

# Monitor

Making the health sector  
work for patients

## Facing the future: smaller acute providers



## About Monitor

As the sector regulator for health services in England, our job is to make the health sector work better for patients. As well as making sure that independent NHS foundation trusts are well led so that they can deliver quality care on a sustainable basis, we make sure: essential services are maintained if a provider gets into serious difficulties; the NHS payment system promotes quality and efficiency; and procurement, choice and competition operate in the best interests of patients.

## Summary

Patients and communities often highly value local hospitals. But there is concern within the sector that smaller non-specialist acute providers operate at too small a scale to be financially sustainable while providing quality care. There are also other pressures, both to consolidate specialist services in fewer centres and to deliver more care outside hospitals, that could pose a challenge to the future of smaller acute providers.

This report looks at the effect the size of acute providers in England (many often described as district general hospitals) has on their performance. We found a limited correlation between size and financial performance, but that this relationship is becoming stronger. This creates an increasing need for many smaller providers to change what care they deliver and how. Such change is consistent with the broader direction of change the NHS is actively seeking as it looks for new models of care that will meet patients' needs. With changes in this direction, smaller acute providers should have an important and sustainable place in the future.

Our statistically based research set out to test whether economies of scale in the delivery of acute NHS hospital services, or other characteristics associated with size, make it more difficult for smaller acute hospitals to perform well. We worked with the sector, our national partners and experts from the Royal Colleges to test and strengthen our findings.

Our analysis of acute non-specialist NHS foundation trusts and NHS trusts did find some evidence that size affects financial performance (when measured by the standard EBITDA<sup>1</sup> measure), especially in the most recent period, the 2013/14 financial year. However, the size of an organisation explained only a limited amount of the difference in financial performance between hospitals. Another factor that also affected financial performance was the proportion of work undertaken under the NHS national tariff (a standard payment system) and we know that smaller providers tend to proportionally do more of this work. However, it was not possible to identify much of what drives the variation in financial performance. These factors could include 'softer' drivers such as relationships among the different players in a local health economy or the quality of leadership at a provider. Our analysis of a variety of clinical measures gave a mixed picture of the relationship between size and quality with no clear indication that smaller providers were performing worse.

Nevertheless, while it is encouraging that their small size does not in itself preclude hospitals from achieving sound performance, future developments such as guidance to increase numbers of permanent staff will put smaller acute providers under mounting pressure.

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<sup>1</sup> Earnings before interest, taxes, depreciation, and amortisation

The NHS as a whole needs to prepare for the expected changes by identifying new models of care. This may mean smaller hospitals working differently with community providers to deliver better out-of-hospital care, or exploring new ways to integrate primary, community and social care with lower risk urgent and elective care.

This will call for a creative approach. Our report took evidence from some providers about innovative approaches they are taking to staffing to address the challenges they face. For example, some small acute hospitals are appointing new nurse specialists or physician associates, or using new technologies such as telemedicine, or making staff appointments jointly with neighbouring hospitals. Building effective partnerships or networks between acute providers and major centres will often be crucial to ensuring delivery of quality services.

New approaches will have to take account of the constraints facing the healthcare sector. They will need to consider whether the right balance is struck between risks to quality of care and risks to access to care, for example, and the impact of greater clinical specialisation, workforce shortages or effects of payment systems on smaller providers. The right approach will vary according to local circumstances. For example, in rural and remote areas questions of access may be of particular importance.

Monitor's job is to inform and support providers and commissioners so they can make the local decisions they need to that are in patients' best interests. Our next steps will be to work with the sector, our national partners and experts to help identify the new models of care that can better address the underlying causes of financial challenge at individual providers and in specific local health economies. This will include understanding the economic impact of moving care out of hospital and the extent to which it might generate savings for commissioners.

We will also identify and share other approaches to addressing the constraints. Providers in the NHS and internationally are adapting and innovating to improve care for patients, and to increase the efficiency of provision by using staff, technology and networks differently. We will explore ways to better share this evidence.

Finally, we should examine the constraints themselves. We need to better understand the factors that are affecting change, such as workforce issues, clinical specialisation or increased staffing levels, and consider how best to balance competing objectives.

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## Facing the future: smaller acute providers

Patients and communities often highly value local hospitals. But there is concern within the sector that smaller non-specialist acute providers operate at too small a scale to be financially sustainable while providing quality care. This review has aimed to evaluate whether non-specialist smaller acute providers in the NHS in England face greater challenges than other providers in delivering quality, sustainable care.

We have sought to examine what factors may be driving challenges, and what options smaller acute providers might have to respond to them. In particular, we have sought to test the hypothesis that scale is a key contributing factor towards the financial performance of an acute provider. Our purpose has been to help Monitor better assess the sustainability of these providers and understand whether proposed solutions to challenged providers will address underlying problems.

We have examined a wide range of qualitative and quantitative evidence and engaged extensively with the healthcare sector. This included, among others, NHS trusts and foundation trusts, the Royal Colleges, NHS England, the NHS Trust Development Authority (TDA), the Care Quality Commission (CQC), the Department of Health (DH), the Nuffield Trust, the King's Fund and the Foundation Trust Network.

### Introduction

We launched this review in October 2013 after some preliminary analysis suggested that among acute NHS foundation trusts smaller providers tend to be more financially challenged. Trends in EBITDA%<sup>2</sup> for foundation trusts showed greater falls in EBITDA% for smaller trusts over the past four years and there were some examples of smaller trusts in significant financial difficulty, with EBITDA% below 2%.<sup>3</sup> We know that there are other types of challenged providers, but our aim was to understand whether there are systematic reasons that mean smaller acute providers (both foundation trusts and NHS trusts) face significant and different challenges from larger providers, and so need to be a specific focus for our regulatory work.

This report sets out:

- the methodology for our work and a description of smaller acute providers in the NHS in England
- a summary of the views we gathered from the sector

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<sup>2</sup> Earnings before interest, taxation, depreciation and amortisation as a percentage of operating revenue. This estimates the financial surplus or profit – effectively operating revenue minus operating costs – and is a widely used measure of financial performance.

<sup>3</sup> These include: Milton Keynes, Heatherwood and Wexham Park, Mid Staffordshire, Morecambe Bay, Bolton, and Peterborough and Stamford.

- the findings of our analysis of the relationship between size and performance
- potential challenges other than size facing acute providers, and their relationship to scale
- potential future challenges for smaller acute providers.

## Methodology

We focused on the 142 general (non-specialist) acute NHS foundation trusts and NHS trusts providing patient care in the 2012/13 financial year, examining their performance and possible drivers of performance since 2009/10, where information was available.<sup>4</sup> We included only general acute providers as specialist, mental health, ambulance and other non-acute providers are likely to face different challenges and their model of production is too different to be comparable. We also excluded privately owned providers from our analysis as they provide a substantially different service mix.

To help us make comparisons between providers of different sizes, we defined 'smaller' as providers with operating revenue (income) under £300 million in the 2012/13 financial year.<sup>5</sup> This threshold was chosen to capture foundation trusts with a very low or negative EBITDA% in 2012/13. We further split this group into those with operating revenue under £200 million (smallest) and those with operating revenue between £200 and £300 million (small). Together these represent 75 (over half) of the acute non-specialist providers operating in the NHS in England today and one third of all inpatient spells.<sup>6</sup> Where appropriate, we also examined size by number of beds at a provider as well as their income.

To identify the potential issues that may create greater challenges for smaller acute providers compared with larger ones, we spoke to experts in the sector before launch.

For each factor raised as a potential issue, we used a range of quantitative and qualitative information to assess whether it affects performance at acute providers and, if so, whether it affects smaller acute providers more than larger ones. More information on our approach and some of its limitations is available in Annex 1 to this report.

