)
- Gordon H (2017) Focus on physicians: census of consultant physicians and higher specialty trainees 2016–17. [www.rcplondon.ac.uk/projects/outputs/2016-17-census-uk-consultants-and-higher-specialty-trainees](http://www.rcplondon.ac.uk/projects/outputs/2016-17-census-uk-consultants-and-higher-specialty-trainees). Accessed 20 July 2018.
- Graves M and Doucet S (2016) 'Factors affecting interprofessional collaboration when communicating through the use of information and communication technologies: a literature review', *Journal of Research in Interprofessional Practice and Education* 6(2), 1–33.
- Gray A (2004) 'Secondary transport of the critically ill and injured adult', *Emergency Medicine Journal* 21(3), 281–5.
- Greenhill JA, Walker J and Playford D (2015) 'Outcomes of Australian rural clinical schools: a decade of success building the rural medical workforce through the education and training continuum', *Rural Remote Health* 15(3), 2991.
- Grosse SD, Schechter MS, Kulkarni R, Lloyd-Puryear MA, Strickland B and Trevathan E (2009) 'Models of comprehensive multidisciplinary care for individuals in the United States with genetic disorders', *Pediatrics* 123(1), 407–12.

- Hamilton-Fairley D, Coakley J and Moss F (2014) 'Hospital at night: an organizational design that provides safer care at night', *BMC Medical Education* 14(suppl 1), S17.
- Han L, Meacock R, Anselmi L, Kristensen SR, Sutton M, Doran T, Clough S and Power M (2017) 'Variations in mortality across the week following emergency admission to hospital: linked retrospective observational analyses of hospital episode data in England, 2004/5 to 2013/14'. [www.ncbi.nlm.nih.gov/books/NBK464621](http://www.ncbi.nlm.nih.gov/books/NBK464621). Accessed 20 July 2018.
- Harrison A (2012) 'Assessing the relationship between volume and outcome in hospital services: implications for service centralization', *Health Services Management* 25(1), 1–6.
- Health Education England (2016a) 'Enhancing junior doctors' working lives: a progress report'. <https://hee.nhs.uk/sites/default/files/documents/Enhancing%20junior%20doctors%20working%20lives%20-%20a%20progress%20report.pdf>
- Health Education England (2016b) 'Training in smaller places: product of a task and finish group commissioned by Health Education England'. <https://madeinheene.hee.nhs.uk/Portals/0/Policies/overarching/Training%20in%20Smaller%20Places%20June%202016.pdf>
- Health Quality and Safety Commission New Zealand (2017) 'A window on the quality of New Zealand's health care 2017'. [www.hqsc.govt.nz/assets/Health-Quality-Evaluation/Windows\\_Document/Window-Jun-2018.pdf](http://www.hqsc.govt.nz/assets/Health-Quality-Evaluation/Windows_Document/Window-Jun-2018.pdf)
- Hearnshaw SA, Logan RFA, Lowe D, Travis SPL, Murphy MF and Palmer KR (2010) 'Use of endoscopy for management of acute upper gastrointestinal bleeding in the UK: results of a nationwide audit', *Gut* 59(8), 1022–9.
- Heart of England Foundation Trust (2014) *Clinical Case for Reconfiguration of Surgical Services*. Heart of England Foundation Trust.
- Henderson J, Kurinczuk J and Knight M (2017) 'Resident consultant obstetrician presence on the labour ward versus other models of consultant cover: a systematic review of intrapartum outcomes', *BJOG: An International Journal of Obstetrics & Gynaecology* 124(9), 1311–20.
- Hogenbirk JC, French MG, Timony PE, Strasser RP, Hunt D and Pong RW (2015a) 'Outcomes of the Northern Ontario School of Medicine's

distributed medical education programmes: protocol for a longitudinal comparative multicohort study', *BMJ Open* 5(7), e008246.

Hogenbirk JC, Robinson DR, Hill ME, Pong RW, Minore B, Adams K, Strasser RP and Lipinski J (2015b) 'The economic contribution of the Northern Ontario School of Medicine to communities participating in distributed medical education', *Canadian Journal of Rural Medicine* 20(1), 25–32.

Ibrahim AM, Hughes TG, Thumma JR and Dimick JB (2016) 'Association of hospital critical access status with surgical outcomes and expenditures among Medicare beneficiaries', *Journal of the American Medical Association* 315(19), 2095–103.

Imison C (2011) 'Reconfiguring hospital services'. [www.kingsfund.org.uk/publications/articles/briefing-reconfiguring-hospital-services](http://www.kingsfund.org.uk/publications/articles/briefing-reconfiguring-hospital-services). Accessed 20 July 2018.

Imison C (2018) 'Hospital reconfiguration: if workforce is the problem, why is workforce not the solution?'. [www.nuffieldtrust.org.uk/news-item/hospital-reconfiguration-if-workforce-is-the-problem-why-is-workforce-not-the-solution](http://www.nuffieldtrust.org.uk/news-item/hospital-reconfiguration-if-workforce-is-the-problem-why-is-workforce-not-the-solution). Accessed 20 July 2018.