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<sup>4</sup> Most of our analysis has focused on data for the period 2008/9 to 2012/13, as this is the last year for which a complete range of financial, operational and clinical data were available. Where data for 2013/14 has been available, we have also looked used these, eg for the latest financial performance date.

<sup>5</sup> Operating revenue has been compiled from APR returns for foundation trusts and FIMS returns for NHS trusts.

<sup>6</sup> For inpatient activity, a 'spell' is defined as the period between a patient being admitted and discharged, including any treatments and procedures completed in this time. It is effectively equivalent to an inpatient admission.

We have subjected the analysis to an external quality assurance process including:

- a review of the analysis and conclusions by the King's Fund
- a review of the econometric work by Dr Mauro Laudicella of Imperial College London and City University London.

We also worked with the healthcare sector, our national partners and experts from the Royal Colleges to test and strengthen our findings.

## Characteristics of smaller acute providers in the NHS in England

Hospitals in England tend to be larger than those in the rest of Europe. The hospitals we consider smaller would be seen as relatively large in other countries. Table 1 sets out some features of English acute providers and summarises some of the differences between the characteristics of smaller and larger acute providers in the NHS in England. Figure 2 shows a map of the location of all acute type 1 A&E<sup>7</sup> sites in England.

**Table 1: Provider characteristics by operating revenue category, 2012/13**

		<£200m	£200m- £300m	>£300m
<b>Number of providers</b>	Total in each category (based on 2012/13 operating revenue)	30	45	67
<b>Provider characteristics</b>	Average operating revenue, 2012/13	£166m	£250m	£523m
	Average number of sites	1	1.2	2.1
	Average number of beds (provider total general and acute beds), 2012/13	396	548	953
	Average number of service specialties, 2012/13*	24	27	35
	Average number of inpatient spells (to nearest thousand), 2012/13	58,000	81,000	148,000

<sup>7</sup> Type 1 emergency departments are a consultant-led 24-hour service with full resuscitation facilities and designated accommodation for the reception of accident and emergency patients.

		<£200m	£200m- £300m	>£300m
	Average number of FTE consultants employed	113	164	346
	Inpatient spells per FTE consultant**	513	494	428
<b>Location characteristics</b>	Average distance from (next) nearest hospital with A&E	26.8km	23.0km	21.0km
	Average distance from nearest major trauma centre	46.1km	48.6km	32.4km
	Average inpatient catchment population 2012/13 (to nearest thousand)	195,000	275,000	470,000
	Average % of inpatients from an urban (ONS) area 2012/13	72%	83%	83%
	Average % of inpatients aged 65 and older or under 5, 2007-13	29%	29%	26%

FTE=full time equivalent; ONS=Office for National Statistics.

Source: HES 2012/13, APR 2012/13, FIMS 2012/13, ONS

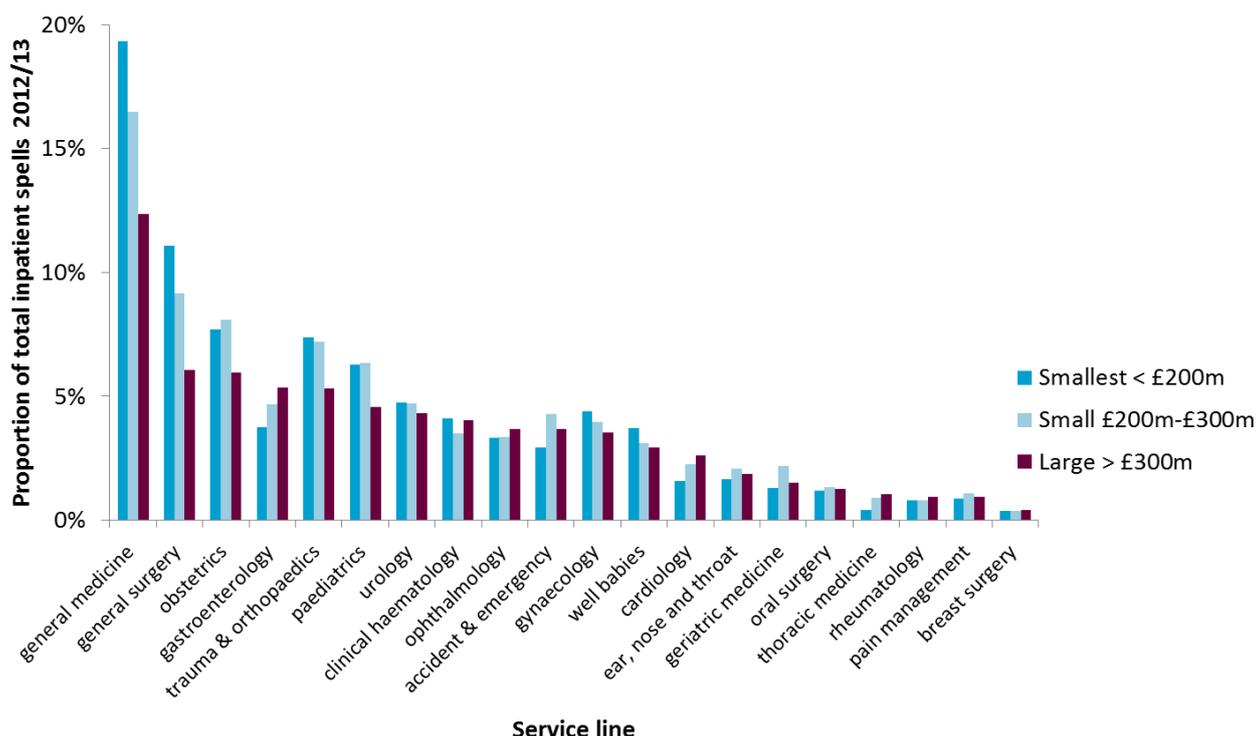
\* As measured by the number of NHS Hospital and Community Health Service (HCHS) Workforce Statistics grade consultants with distinct occupation codes (distinct CCSTs for publication) in post at providers in September 2013. Source: Health and Social Care Information Centre (HSCIC), Provisional NHS Hospital & Community Health Service monthly workforce statistics. HSCIC extract from Electronic Staffing Record (ESR).

\*\* This does not take account of the differing levels of research and development or other activities undertaken by consultants, which may make these figures less comparable between different sized trusts.

Smaller acute providers in the NHS in England differ from larger ones in some significant ways. The smallest providers in particular are more likely to be single site, be located further from other providers, and deliver a smaller range of services to more rural populations. This highlights the importance of differentiating between challenges that are due to size and those that may be due to factors that are correlated with size, eg remoteness.

In smaller providers, the 20 most commonly provided service specialties<sup>8</sup> accounted for 86% of inpatient admissions at these providers in 2012/13, compared with 72% for larger providers (Figure 1). To identify the most commonly provided service specialties we looked at the specialties provided by more than 70% of the smallest acute providers (ie those with operating revenue in 2012/13 of less than £200 million). In other words, these are the services that most smaller providers are providing.

**Figure 1: Inpatient services provided by NHS acute providers – proportion of inpatient spells 2012/13**



Source: Inpatient HES 2012/13

Much of our analysis also revealed large variation between smaller providers. In particular, one factor that stakeholders felt was important in understanding the differences between smaller providers was whether the provider was in an urban or remote area. Table 2 illustrates some differences in the characteristics of smaller providers according to distance from the next nearest A&E department. For example, compared with smaller urban providers, smaller remote providers tend to have, on average, older inpatient populations, fewer inpatient spells, and are in less deprived areas.

<sup>8</sup> This is defined by the Healthcare Resource Group (HRG) specialty of the consultant that the patient is first admitted to. Taken from Hospital Episode Statistics (HES) data 2012/13.

**Table 2: Characteristics of smaller acute providers in the NHS in England**

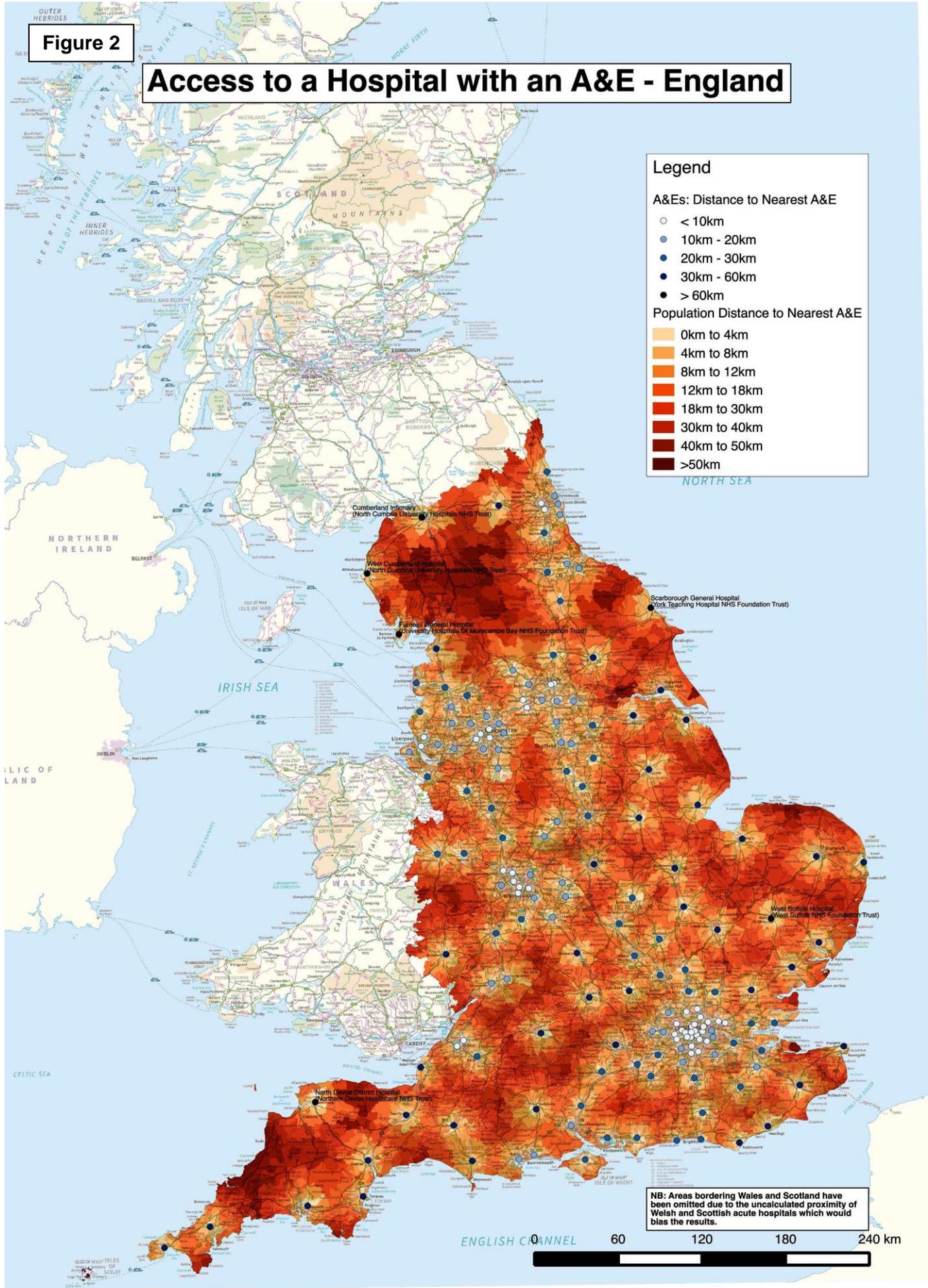
	Average characteristics	Remote: less than 30km from next provider with A&E (eg Northern Devon Healthcare NHS Trust)*	Between 20km and 30km from next provider with A&E (eg Frimley Park NHS Foundation Trust)	Urban: less than 20km from next provider with A&E (eg The Whittington Hospital NHS Trust)
	<b>Number of smaller trusts</b>	19	23	33
<b>Other providers</b>	Classified by distance by road from next nearest acute provider with an A&E department	>30 km	20 km - 30 km	<20 km
	Average distance by road from nearest acute tertiary centre (providing NHS highly specialised services)	83.5 km	38.6 km	20.8 km
<b>Demand</b>	Inpatient catchment population	236,050	256,300	236,900
	Proportion of catchment area urban (ONS)	56%	79%	92%
	Number of inpatient spells a year	54,111	59,044	64,477
	Average age of patients	53.0	50.4	48.8
	Deprivation of catchment population (ONS)	17.8	18.7	23.3
<b>Supply</b>	Number of service specialities delivered	26.5	24.8	25.3

ONS=Office for National Statistics

\* The most remote provider with an A&E department is 86 km away from the next nearest A&E site.

Figure 2

# Access to a Hospital with an A&E - England



## What we heard from the healthcare sector about the challenges facing acute providers

Many people have contributed to our research. We received qualitative evidence from providers, healthcare professionals and other parties with an interest in acute care. This came from four sources:

- responses to our call for evidence, launched on the Monitor website in October 2013
- responses to our questionnaire sent to all acute providers
- face-to-face and telephone interviews with acute providers, including foundation trusts and NHS trusts and smaller and larger providers
- meetings with our national partners: NHS TDA, NHS England, CQC and DH
- meetings with our clinical advisory group of members of the Royal Colleges and others.<sup>9</sup>

We received 14 responses to our call for evidence and 28 completed questionnaires. We also held face-to-face and telephone interviews with 26 acute providers. This sample was too small for us to conduct robust quantitative analysis using this information; however, we have used it to inform our quantitative research.

Many of the people we heard from told us that there are challenges that could affect the ability of acute providers to deliver services. The key messages are summarised below. These challenges were often relevant to the healthcare sector as a whole, rather than specifically related to smaller providers or to size.

### Delivering better quality and financial sustainability in the future will be difficult

Most providers told us that the biggest challenge they face is maintaining or improving the quality of services while ensuring financial sustainability. Providers were concerned about the scope for achieving further efficiencies, especially if they had already achieved significant cost improvement plans over a number of years.

In response to pressure to improve clinical quality, many providers told us that they are seeking to implement seven-day services or that they are looking to increase consultant numbers in line with clinical standards for consultant-delivered care in

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<sup>9</sup> The clinical advisory group met three times over the course of the project and had representatives from the Academy of Medical Royal Colleges, the Royal College of Physicians, the Royal College of Surgeons, the Royal College of Paediatrics and Child Health, the Royal College of Obstetrics and Gynaecology, the Royal College of Pathologists, the Royal College of Radiologists, the Royal College of Anaesthetists and the College of Emergency Medicine

some areas.<sup>10</sup> However, providers were also concerned about the implications of these standards and recommendations for their costs and financial sustainability.

### **There are workforce shortages in key areas**

Nearly everyone we heard from considered workforce issues to be a main challenge for acute providers. Both large and small providers believed that recruitment difficulties, particularly for qualified nurses and for A&E staff, are being driven by national shortages of staff. They also told us that there are national shortages of junior and middle-grade doctors in certain specialties (for example, paediatrics).

We were often told that recruitment issues are driven by location or provider reputation rather than size. However, some of the smaller providers we spoke to thought that size may also play a part. For example, a consultant considering job offers from two providers, one running a one-in-five rota the other a one-in-twelve rota, may be more tempted to accept the latter offer.

The demands of seven-day working and other clinical standards may exacerbate recruitment challenges; many providers told us that workforce is the main challenge to achieving seven-day care. One smaller provider, which had participated in the Keogh review pilots, told us that it would need to recruit another 20 consultants to implement seven-day care (with exact numbers depending on the staffing model that is implemented).