Imison C, Castle-Clarke S and Watson R (2016a) 'Reshaping the workforce to deliver the care patients need'. [www.nuffieldtrust.org.uk/files/2017-01/reshaping-the-workforce-web-final.pdf](http://www.nuffieldtrust.org.uk/files/2017-01/reshaping-the-workforce-web-final.pdf)

Imison C, Castle-Clarke S, Watson R and Edwards N (2016b) 'Delivering the benefits of digital health care'. [www.nuffieldtrust.org.uk/files/2017-01/delivering-the-benefits-of-digital-technology-web-final.pdf](http://www.nuffieldtrust.org.uk/files/2017-01/delivering-the-benefits-of-digital-technology-web-final.pdf)

Imison C, Sonola L, Honeyman M and Ross S (2014) 'The reconfiguration of clinical services: what is the evidence?'. [www.kingsfund.org.uk/publications/reconfiguration-clinical-services](http://www.kingsfund.org.uk/publications/reconfiguration-clinical-services). Accessed 20 July 2018.

Institute of Medicine (2010) 'The future of nursing: leading change, advancing health'. [www.ncbi.nlm.nih.gov/pubmed/24983041](http://www.ncbi.nlm.nih.gov/pubmed/24983041). Accessed 20 July 2018.

Iwashyna TJ (2012) 'The incomplete infrastructure for interhospital patient transfer', *Critical Care Medicine* 40(8), 2470–8.

Joynt KE, Harris Y, Orav EJ and Jha AK (2011) 'Quality of care and patient outcomes in critical access rural hospitals', *Journal of the American Medical Association* 306(1), 45–52.

- Kaplan LJ, Frankel H, Davis KA and Barie PS (2007) 'Pitfalls of implementing acute care surgery', *The Journal of Trauma: Injury, Infection, and Critical Care* 62(5), 1264–71.
- Kitahata MM, Koepsell TD, Deyo RA, Maxwell CL, Dodge WT and Wagner EH (1996) 'Physicians' experience with the acquired immunodeficiency syndrome as a factor in patients' survival', *New England Journal of Medicine* 334(11), 701–7.
- Kontos MC, Wang Y, Chaudhry SI, Vetrovec GW, Curtis J, Messenger J and NDCR (2013) 'Lower hospital volume is associated with higher in-hospital mortality in patients undergoing primary percutaneous coronary intervention for ST-segment-elevation myocardial infarction: a report from the NCDR', *Circulation: Cardiovascular Quality and Outcomes* 6(6), 659–67.
- Kozhimannil KB, Hung P, Prasad S, Casey M, McClellan M and Moscovice IS (2014) 'Birth volume and the quality of obstetric care in rural hospitals', *Journal of Rural Health* 30(4), 335–43.
- Latessa R, Beaty N, Royal K, Colvin G, Pathman DE and Heck J (2015) 'Academic outcomes of a community-based longitudinal integrated clerkships program', *Medical Teacher* 37(9), 862–7.
- Leong KS, Titman A, Brown M, Powell R, Moore E and Bowen-Jones D (2015) 'A retrospective study of seven-day consultant working: reductions in mortality and length of stay', *Journal of the Royal College of Physicians of Edinburgh* 45(4), 261–7.
- Lepage B, Robert R, Lebeau M, Aubeneau C, Silvain C and Migeot V (2009) 'Use of a risk analysis method to improve care management for outlying inpatients in a university hospital', *Quality and Safety in Health Care* 18(6), 441–5.
- Levy MM, Dellinger RP, Townsend SR, Linde-Zwirble WT, Marshall JC, Bion J, Schorr C, Artigas A, Ramsay G, Beale R, Parker MM, Gerlach H, Reinhart K, Silva E, Harvey M, Regan S and Angus DD (2010) 'The Surviving Sepsis Campaign: results of an international guideline-based performance improvement program targeting severe sepsis', *Intensive Care Medicine* 36(2), 222–31.
- Lim ME, Worster A, Goeree R and Tarride J-É (2013) 'Simulating an emergency department: the importance of modeling the interactions between

physicians and delegates in a discrete event simulation', *BMC Medical Informatics and Decision Making* 13(1). <http://bmcmmedinformdecismak.biomedcentral.com/articles/10.1186/1472-6947-13-59>. Accessed 20 July 2018.

Loversidge J, Yen P-Y, Chipps E, Gallagher-Ford L, Genter L and Buck J (2018) 'Top-of-license nursing practice, part 2: differentiating BSN and ADN perceptions of top-of-license activities', *JONA: The Journal of Nursing Administration* 48(6), 329–34.

Mansha M, Lakkol S and Rangan A (2012) 'The significant impact of acute air ambulance patient transfers on a trauma unit', *The Bulletin of the Royal College of Surgeons of England* 94(4), 1–3.

Marshall JC, Bosco L, Adhikari NK, Connolly B, Diaz JV, Dorman T and others (2017) 'What is an intensive care unit? A report of the task force of the World Federation of Societies of Intensive and Critical Care Medicine', *Journal of Critical Care* 37, 270–6.

Martin I, Mason D, Stewart J, Mason D, Smith N and Gill K (2007) 'Emergency admissions: a journey in the right direction?'. [www.ncepod.org.uk/2007report1/Downloads/EA\\_report.pdf](http://www.ncepod.org.uk/2007report1/Downloads/EA_report.pdf)

Marx WH, Simon R, O'Neill P, Shapiro MJ, Cooper AC, Farrell LS, McCormack JE, Bessey PQ and Hannan E (2011) 'The relationship between annual hospital volume of trauma patients and in-hospital mortality in New York State', *The Journal of Trauma: Injury, Infection, and Critical Care* 71(2), 339–46.

Mattson J (2010) 'Transportation, distance and health care utilization for older adults in rural and small urban areas', *Transportation Research Record: Journal of the Transportation Research Board* 2265. <https://trrjournalonline.trb.org/doi/abs/10.3141/2265-22>. Accessed 20 July 2018.

McNeill GBS, Brand C, Clark K, Jenkins G, Scott I, Thompson C and Jenkins P (2011) 'Optimizing care for acute medical patients: the Australasian Medical Assessment Unit Survey', *Internal Medicine Journal* 41(1a), 19–26.

Meacock R, Anselmi L, Kristensen SR, Doran T and Sutton M (2017) 'Higher mortality rates amongst emergency patients admitted to hospital at weekends reflect a lower probability of admission', *Journal of Health Services Research & Policy* 22(1), 12–9.

- Meacock R, Doran T and Sutton M (2015) 'What are the costs and benefits of providing comprehensive seven-day services for emergency hospital admissions?', *Health Economics* 24(8), 907–12.
- Meacock R and Sutton M (2018) 'Elevated mortality among weekend hospital admissions is not associated with adoption of seven day clinical standards', *Emergency Medicine Journal* 35(2), 108–13.
- Medical Board of Australia (2016) 'Registration standard: continuing professional development'. [www.medicalboard.gov.au/Registration-Standards.aspx](http://www.medicalboard.gov.au/Registration-Standards.aspx). Accessed 20 July 2018.
- Medical Council of New Zealand (2018) 'Recertification and continuing professional development'. [www.mcnz.org.nz/assets/News-and-Publications/Recertification-and-continuing-professional-development-30-4-2018-v7.pdf](http://www.mcnz.org.nz/assets/News-and-Publications/Recertification-and-continuing-professional-development-30-4-2018-v7.pdf)
- Metcalf D, Perry DC, Bouamra O, Salim A, Woodford M, Edwards A, Lecky FE and Costa ML (2016) 'Regionalisation of trauma care in England', *The Bone & Joint Journal* 98-B(9), 1253–61.
- Michtalik HJ, Pronovost PJ, Marsteller JA, Spetz J and Brotman DJ (2013) 'Developing a model for attending physician workload and outcomes', *JAMA Internal Medicine* 173(11), 1026–8.
- Ministry of Health, New Zealand Government (2010) 'The credentialling framework for New Zealand health professionals'. [www.health.govt.nz/system/files/documents/publications/credentialling-framework-nz-health-professionals.pdf](http://www.health.govt.nz/system/files/documents/publications/credentialling-framework-nz-health-professionals.pdf)
- Mohr NM, Harland KK, Shane DM, Miller SL and Torner JC (2016) 'Potentially avoidable pediatric interfacility transfer is a costly burden for rural families: a cohort study', *Academic Emergency Medicine* 23(8), 885–94.
- Monitor (2014a) 'Exploring international acute care models'. [www.gov.uk/government/publications/exploring-international-acute-care-models](http://www.gov.uk/government/publications/exploring-international-acute-care-models). Accessed 20 July 2018.
- Monitor (2014b) 'Facing the future: smaller acute providers'. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/320075/smalleracuteproviders-report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/320075/smalleracuteproviders-report.pdf)
- National Confidential Enquiry into Patient Outcome and Death (2005) 'An acute problem? A report of the National Confidential Enquiry into Patient

Outcome and Death'. [www.ncepod.org.uk/2005report/NCEPOD\\_Report\\_2005.pdf](http://www.ncepod.org.uk/2005report/NCEPOD_Report_2005.pdf)

National Emergency Laparotomy Audit (2017) 'Third patient report of the National Emergency Laparotomy Audit (NELA)'. [www.nela.org.uk/reports?newsid=1047](http://www.nela.org.uk/reports?newsid=1047) . Accessed 20 July 2018.

Ng Kam Chuen MJ, Schofield R, Sankaranarayanan R, Crowe C, Helm K, Lane D and others (2012) 'Development of a cardiologist delivered service leads to improved outcomes following admission with acute coronary syndromes in a large district general hospital', *Acute Cardiac Care* 14(1), 1-4.

NHS Digital (2016) Hospital accident and emergency activity, 2015-16. <https://digital.nhs.uk/data-and-information/publications/statistical/hospital-accident--emergency-activity/2015-16>. Accessed on 23 July 2018.

NHS England (2013a) 'NHS services, Seven Days a Week Forum: a summary of initial findings'. [www.england.nhs.uk/wp-content/uploads/2013/12/forum-summary-report.pdf](http://www.england.nhs.uk/wp-content/uploads/2013/12/forum-summary-report.pdf)

NHS England (2013b) 'The NHS belongs to the people: a call to action'. [www.england.nhs.uk/wp-content/uploads/2013/07/nhs-belongs.pdf](http://www.england.nhs.uk/wp-content/uploads/2013/07/nhs-belongs.pdf)

NHS England (2014) 'Safe, compassionate care for frail older people using an integrated care pathway: practical guidance for commissioners, providers and nursing, medical and allied health professionals'. [www.england.nhs.uk/wp-content/uploads/2014/02/safe-comp-care.pdf](http://www.england.nhs.uk/wp-content/uploads/2014/02/safe-comp-care.pdf)

NHS Improvement (2018a) 'Ambulatory emergency care guide: same day acute frailty services'. <https://improvement.nhs.uk/resources/ambulatory-emergency-care-guide-same-day-acute-frailty-services>. Accessed 20 July 2018.