### **Working collaboratively with other providers will be very important**

We were told that all providers, and particularly smaller ones, cannot exist in isolation. Nearly all the providers we heard from told us that they are working with other acute providers in partnerships or networks to address workforce shortages, ensure comprehensive service provision (particularly of specialist services) and make further savings. We heard that collaborative working arrangements can be an important alternative to centralisation, and are often vital in addressing current and future challenges. Smaller providers also considered it important that larger providers are more open to working with others to help ensure the acute sector is able to face the challenges ahead.

Several providers felt that the challenges they face would be exacerbated if local primary, community and social care services were not able to help deal with local pressures and demands. Many of the providers we heard from are pursuing strategies to work more closely with community and social care partners, or to

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<sup>10</sup> For example, The Royal College of Obstetrics and Gynaecology recommends that units with between 2,500-4,000 births a year should have 60-hours consultant presence; units with 4,000 to 5,000 births, 98-hours consultant presence; and units with over 5,000 births 168-hours consultant presence. See RCOG (2007), '*Safer childbirth: minimum standards for the organisation and delivery of care in labour*'.

provide a more integrated approach to patient pathways. However, providers also highlighted the risks associated with such strategies including the potential loss of acute income and a lack of clarity over how payments and risk-sharing arrangements for community services would work in future.

### **There may be economies of scale in delivering services**

We heard that some acute providers thought they faced challenges arising from economies of scale. Several providers told us that they operate services below capacity, either because a minimum level of staffing is necessary to meet NHS England service specifications (for example, for neonatal care), or because demand for the service is variable and spare capacity is needed to cope with peaks. Some providers felt they were required to maintain services at small scale because local populations expect them, even when they thought it was not necessarily justified on clinical and financial grounds.

We were also told that some providers may not be able achieve the scale to fund the level of consultant presence recommended by clinical standards,<sup>11</sup> particularly for unplanned care, and that at low volumes the tariff does not cover the costs of unplanned care.

### **We found limited evidence of a size effect, though it appears to be growing**

We began our analysis by examining the correlations between different financial outcome measures and provider size, as measured by both provider income and total bed base. The main financial outcome measure we used was EBITDA% for foundation trusts and NHS trusts between 2009/10 and 2012/13,<sup>12</sup> though we also looked at:

- operating surplus as a percentage of operating revenue between 2009/10 and 2012/13
- cash and cash equivalents as a percentage of operating revenue between 2009/10 and 2012/13
- capital expenditure as a percentage of operating revenue between 2009/10 and 2012/13.

We have also done some initial analysis of recently available data from 2013/14, where possible.

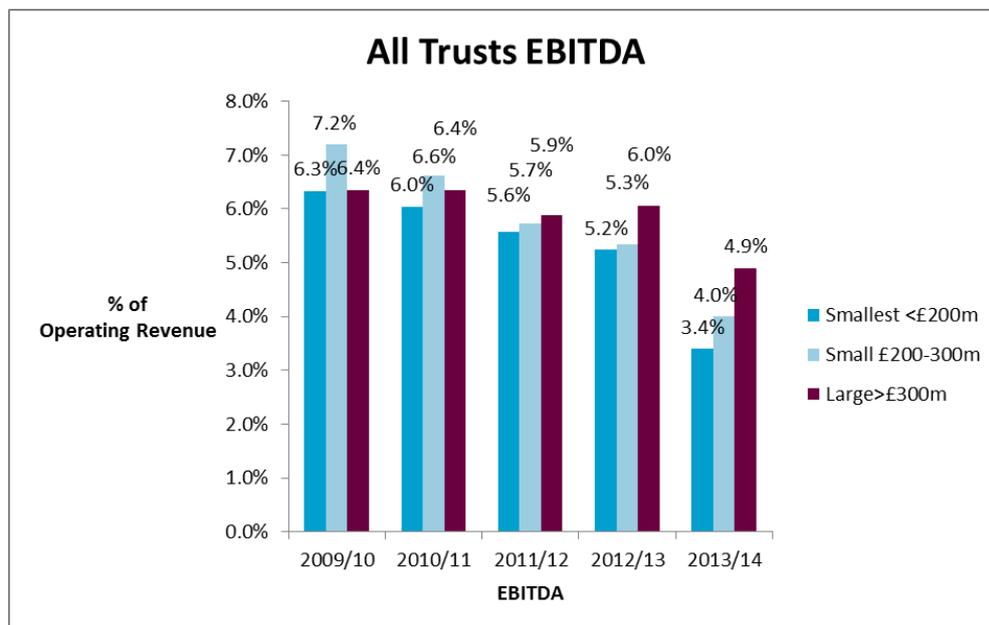
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<sup>11</sup> One of the questions we asked in our questionnaire to all acute providers was: What are the main barriers you face in meeting Royal College guidelines/standards concerning levels of on-site consultant cover for maternity, emergency general surgery, acute paediatrics, A&E and stroke?

<sup>12</sup> We also used an adjusted EBITDA% measure for better comparison between foundation trusts and NHS trusts.

Figure 3 shows trends in EBITDA% for foundation trusts and NHS trusts over the past five years against their operating revenue. This shows that the average EBITDA% for the smallest providers has been lower than larger providers' for each year and has fallen more than average EBITDA% for larger providers.

**Figure 3: EBITDA% as a percentage of operating revenue, 2009/10 to 2013/14**



Source: APR, FIMS (provider reported, not adjusted;<sup>13</sup> 2013/14 data is provisional/unaudited)

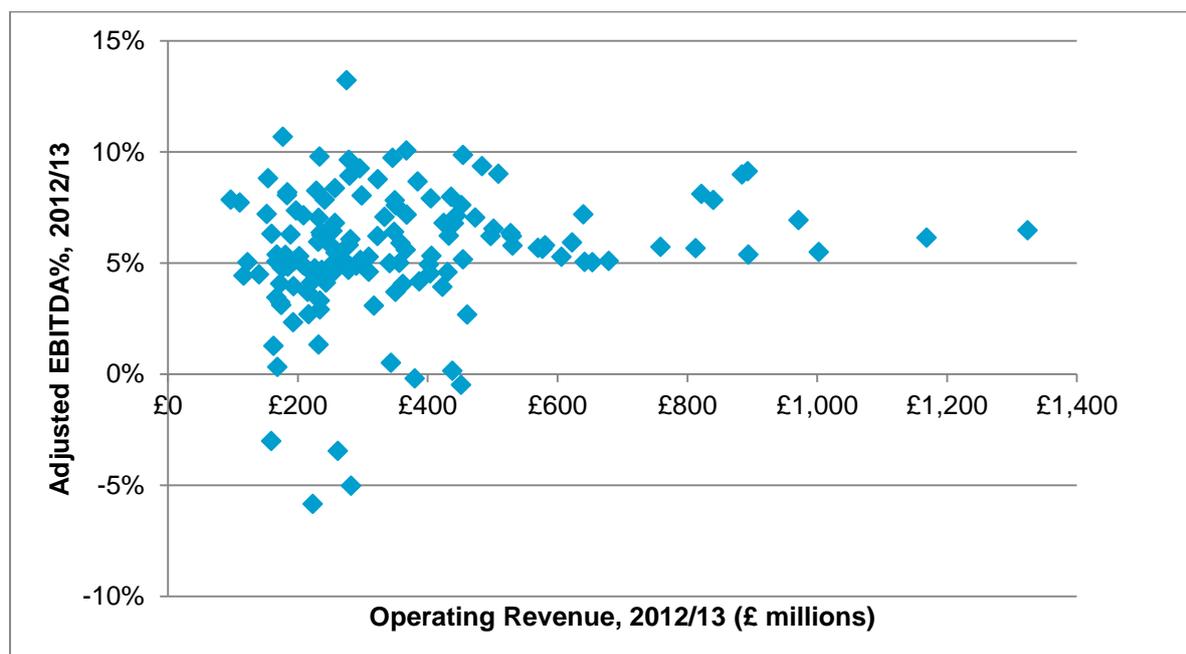
When we looked at this trend, we found no statistically significant linear relationship between operating revenue and level of EBITDA% in earlier years. However, this changed in 2012/13 when the relationship became statistically significant. Analysis of the latest data from 2013/14 shows that this trend has become stronger.