NHS Improvement (2018b) 'Same day emergency care (ambulatory emergency care)'. <https://improvement.nhs.uk/resources/same-day-emergency-care-ambulatory>. Accessed 20 July 2018.

Nichols A, Streeton M-J and Cowie M (2008) 'Australian College of Rural and Remote Medicine', *Australian Journal of Rural Health* 10(5), 263-4.

Nixon G, Blattner K, Williamson M, McHugh P and Reid J (2017) 'Training generalist doctors for rural practice in New Zealand', *Rural Remote Health* 17(1), 4047.

- Nuffield Trust (2017) 'The NHS workforce in numbers: facts on staffing and staff shortages in England'. [www.nuffieldtrust.org.uk/resource/the-nhs-workforce-in-numbers](http://www.nuffieldtrust.org.uk/resource/the-nhs-workforce-in-numbers). Accessed 20 July 2018.
- O'Hara R, Johnson M, Siriwardena AN, Weyman A, Turner J, Shaw D and others (2015) 'A qualitative study of systemic influences on paramedic decision making: care transitions and patient safety', *Journal of Health Services Research & Policy* 20(1 suppl), 45–53.
- Organisation for Economic Co-operation and Development (2016) 'Health workforce policies in OECD countries: right jobs, right skills, right places'. [www.oecd.org/publications/health-workforce-policies-in-oecd-countries-9789264239517-en.htm](http://www.oecd.org/publications/health-workforce-policies-in-oecd-countries-9789264239517-en.htm). Accessed 20 July 2018.
- Paparella G (2016) 'Person-centered care in Europe: a cross-country comparison of health system performance, strategies and structures'. [www.picker.org/wp-content/uploads/2016/02/12-02-16-Policy-briefing-on-patient-centred-care-in-Europe.pdf](http://www.picker.org/wp-content/uploads/2016/02/12-02-16-Policy-briefing-on-patient-centred-care-in-Europe.pdf)
- Park Y-H, Kwon I-G, Park K-S, Jang H-J, Song M-R and Kim H-J (2013) 'Case study on improvements in non-value-added nursing activities to increase the efficiency of nursing care', *Quality Improvement in Health Care* 19(2), 68–80.
- Pashen D, Chater B, Murray R, Sheedy V, White C, Eriksson L, de la Rue S and du Rietz M (2007) 'The expanding role of the rural generalist in Australia: a systematic review'. [http://files.aphcri.anu.edu.au/research/full\\_report\\_12512.pdf](http://files.aphcri.anu.edu.au/research/full_report_12512.pdf)
- Pereira Gray DJ, Sidaway-Lee K, White E, Thorne A and Evans PH (2018) 'Continuity of care with doctors—a matter of life and death? A systematic review of continuity of care and mortality', *BMJ Open* 8(6), e021161.
- Pietz K, Byrne M, Daw C and Petersen L (2007) 'The effect of referral and transfer patients on hospital funding in a capitated health care delivery system', *Medical Care* 45(10), 951–8.
- Public Health England (2017) 'Facing the facts, shaping the future: a draft health and care workforce strategy for England to 2027'. <https://hee.nhs.uk/our-work/workforce-strategy>. Accessed 20 July 2018.
- Rafferty AM, Clarke SP, Coles J, Ball J, James P, McKee M and Aiken LH (2007) 'Outcomes of variation in hospital nurse staffing in English

hospitals: cross-sectional analysis of survey data and discharge records', *International Journal of Nursing Studies* 44(2), 175–82.

- Ramnarayan P, Thiru K, Parslow RC, Harrison DA, Draper ES and Rowan KM (2010) 'Effect of specialist retrieval teams on outcomes in children admitted to paediatric intensive care units in England and Wales: a retrospective cohort study', *The Lancet* 376(9742), 698–704.
- Ramsay AIG, Morris S, Hoffman A, Hunter RM, Boaden R, McKeivitt C, Perry C, Pursani N, Rudd AG, Turner SJ, Tyrrell PJ, Wolfe CD and Fulop NJ (2015) 'Effects of centralizing acute stroke services on stroke care provision in two large metropolitan areas in England', *Stroke* 46(8), 2244–51.
- Rechel B, Džakula A, Duran A, Fattore G, Edwards N, Grignon M and others (2016) 'Hospitals in rural or remote areas: an exploratory review of policies in 8 high-income countries', *Health Policy* 120(7), 758–69.
- Reif SS and Ricketts TC (1999) 'The Medicare Critical Access Hospital program: the first year', *Journal of Rural Health* 15(1), 61–6.
- Rogg JG, Huckman R, Lev M, Raja A, Chang Y and White BA (2017) 'Describing wait time bottlenecks for ED patients undergoing head CT', *The American Journal of Emergency Medicine* 35(10), 1510–3.
- Ross JS, Normand S-LT, Wang Y, Ko DT, Chen J, Drye EE and others (2010) 'Hospital volume and 30-day mortality for three common medical conditions'. *The New England Journal of Medicine* 362(12), 1110–8.
- Royal College of Emergency Medicine (2015) 'Time to act – urgent care and A&E: the patient perspective'. [www.rcem.ac.uk/docs/Policy/CEM8480-Time%20to%20Act%20Urgent%20Care%20and%20A+E%20the%20patient%20perspective.pdf](http://www.rcem.ac.uk/docs/Policy/CEM8480-Time%20to%20Act%20Urgent%20Care%20and%20A+E%20the%20patient%20perspective.pdf)
- Royal College of Physicians (2007) 'Acute medical care: the right person, in the right setting – first time'. [https://cdn.shopify.com/s/files/1/0924/4392/files/acute\\_medical\\_care\\_final\\_for\\_web.pdf?1709961806511712341](https://cdn.shopify.com/s/files/1/0924/4392/files/acute_medical_care_final_for_web.pdf?1709961806511712341). Accessed 20 July 2018.
- Royal College of Physicians (2010) *Position Statement: Care of medical patients out of hours*. Royal College of Physicians.
- Royal College of Physicians and Surgeons of Canada (2013) 'Fatigue, risk and excellence: towards a pan-Canadian consensus on resident duty hours'. [www.residentdutyhours.ca](http://www.residentdutyhours.ca). Accessed 20 July 2018.

- Royal College of Physicians and Surgeons of Canada (2016) 'Areas of focused competence (AFC-diploma) programs revised accreditation policy and procedure'. [www.royalcollege.ca/portal/pls/portal/!PWEB\\_PORTAL.wwpob\\_page.show?\\_docname=3147961.PDF](http://www.royalcollege.ca/portal/pls/portal/!PWEB_PORTAL.wwpob_page.show?_docname=3147961.PDF)
- Royal College of Radiologists (2014) 'Radiology in the UK – the case for a new service model'. [www.rcr.ac.uk/sites/default/files/RCR\\_Clinical\\_Radiology\\_response\\_to\\_Dalton\\_Review.pdf](http://www.rcr.ac.uk/sites/default/files/RCR_Clinical_Radiology_response_to_Dalton_Review.pdf)
- Royal College of Surgeons (2007) 'Separating emergency and elective surgical care: recommendations for practice'. [www.rcseng.ac.uk/library-and-publications/rcs-publications/docs/seperating-emergency-and-elective](http://www.rcseng.ac.uk/library-and-publications/rcs-publications/docs/seperating-emergency-and-elective). Accessed 20 July 2018.
- Royal College of Surgeons (2011) 'Emergency surgery: standards for unscheduled surgical care'. [www.rcseng.ac.uk/library-and-publications/rcs-publications/docs/emergency-surgery-standards-for-unscheduled-care](http://www.rcseng.ac.uk/library-and-publications/rcs-publications/docs/emergency-surgery-standards-for-unscheduled-care). Accessed 20 July 2018.
- Royal College of Surgeons (2013) 'Reshaping surgical services: principles for change'. [www.rcseng.ac.uk/news-and-events/media-centre/press-releases/rcs-publishes-principles-for-reshaping-surgical-services](http://www.rcseng.ac.uk/news-and-events/media-centre/press-releases/rcs-publishes-principles-for-reshaping-surgical-services). Accessed 20 July 2018.
- Rural Health Advisory Committee (2011) 'Rural Health Advisory Committee's report on general surgery in rural Minnesota'. [www.health.state.mn.us/divs/orhpc/pubs/rhac/surgery.pdf](http://www.health.state.mn.us/divs/orhpc/pubs/rhac/surgery.pdf)
- Sabin J, Subbe CP, Vaughan L and Dowdle R (2014) 'Safety in numbers: lack of evidence to indicate the number of physicians needed to provide safe acute medical care', *Clinical Medicine* 14(5), 462–7.
- Scott I, Vaughan L and Bell D (2009) 'Effectiveness of acute medical units in hospitals: a systematic review', *International Journal for Quality in Health Care* 21(6), 397–407.
- Scurlock C and Becker C (2016) 'Telemedicine for trauma and emergency: the eICU', *Current Trauma Reports* 2(3), 132–7.
- Services for Australian Remote and Rural Allied Health (2017) 'Allied Health Rural Generalist Pathway: multijurisdictional strategy'. [https://sarrah.org.au/sites/default/files/images/info\\_3.\\_ahrg\\_pathway\\_multijurisstrategy\\_20170614\\_in.pdf](https://sarrah.org.au/sites/default/files/images/info_3._ahrg_pathway_multijurisstrategy_20170614_in.pdf)