### Size appears to explain only a small amount of variation in financial performance

While we can see evidence of a growing trend of poorer financial performance at smaller providers, this hides a substantial amount of variation. Figure 4 shows the EBITDA% in 2012/13 against operating revenue for all 142 acute non-specialist providers. While some smaller providers are performing poorly, many perform well. This suggests that, while size, or factors that are correlated with size, may be increasingly important, there are likely to be several other factors that are important in explaining financial performance.

<sup>13</sup> There are a few accounting differences (see the data sources table in Annex 1) between providers' and foundation providers' EBITDA% which could make them less comparable. We have adjusted for these differences for 2011/12 and 2012/13, and the results are consistent with those presented here. The results are almost identical in rank, with a correlation coefficient of 0.99.

**Figure 4: EBITDA% against operating revenue for foundation trusts and NHS trusts, 2012/13**



Source: APR, FIMS

To explore the impact of scale further, and informed by our understanding of the various factors that are likely to influence the financial performance of all acute providers, we did simple econometric<sup>14</sup> analysis to isolate the impact of scale as a driver of financial performance, measured by EBITDA%.

This analysis looked at the performance of all acute non-specialist providers and took into account several other characteristics that may affect financial performance. These included those relating to a provider's size, estate, activity and revenue mix, scope of clinical services provided, workforce characteristics, location (including distance from other acute providers), competition, and other characteristics of their local health economy, such as the number of GPs, and delayed discharges attributed to problems in social and/or community care per spell.<sup>15</sup>

Once we controlled for these characteristics, we did not find that size has been an important driver of financial performance over the past four years, though looking at the latter two years of data in our sample we did find that the relationship between size and financial performance was more pronounced and more statistically robust than for our full four-year data set.

<sup>14</sup> Econometrics is a statistical technique which seeks to test what the relationship is between one variable (say, a hospital's financial performance) and a set of other (explanatory) variables (say, a hospital's size, location, case mix, etc) simultaneously. This allows us to isolate the effects of any one of these explanatory variables, while holding the others constant.

<sup>15</sup> More details are set out in Annex 1.

We did find that factors other than size appear to be important drivers of provider financial performance. Those that did have a statistically significant relationship with financial performance are set out in Table 3. For example, these results suggest that a provider deriving 70% of clinical revenue from services paid through tariff would be expected to have an EBITDA% 0.2 percentage points smaller than a provider who derived only 65% of their clinical revenue from tariff services. We explore these factors in more detail in the next section.

**Table 3: Key results of econometric analysis and their impact on EBITDA% at all acute providers**

Explanatory variable	Assumed change in explanatory variable*	Impact on EBITDA%	Robustness
<b>Operating revenue (millions)</b>	£108,000,000	0.3	Not consistent for all measures of size (beds and activity), only for revenue**
<b>More than one major site – measured by number of A&amp;E sites</b>	An additional A&E site	-1	Significant in most models**
<b>Private finance initiative (PFI) indicator</b>	If a provider has a PFI	1.4	Significant in all models***
<b>Tariff share of revenue</b>	5 percentage points	-0.2	Significant in most models, but not for all time periods***
<b>Number of service specialties</b>	4 specialties	-0.3	Significant, but not in all models and not for other measures of scope**
<b>Reference cost index (RCI)<sup>16</sup></b>	3 points	-0.2	Significant in all models**

\* For consistency across explanatory variables, we look at the effect of changing each variable by, approximately, half of one standard deviation, based on 2012/13 values.

\*\* Level of significance is 5%. \*\*\* Level of significance is 1%.

Significantly, the factors we could identify and measure together (including size) did not explain much of the variation in financial performance between acute providers of all sizes. This suggests that other, more difficult to quantify, factors might be important. Such factors could include ‘softer’ drivers such as relationships among the different players in a local health economy or the quality of leadership at a provider.

<sup>16</sup> The Reference Cost Index appears to be a reasonably good measure of efficiency, as it is negatively related to financial performance. Also, as outlined below, it is not higher for smaller providers, suggesting that economies of scale in England are not the key drivers of their costs.

## We looked in depth at a range of factors that could be creating difficulties for smaller providers

The analysis above shows the factors that we could measure where we did find a relationship with financial performance. However, we also needed to understand whether these factors are related to size. Many people also told us about other characteristics that smaller acute providers often have that can negatively affect their performance, such as their ability to attract workforce and the mix of work they do. To understand these characteristics better we analysed them in more detail. To do so, we developed a simple categorisation framework to group the hypotheses. This is shown in Table 4.

**Table 4: Hypotheses tested by category**

Category	Potential issues
1 Service model	<p>Economies of scale and scope</p> <p>Operational challenges, eg multiple sites</p> <p>Flexibility to respond to unexpected pressures, eg fluctuations in demand</p>
2 Inputs	<p>Ability to attract workforce</p> <p>Quality of estates, including access to PFI funding</p>
3 Commissioners and payment systems	<p>Commissioner resources</p> <p>Diversity of income, such as from nationally commissioned specialist services, education and training, R&amp;D and private patients</p> <p>Impact of payment systems including tariff</p> <p>Impact of competition</p>
4 Patient pathways in the local health economy	<p>Quality of primary, social and community care (measured by GP provision and delayed discharge attributed to social and community care issues)</p> <p>Nature of links to other providers, including distances from other acute providers, especially providers of specialist/tertiary services</p>

Where possible we tested whether these factors, individually or in combination, related to the size of a provider and whether they have been related to the financial performance of acute providers to date.<sup>17</sup>

Our work suggested that the only measurable factor that affects financial performance and where smaller providers are likely to be disproportionately disadvantaged is the proportion of work undertaken under the NHS national tariff (a standard payment system). Smaller providers tend to do proportionally more of this work. Table 5 shows average share of clinical revenue from tariff for smaller and larger providers. Those with operating revenue below £300 million received on average 69.5% of their clinical income from tariff, compared with 65.8% for larger providers.

**Table 5: Share of revenue from tariff and provider size (revenue), 2009/10 to 2012/13**

Operating Revenue	2009/10	2010/11	2011/12	2012/13	Change 2009/10 to 2012/13 (percentage points)
<b>Sub £200m</b>	75.6%	75.7%	73.6%	69.5%	-6.2
<b>£200 to £300m</b>	75.3%	75.3%	71.5%	69.5%	-5.9
<b>Above £300m</b>	69.8%	68.5%	67.7%	65.8%	-4.0

Source: APR, FIMS. Note, numbers may not sum due to rounding.

There are several possible explanations for this relationship between the proportion of a provider's income coming from tariff services and a provider's financial performance. For example, if the tariff does not reflect the whole cost for some services, providers that are more reliant on tariff income could have worse financial outcomes. Alternatively, providers with a higher share of non-tariff revenue in their income could have greater ability to negotiate favourable non-tariff contracts with commissioners.

<sup>17</sup> More details on the full set of high level variables we used to test each of these factors are shown in Annex 1. This also sets out some of the limitations of our analytical approach.

As Table 3 suggests, we found other aspects of a provider's structure that were also likely to affect financial performance, though they did not seem likely to disproportionately disadvantage smaller providers. These were the:

- number of major sites a provider operates
- number of service specialities
- presence of a PFI-funded facility at the provider.