- Society for Acute Medicine (2014) 'SAM level 2 critical care position statement: The interface between acute medicine and critical care'. [www.acutemedicine.org.uk/wp-content/uploads/2014/03/SAMLevel2Critical\\_Care\\_Postion\\_Statement.doc](http://www.acutemedicine.org.uk/wp-content/uploads/2014/03/SAMLevel2Critical_Care_Postion_Statement.doc)
- Solarsh G, Lindley J, Whyte G, Fahey M and Walker A (2012) 'Governance and assessment in a widely distributed medical education program in Australia', *Academic Medicine* 87(6), 807–14.
- Soong J, Poots A, Scott S, Donald K, Woodcock T, Lovett D and Bell D (2015) 'Quantifying the prevalence of frailty in English hospitals', *BMJ Open* 1(5), 10. <http://bmjopen.bmj.com/content/5/10/e008456.abstract>. Accessed 20 July 2018.
- South East Coast Clinical Senate (2014) 'The clinical co-dependencies of acute hospital services: a clinical senate review'. [www.secsenate.nhs.uk/files/5514/2255/2355/The\\_Clinical\\_Co-dependencies\\_of\\_Acute\\_Hospital\\_Services\\_SEC\\_Clinical\\_Senate\\_Dec\\_2014.pdf?PDFPATHWAY=PDF](http://www.secsenate.nhs.uk/files/5514/2255/2355/The_Clinical_Co-dependencies_of_Acute_Hospital_Services_SEC_Clinical_Senate_Dec_2014.pdf?PDFPATHWAY=PDF)
- St John A and Price CP (2013) 'Economic evidence and point-of-care testing', *Clinical Biochemist Reviews* 34(2), 61–74.
- Statista (2018) 'Number of hospital establishments in Canada as of 2015, by province'. [www.statista.com/statistics/440923/total-number-of-hospital-establishments-in-canada-by-province](http://www.statista.com/statistics/440923/total-number-of-hospital-establishments-in-canada-by-province). Accessed 20 July 2018.
- Stowell A, Claret P-G, Sebbane M, Bobbia X, Boyard C, Genre Grandpierre R, Moreau A and de la Coussaye J-E (2013) 'Hospital out-lying through lack of beds and its impact on care and patient outcome', *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine* 21(1), 17.
- Strasser R, Couper I, Wynn-Jones J, Rourke J, Chater AB and Reid S (2016) 'Education for rural practice in rural practice', *Education for Primary Care* 27(1), 10–4.
- Strasser R, Hogenbirk JC, Minore B, Marsh DC, Berry S, Mccready WG and Graves L (2013) 'Transforming health professional education through social accountability: Canada's Northern Ontario School of Medicine', *Medical Teacher* 35(6): 490–6.

- Strömberg C, Johansson G and Adolfsson A (2007) 'Acute abdominal pain: diagnostic impact of immediate CT scanning', *World Journal of Surgery* 31(12), 2347–54.
- Subbe CP, Burford C, Jeune IL, Masterton-Smith C and Ward D (2015) 'Relationship between input and output in acute medicine – secondary analysis of the Society for Acute Medicine's benchmarking audit 2013 (SAMBA '13)', *Clinical Medicine* 15(1), 15–9.
- Tesson G, Strasser R, Pong RW and Curran V (2005) 'Advances in rural medical education in three countries: Canada, the United States and Australia', *Rural Remote Health* 5(4), 397.
- The Canadian Collaborative Taskforce (2017) 'The rural road map for action: directions'. <http://ruralgp.com/wp-content/uploads/2017/04/Rural-Road-Map-Directions-ENG.pdf>
- The College of Emergency Medicine (2015) 'Medical and practitioner staffing in emergency departments'. [www.rcem.ac.uk/docs/Workforce/RCEM%20Medical%20and%20Practitioner%20Staffing%20in%20EDs.pdf](http://www.rcem.ac.uk/docs/Workforce/RCEM%20Medical%20and%20Practitioner%20Staffing%20in%20EDs.pdf)
- The Health Foundation (2013) 'Improving patient flow'. [www.health.org.uk/sites/health/files/ImprovingPatientFlow\\_fullversion.pdf](http://www.health.org.uk/sites/health/files/ImprovingPatientFlow_fullversion.pdf)
- The King's Fund (2013) 'Time to think differently'. [www.kingsfund.org.uk/projects/time-think-differently](http://www.kingsfund.org.uk/projects/time-think-differently). Accessed 20 July 2018.
- Trauma Victoria (2018) 'Major trauma guidelines & education – Victorian state trauma system'. <https://trauma.reach.vic.gov.au>. Accessed 20 July 2018.
- Turner J, Nicholl J, Mason SM, O'Keaffe C and Anderson J (2014) 'Whole system solutions for emergency and urgent care'. [www.sheffield.ac.uk/polopoly\\_fs/1.366353!/file/Whole\\_System\\_Solutions\\_for\\_Emergency\\_and\\_Urgent\\_Care.pdf](http://www.sheffield.ac.uk/polopoly_fs/1.366353!/file/Whole_System_Solutions_for_Emergency_and_Urgent_Care.pdf)
- Vaughan L, Machaqueiro S, Gaskins M and Imison C (2017) 'The London Quality Standards: a case study in changing clinical care'. [www.nuffieldtrust.org.uk/research/the-london-quality-standards-a-case-study-in-changing-clinical-care](http://www.nuffieldtrust.org.uk/research/the-london-quality-standards-a-case-study-in-changing-clinical-care). Accessed 20 July 2018.
- Ward MM, Jaana M and Natafqi N (2015) 'Systematic review of telemedicine applications in emergency rooms', *International Journal of Medical Informatics* 84(9), 601–16.