We found some evidence that, when size is controlled for, having more than one acute major site (measured by the presence of an A&E department) relates negatively to financial performance. Many acute providers operate a range of sites, often including outreach centres and community hospitals. However, in the qualitative evidence that we received, several acute providers raised issues in relation to operating across multiple sites, which broadly fell into two categories.

1. Split of management focus may mean that multi-site providers perform worse, other things being equal. Two acute providers made the point that senior management presence and their ability to focus on core acute services, such as A&E and maternity services, was very important.
2. Split of clinical workforce across more than one site. For example, providing A&E consultant cover or anaesthetics across two sites can make for inefficient use of resources.

Our results suggest that these concerns may have some justification.

We also found some evidence that, when size is controlled for, providers with more service specialities tend to have worse financial outcomes.<sup>18</sup> Although this evidence was not consistent across all our analyses, it does suggest that there are unlikely to be financial benefits associated with widening the scope of services without a strong case that the additional activity will attract sufficient revenue to cover the costs.

Finally, we also found that a PFI is correlated with better financial performance. However, this finding should be interpreted with caution. It is plausible that the improved estate quality associated with PFI-funded facilities positively affects a provider's operational and, therefore, financial performance. An alternative explanation is that the award of a PFI may be related to other, less easy to quantify, factors that affect good financial performance, such as a sound local health economy or high quality and stable leadership.

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<sup>18</sup> We have defined the number of specialities at a provider in terms of the number of different specialities into which its consultants are classified in the Electronic Staffing Record data collected by HSCIC. While not a perfect measure of the various service lines at a provider, this should be a reasonable proxy.

We set out below some of our other results on factors for which we did not find a strong relationship with size. A comprehensive set of our results for the other factors we tested is available in Annex 1. Some of these results might reflect limitations of our analysis and variables. Our analysis looks across all providers and only at high-level indicators. It is possible, for example, that conclusions might differ with more detailed analysis or if better data were available. In addition, it focuses on past performance when we know that the NHS is changing. Even where we have found no particular issues for smaller providers in relation to a potential driver of performance, it does not rule this out as an issue for an individual small provider or within a particular service line.

### Economies of scale

Our econometric analysis showed that providers with higher Reference Cost Indices (RCI) did, as we would expect, perform worse financially. However, our more detailed analysis did not find that higher costs have been associated with smaller scale. That is, we did not find strong evidence that, to date, there have been significant economies of scale in the delivery of acute non-specialist hospital services at the scale they are currently delivered in England.

There is a growing body of literature investigating economies of scale in delivering acute hospital services. This research has had a primarily organisation-level or hospital-level focus, with little analysis at the service level, which would be of greater relevance to us since different hospitals can offer very different service mixes. Of specific relevance is recent work by Frontier Economics and Boston Consulting Group (BCG) for Monitor. This work used bottom-up cost-modelling to the costs of delivering some specific services according to best practice, rather than analysing service-line cost data from a range of providers.<sup>19</sup>

Taken together, the existing academic literature presents a mixed picture of the existence of economies of scale in hospital services. The bottom-up cost modelling presents a theoretically plausible picture of significant economies of scale, particularly in the provision of A&E and maternity services. However, much of the hospital-level empirical research covering various countries suggests that economies of scale may exist up to 200 beds, but that hospitals with more than 600 beds show diseconomies of scale.<sup>20</sup> Even the smallest English acute providers (those with operating revenue below £200 million) have an average total bed base of 435.

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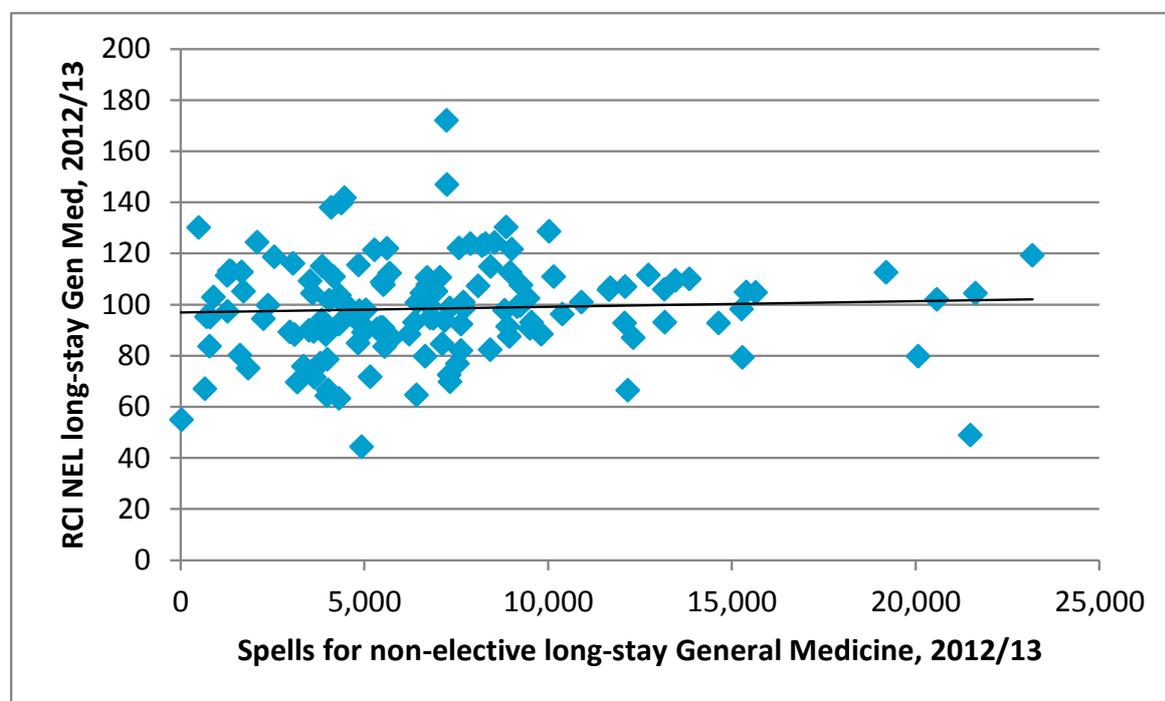
<sup>19</sup> Frontier Economics and BCG (August 2012), *A study investigating the extent to which there are economies of scale and scope in healthcare markets and how these can be measured by Monitor*. Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/303160/Monitor\\_Economies\\_of\\_Scale\\_and\\_Scope\\_-\\_FINAL\\_REPORT\\_0\\_0.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/303160/Monitor_Economies_of_Scale_and_Scope_-_FINAL_REPORT_0_0.pdf)

<sup>20</sup> See Posnett, J., 'Are bigger hospitals better?' In McKee and Healy, eds (2002) *Hospitals in a changing Europe*. OUP.

Recent analysis of NHS mergers also suggests little evidence of gains from increasing the scale of providers, though this could be the result of several factors.<sup>21</sup>

We analysed reference cost data to examine the relationship between costs and scale at whole-provider level and looked at the following services: A&E, acute general medicine, obstetrics, stroke, inpatient paediatrics and emergency general surgery. Together these services represent 53% of all inpatient spells at smaller providers. Our work suggests that there are currently only limited relationships between scale and costs for these services. For example, Figure 5 shows little correlation between reference costs and volumes for non-elective long-stay<sup>22</sup> general medicine at the scale acute care is provided in England.

**Figure 5: Long stay non-elective general medicine reference cost index against volumes, 2012/13**



Source: DH Reference costs 2012/13

We found a similar pattern for the other services we examined, with few exceptions. Maternity care was one service line which showed a very slight relationship between scale and costs. Figure 6 shows the relationship for non-elective short-stay<sup>23</sup>

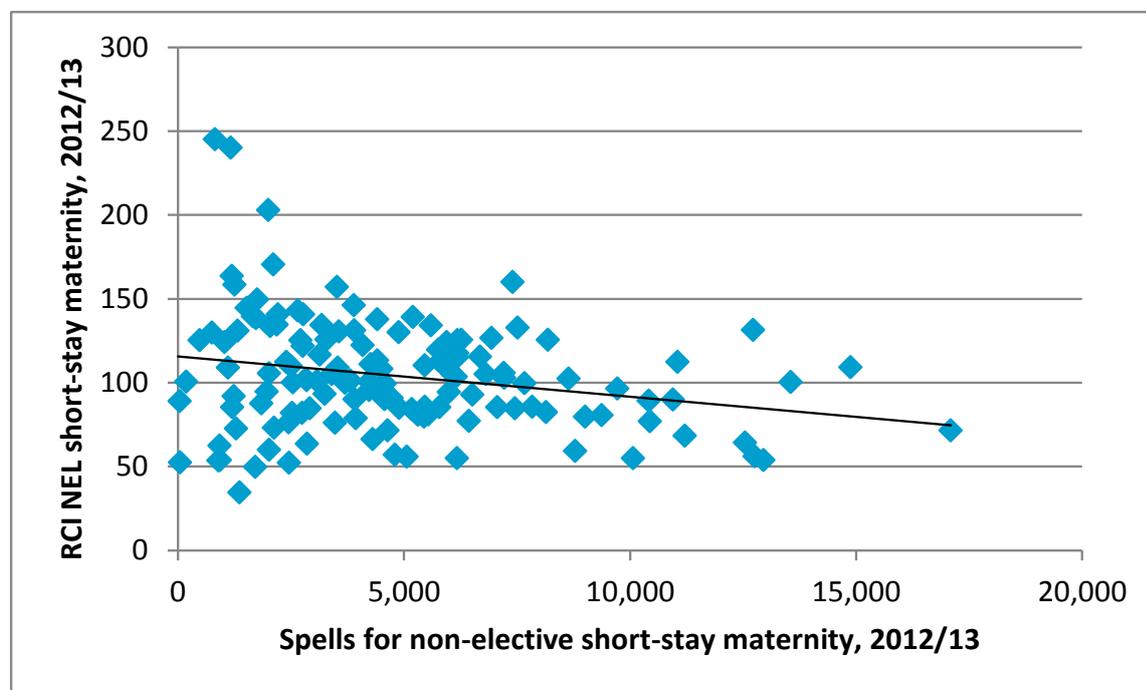
<sup>21</sup> See Gaynor, M., Laudicella, M., and Propper, C. (2012) 'Can government do it better? Merger mania and hospital outcomes in the English NHS, *Journal of Health Economics*, 31 (3), 528 -543.

<sup>22</sup> Long stay in the context of reference costs refers to patients admitted for a longer than expected period, which varies for different treatments. See: Department of Health (2012), *A simple guide to Payment by Results*, p.34. Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/213150/PbR-Simple-Guide-FINAL.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/213150/PbR-Simple-Guide-FINAL.pdf)

<sup>23</sup> Short stay in the context of the tariff system refers to patients admitted for a shorter than expected period, typically less than two days. See: Department of Health (2012), *A simple guide to Payment by*

maternity care. We see that costs tend to be lower for higher volume providers, but, clearly, there is much variation, with many low-volume providers reporting costs that are as low as those for high-volume providers.

**Figure 6: Non-elective short-stay maternity reference cost index against volumes, 2012/13**



Source: DH Reference costs 2012/13

These findings differ from the cost-modelling analysis by Frontier Economics/BCG, which predicts substantial economies of scale in A&E and maternity services.<sup>24</sup> There are four possible explanations.

- Reference cost data are not a good measure of costs. However, these data appear to be a good measure of efficiency in our econometric analysis, which suggests that reported reference costs may well reflect genuine cost differences.
- All acute providers in the English NHS operate at a sufficient scale in their core services to exhaust economies of scale. This is consistent with research that suggests economies of scale are reached at 200 beds (all acute

Results, p.34. Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/213150/PbR-Simple-Guide-FINAL.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/213150/PbR-Simple-Guide-FINAL.pdf)

<sup>24</sup> Frontier Economics and BCG (August 2012), *A study investigating the extent to which there are economies of scale and scope in healthcare markets and how these can be measured by Monitor*. Available at: [http://monitor.gov.uk/sites/default/files/Monitor%20Economies%20of%20Scale%20and%20Scope%20-%20FINAL%20REPORT\\_0\\_0.pdf](http://monitor.gov.uk/sites/default/files/Monitor%20Economies%20of%20Scale%20and%20Scope%20-%20FINAL%20REPORT_0_0.pdf)

non-specialist providers in England have a larger bed base).<sup>25</sup> However, the cost models predict a minimum efficient scale significantly above the volumes of most acute providers in England.

- Larger providers are experiencing diseconomies of scale that are not included in the cost models. We would expect to see this in practice as an increase in costs as volumes increase beyond a certain point. However, this is not shown in the data.
- There is a difference between the cost base seen in practice and the cost base used to model costs in theory. The Frontier Economics/BCG work is based on best practice guidelines from the Royal Colleges, which often specify a greater number of fixed inputs (eg number of consultants) than is typically available in acute hospitals.

It is our view that the last possible explanation is the most likely. However, as these best practice guidelines are increasingly adopted by the NHS, economies of scale may also start to characterise these services.

### **Ability to attract workforce**

Many providers told us of the difficulties they had in attracting a high-quality clinical workforce. However, while we did find that smaller acute providers have more difficulty attracting clinicians, this evidence was quite weak (Table 6).

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<sup>25</sup> See, for example, Posnett (1999), 'Is bigger better? Concentration in the provision of secondary care', *British Medical Journal*. Available at: [www.bmj.com/content/319/7216/1063.1](http://www.bmj.com/content/319/7216/1063.1)

**Table 6: Summary of workforce analysis**

Measure	Results
<b>Vacancy rates</b>	Smaller providers had higher clinical vacancy rates than larger providers between 2008 and 2010. Looking at each year, the difference between smaller and larger providers was statistically significant only in the final year, 2010.
<b>Locum rates</b>	On average, acute providers with operating revenues greater than £200 million reduced their use of clinical locums between 2009 and 2013, whereas the smallest providers did not. However, when we looked at the difference in the mean locum rates between the smallest providers and other providers we found that this difference was statistically significant only in the latest year (2013). Between 2009 and 2013, the average locum rate for smaller and smallest trusts was 2.2% and 2.6%, respectively, whereas for larger trusts it was 1.9%.
<b>Staff stability</b>	There did not appear to be a clear difference in providers' ability to retain managerial and medical staff, as measured by turnover rates, between 2008 and 2013. For acute providers in general, the managerial workforce appeared to have been less stable than the clinical workforce during this period.

*Data sources: Electronic Workforce Records 2008-13, HSCIC*

Nor did our econometric analysis identify any of our workforce measures as important drivers of financial performance. There may be two reasons for this. First, the workforce data we have access to might not fully reflect providers' workforce challenges or there may be inconsistencies in the way providers capture and report information to the NHS Electronic Staff Record. Second, all providers might face similar workforce issues, regardless of size. This is consistent with what we heard from providers in our qualitative evidence, where there was a strong consensus among providers, that it is difficult to recruit to a range of roles and that locum staff are needed to cover vacancies.

The main factor that we heard was driving recruitment problems is a national shortage of clinical staff; 21 of 25 providers answering the section on recruitment in our questionnaire mentioned national shortages as a reason for problems with recruitment.<sup>26</sup> We heard from many providers that clinical staff shortages occur in certain specialties and grades, for example nurses, junior and middle-grade doctors, and staff for core medical specialties, such as acute and emergency medicine.

<sup>26</sup> The question posed in the Monitor questionnaire was: Where you face difficulties in recruiting staff with the right skills or mix of staff, what are the main factors driving this problem? Please explain, in particular setting out whether you think these issues are driven by national shortages or by specific issues at your provider.