- Ward MM, Leigh JP and Fries JF (1993) 'Progression of functional disability in patients with rheumatoid arthritis: associations with rheumatology subspecialty care', *Archives of Internal Medicine* 153(19), 2229–37.
- Watson R, Imison C, Crump H, Currie C and Gaskins M (2016) 'Emergency general surgery: challenges and opportunities'. [www.nuffieldtrust.org.uk/files/2017-01/emergency-general-surgery-web-final.pdf](http://www.nuffieldtrust.org.uk/files/2017-01/emergency-general-surgery-web-final.pdf)
- West MA and Dawson JF (2012) 'Employee engagement and NHS performance'. [www.kingsfund.org.uk/sites/default/files/employee-engagement-nhs-performance-west-dawson-leadership-review2012-paper.pdf](http://www.kingsfund.org.uk/sites/default/files/employee-engagement-nhs-performance-west-dawson-leadership-review2012-paper.pdf)
- Westall C, Spackman R, Nadarajah CV and Trepte N (2015) 'Are hospital admissions reduced by acute medicine consultant telephone triage of medical referrals?', *Acute Medicine* 14(1), 10–3.
- Whiteley S, Macartney I, Mark J, Barratt H and Binks R (2011) *Guidelines for the Transport of the Critically Ill Adult* (3rd edn). Intensive Care Society.
- Wilcox ME, Harrison DA, Short A, Jonas M and Rowan KM (2014) 'Comparing mortality among adult, general intensive care units in England with varying intensivists cover patterns: a retrospective cohort study', *Critical Care* 18(4), 491. <http://ccforum.biomedcentral.com/articles/10.1186/s13054-014-0491-3>. Accessed 20 July 2018.
- Wisher J, Solleveld P, Rudowitz R and Antonisse L (2016) 'A look at rural hospital closures and implications for access to care: three case studies'. <http://files.kff.org/attachment/issue-brief-a-look-at-rural-hospital-closures-and-implications-for-access-to-care>. Accessed 20 July 2018.
- Working Time Regulations Taskforce (2014) 'The implementation of the Working Time Directive, and its impact on the NHS and health professionals: report of the independent Working Time Regulations Taskforce to the Department of Health'. [www.rcseng.ac.uk/about-the-rcs/government-relations-and-consultation/working-time-directive-taskforce](http://www.rcseng.ac.uk/about-the-rcs/government-relations-and-consultation/working-time-directive-taskforce). Accessed 20 July 2018.

# Acknowledgements

This project was part-funded by the NIHR Health Services and Delivery Research Programme, Project: 14/195/02.

The views expressed are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health and Social Care.

We thank the members of the Project Team for their support with this research:

- Dr Martin Bardsley, Senior Fellow, The Health Foundation
- Professor Derek Bell, Professor of Acute Medicine, Imperial College London
- Dr Miranda Davies, Senior Research Analyst, Nuffield Trust
- Dr Andrew Goddard, President, Royal College of Physicians
- Dr Claudia Leone, Researcher in Policy, Nuffield Trust
- Dr Mariya Melnychuk, Research Associate in Health Economics, University College London
- Professor Steve Morris, Chair of Health Economics, University College London
- Professor Anne Marie Rafferty, Professor of Nursing Policy, King's College London
- Dr Paul Smith, Senior Information Analyst, Central Manchester University Hospitals NHS Foundation Trust

We also thank the following previous members of the Project Team for their research contributions: Matt Gaskins, Silvia Lombardo and Sílvia Machaqueiro.

The authors would like to thank the following people, all of whom contributed to this project during the research phase.

Adam Sewell-Jones, Executive Director of Improvement, NHS Improvement  
 Alan Hart-Thomas, Assistant Medical Director, Airedale NHS Foundation Trust  
 Alasdair MacDonald, Director of Medicine, Launceston General Hospital  
 Alison Davies, Professor of Agricultural Economics, University of Kentucky, USA  
 Andrew Connolly, Chairperson, Medical Council of New Zealand  
 Andrew Goddard, Registrar, Royal College of Physicians  
 Ann Casey, Clinical Workforce Lead, NHS Improvement  
 Ben Mearns, Consultant Physician in Acute and Emergency Medicine, Chief of Medicine, Sussex Healthcare  
 Bruce Chater, Associate Professor, Rural Clinical School, University of Queensland, Australia  
 Catherine Webb, Clinical Fellow, NHS England  
 Charlotte Williams, Group Director – Strategy & New Care Models, Mid Essex, Southend and Basildon Hospitals  
 Chris Thorpe, Quality Lead, Faculty of Intensive Care Medicine  
 Cliff Mann, Past President, Royal College of Emergency Medicine

Danielle Frechette, Executive Director, Royal College of Physicians and Surgeons of Canada  
 Danielle Nimmons, Academic Placement, The Nuffield Trust  
 Daryl Wall, Director of Trauma Services, Royal Brisbane and Women’s Hospital, Australia  
 David Steel, Former CEO, NHS Quality Improvement Scotland  
 Derek Bell, Professor of Acute Medicine, Imperial  
 Doug Robertson, Associate Medical Director, Mid Cheshire Hospitals Foundation Trust  
 Ed Smith, Consultant in Emergency Medicine, York Hospital Foundation Trust  
 Edwin Borman, Medical Director, Shrewsbury and Telford Hospital Trust  
 Elaine Mead, CEO, NHS Highland  
 Emma Lockyer, Head of Business Development, New Care Models, NHS England  
 Erica Reid, Director of Hospital Care, Borders General Hospital  
 Franco Guarasci, Consultant Physician, Airedale NHS Trust  
 Frank Rawlinson, Chief Medical Officer, Whanganui District Health Board, New Zealand  
 Garry Swann, Clinical Director for Advanced Practice, Heart of England Foundation Trust  
 George Thompson, Medical Director, Northern Devon Healthcare Trust (Barnstable)  
 Gerrard Phillips, Senior Censor/Education and Training Vice President, Royal College of Physicians  
 Giles Maskell, Past President, Royal College of Radiologists  
 Gill Collinson, Chief Nurse, NHS Richmondshire and Whitby CCG  
 Hannah Skene, Acute Physician, Service Director Acute Medicine, Chelsea & Westminster Healthcare NHS Foundation Trust  
 Harriet Gordon, Director of the Medical Workforce Unit, Royal College of Physicians  
 Helen Maitland, Unscheduled Care Director, Scottish Government  
 Ian Setchfield, Acute Care Nurse Consultant, East Kent Hospitals Foundation Trust  
 Ian Sturgess, Chair of AMM Steering group, acute physician/geriatrician, NHS Improvement  
 Jack Evershed, Joint Chair of Mid Wales Collaborative, Patient Representative  
 Jacob West, ACC National Care Model Lead, NHS England  
 James Bartlett, Acute Medicine Consultant, Wye Valley Trust  
 James Ward, Principal Research Associate, Cambridge University Engineering Department  
 Jane Johnson, Local Director, North Midlands, Health Education England  
 Janice Fazackerley, Elected Council Member, Royal College of Anaesthetists  
 Jo Bayley, GP and Clinical Associate, AMM Programme, NHS England  
 John Abercrombie, Consultant Surgeon, Royal College of Surgeons  
 John Clarkson, Professor of Engineering Design, University of Cambridge  
 John Coakley, Non Executive Director, Wirral University Teaching Hospitals  
 John Dean, Clinical Director of Quality Improvement, Royal College of Physicians  
 John Gommans, Consultant General Physician and Chief Medical Officer, Hawke’s Bay District Health Board, New Zealand  
 Julian Auckland-Lewis, Manager, North Cumbria Foundation Trust  
 Karen Le Ball, Consultant Geriatrician, Belford Hospital, NHS Highland  
 Katherine Smith, Group Manager – Acute, Northern Devon Healthcare  
 Keith Willet, Medical Director for Acute Care, NHS England  
 Ken Clarke, Chief Medical Officer, MidCentral District Health Board, New Zealand  
 Kevin Kelleher, Consultant, Elderly Care, Care Quality Commission  
 Lisa Munro Davies, Vice President, Royal College of Emergency Medicine  
 Louise Watson, New Care Models Programme Director, NHS England  
 Marianne Loynes, Director, NHS Improvement  
 Mark Hindmarsh, Joint Head of Strategy, York Teaching Hospital NHS Foundation Trust  
 Mark Holland, President, Society of Acute Medicine  
 Mark Radford, Director for Nursing Improvement, NHS Improvement  
 Mark Temple, RCP Future Hospital Officer, Royal College of Physicians  
 Martin Byrne, Executive Director Medical Services, Darling Downs Health Service, Australia

Meilir Jones, GP and advisor on reconfiguration, Hywel Dda Health Board  
Michael Handy, Trauma Nurse Practitioner, Royal Brisbane Hospital, Australia  
Mike Jones, Consultant, Acute Medicine, County Durham & Darlington NHS Foundation Trust  
Namita Kumar, Post Graduate Dean, North East of England, Health Education England  
Natalie King, Consultant Physician, Surrey and Sussex Healthcare  
Nick Scriven, Consultant Acute and General Medicine, Calderdale and Huddersfield Foundation Trust  
Nicola Irvine, Consultant Acute Physician and Researcher, NHS Scotland  
Philip Bright, Head of School of Medicine, Health Education England  
Rebecca Batty, Advanced Clinical Practitioner nursing, Harrogate & District NHS Foundation Trust  
Richard Bohmer, Management Academic, Independent  
Richard Fleet, Professor of Emergency Medicine, Laval University, Canada  
Roger Duckitt, Clinical Director for Acute Medicine, Worthing and Southlands Foundation Trust  
Roger Strasser, Dean, Northern Ontario School of Medicine  
Sarah Henry, Advanced Clinical Practitioner (physiotherapy), Harrogate & District NHS Foundation Trust  
Shirley Hammersley, Consultant Acute Physician, Mid Cheshire Hospitals Foundation Trust  
Simon Fletcher, Elected Council Member, Royal College of Anaesthetists  
Simon Watkin, Consultant Physician, Borders General Hospital  
Stacey Hunter, Chief Operating Officer, Airedale NHS Foundation Trust  
Steve Slade, Director, Health Systems and Policy, Royal College of Physicians and Surgeons of Canada  
Sunil Lobo, Consultant Acute Medicine & Clinical Lead Ambulatory Care, East Kent Hospitals Foundation Trust  
Teresa Dowsing, Physician Associate, George Eliot Hospital NHS Trust  
Tim Evans, National Director of Clinical Productivity, NHS Improvement  
Vicky Scott, National Lead - Acute Medical Models, NHSE/NHSI

**Nuffield Trust is an independent health charity. We aim to improve the quality of health care in the UK by providing evidence-based research and policy analysis and informing and generating debate.**

**59 New Cavendish Street  
London W1G 7LP  
Telephone: 020 7631 8450  
[www.nuffieldtrust.org.uk](http://www.nuffieldtrust.org.uk)  
Email: [info@nuffieldtrust.org.uk](mailto:info@nuffieldtrust.org.uk)**

Published by the Nuffield Trust.  
© Nuffield Trust 2018. Not to be reproduced without permission.  
ISBN: 978-1-910953-56-3

Design by Soapbox: [soapbox.co.uk](http://soapbox.co.uk)

**nuffieldtrust**