This is supported by other evidence that several medical specialties are facing shortages of skilled staff. For example, the Keogh review found that insufficient doctors choose to specialise in emergency medicine because of the nature of the work and the working conditions.<sup>27</sup> Similarly, in a survey of 2,000 ward sisters by the Royal College of Nursing, 69% reported a difference between the total number of funded posts and the number of staff in post. Of these, 52% reported that the number of employed staff was slightly below the total number of posts and 34% reported that they were significantly below the total number of posts. By far the most common cause of understaffing was difficulty recruiting, reported by 53% of respondents.<sup>28</sup>

We also tested at a high level to see if there was a relationship between characteristics of provider location (such as level of deprivation) and difficulties in attracting staff, as measured by vacancy and locum rates. We did not find strong correlations, although the results suggest it is more difficult to recruit consultants in areas with high crime rates.

However, our analysis did not identify any differences in the impact on providers' financial performance of vacancies or locum use between providers, nor did it test for any differences in the quality of the workforce. The providers we spoke to felt that, in practice, vacancies would have a greater impact on smaller providers because a smaller clinical workforce reduces the flexibility to provide cover.

### **The non-elective/elective case mix**

Many smaller providers and experts raised the balance between non-elective and elective activity as a potential issue facing smaller providers. In particular, many were concerned about the impact of the marginal rate rule, under which providers are paid less for admissions over a certain level. The reimbursement most acute providers receive for A&E admissions above the 2008/09 level is 30% of the standard tariff.

Our quantitative analysis did show that a greater proportion of activity at smaller providers tends to be non-elective than for larger providers. But our econometric analysis did not find the proportion of non-elective activity at a provider was related to financial performance.

We also looked at whether changes in the levels of admissions from A&E since 2008/09 (those affected by the marginal rate rule) were related to financial performance. We did not see a relationship between these changes in admissions

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<sup>27</sup> NHS England (2013), *Transforming urgent and emergency care services in England Urgent and Emergency Care Review End of Phase 1 Report Appendix 1 – Revised Evidence Base from the Urgent and Emergency Care Review*. Available at [www.nhs.uk/NHSEngland/keoghreview/Documents/UECR.Ph1Report.Appendix%201.EvBase.FV.pdf](http://www.nhs.uk/NHSEngland/keoghreview/Documents/UECR.Ph1Report.Appendix%201.EvBase.FV.pdf)

<sup>28</sup> Royal College of Nursing (2013), *Frontline First: Running the red light*, November 2013 special report. [http://royalnursing.3cdn.net/e678a38646d8d670b1\\_rdm6bgu19.pdf](http://royalnursing.3cdn.net/e678a38646d8d670b1_rdm6bgu19.pdf)

and provider size, nor a relationship with financial performance. This result could reflect some of the limitations of our approach. However, it could reflect that some of the affected providers might have been able to negotiate an adjusted baseline level of A&E admissions or have been able to compensate in another way.

This does not mean, however, that the marginal rate rule does not create significant difficulties for some providers. Further, the ways in which the remaining 70% of funding is spent by commissioners to relieve pressure on urgent and emergency care services may be more important than the levels or changes in A&E activity. Research by the Foundation Trust Network found that many local health economies had not agreed plans to reinvest this 70% of funding.<sup>29</sup>

### **Most of the variation in performance cannot be explained by factors we can easily identify and measure**

Our analysis has examined the relationship between financial performance and a range of measurable factors. Despite this, even taking account of all these factors together, our analysis explains less than one-quarter of the variation in financial performance. This means there are likely to be other features associated with

financial performance that are difficult to measure or observe (the 'softer' drivers). Based on our qualitative evidence, these less observable factors might include:

- the quality of relationships among different players in a local health economy
- the financial health of other providers in the area
- the reputation of a provider
- 'buyer power' in procurement
- the leadership at a provider
- the quality of internal relationships between management and clinicians
- the longer-term historic circumstances of the provider.

These types of factors might be identifiable only with more in-depth work in a local health economy, but could be crucial to explaining the current financial performance of a provider. In particular, our analysis suggests that together they may be more important than size.

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<sup>29</sup> Foundation Trust Network submission to the Monitor/NHS England Call for Evidence, June 2013. Available at: [www.foundationtrustnetwork.org/resource-library/ftn-consultation-response-monitor-30-marginal-rate-rule/](http://www.foundationtrustnetwork.org/resource-library/ftn-consultation-response-monitor-30-marginal-rate-rule/)

## We did not find a consistent relationship between size and indicators of quality

It is beyond the scope of this study to do a full statistical assessment of the relationship between clinical outcomes at hospitals and size, so we cannot conclude with certainty on the relationship between size and clinical outcomes. For example, these indicators do not enable conclusions to be drawn about differences in quality in individual service lines. There are also noted limitations to using such indicators as measures of quality.<sup>30</sup> However, we have looked at a range of high-level indicators covering patient experience, effectiveness and safety to see if there was any clear relationship between size (as measured by beds and income) and outcomes.<sup>31</sup>

The analysis looks at data from single-site providers only as a range of clinical indicators are not available at hospital level and excluding multi-site providers avoids difficulties in distinguishing between different outcomes at individual sites within multi-site providers.<sup>32,33</sup> For example, a large multi-site trust may run two acute hospitals, with performance above average at one hospital site and below average at the other. Using only the overall indicator for the provider would not enable us to pick up on these differences, nor would we know whether they were related to hospital or provider size.

Taking these indicators together, the data does not appear to offer clear evidence that smaller hospitals consistently perform worse, although the limitations to our approach mean that we might not expect differences related to size to be detected.<sup>34</sup> We tested statistically whether:

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<sup>30</sup> See Veena S Raleigh and Catherine Foot (2010), *Getting the measure of Quality – Opportunities and challenges*, The King's Fund, p.7: "There are relatively few indicators that are universally accepted as unambiguous measures of quality. Most raise questions for further investigation and validation before one can be confident that a provider or service is 'good' or 'bad'...." Available at: [www.kingsfund.org.uk/sites/files/kf/Getting-the-measure-of-quality-Veena-Raleigh-Catherine-Foot-The-Kings-Fund-January-2010.pdf](http://www.kingsfund.org.uk/sites/files/kf/Getting-the-measure-of-quality-Veena-Raleigh-Catherine-Foot-The-Kings-Fund-January-2010.pdf)

<sup>31</sup> SHMI, HSMR, A&E 4h target, Emergency readmissions within 30 days, RTT18w, Patient experience, Staff FFT, MRSA per 100,000 bed days, C. difficile per 100,000 bed days for the last three years (2010-2011, 2011-2012, 2012-2013). Clinical audit- meeting patient hip fracture standards of care and provision of secondary prevention medicines (2012-13) Patient Friends and Family Test (Q1 2013-2014) CQC intelligent monitoring risk score (Q2 2013-2014). It should be noted that many such indicators will not be direct measures of quality, for example, often these indicators reflect processes rather than quality outcomes.

<sup>32</sup> Trust sites have been identified using the 2013 Dr Foster site level HSMR list of acute hospitals. All acute non-specialist non- community sites of a trust with over 1,000 spells have been included. Conducting analysis for single site trusts only we exclude 57 providers in total (33%):. 48 large income trusts (70%); 8 small £200m-300m (17%); and 1 small<£200m (3%). These are similar for beds groups.

<sup>33</sup> We conducted this analysis for most indicators also including multi-site providers and found that in general there was little difference in the results..

<sup>34</sup> Our analysis is limited by the quality of the indicators. In addition, data availability means that it has not been possible to explore differences in these indicators at patient or service-line level. Using hospital-level indicators constrains the number of observations available, reducing the sensitivity of our analysis to relationships which might be detected at a lower (eg service-line) level. Our analysis

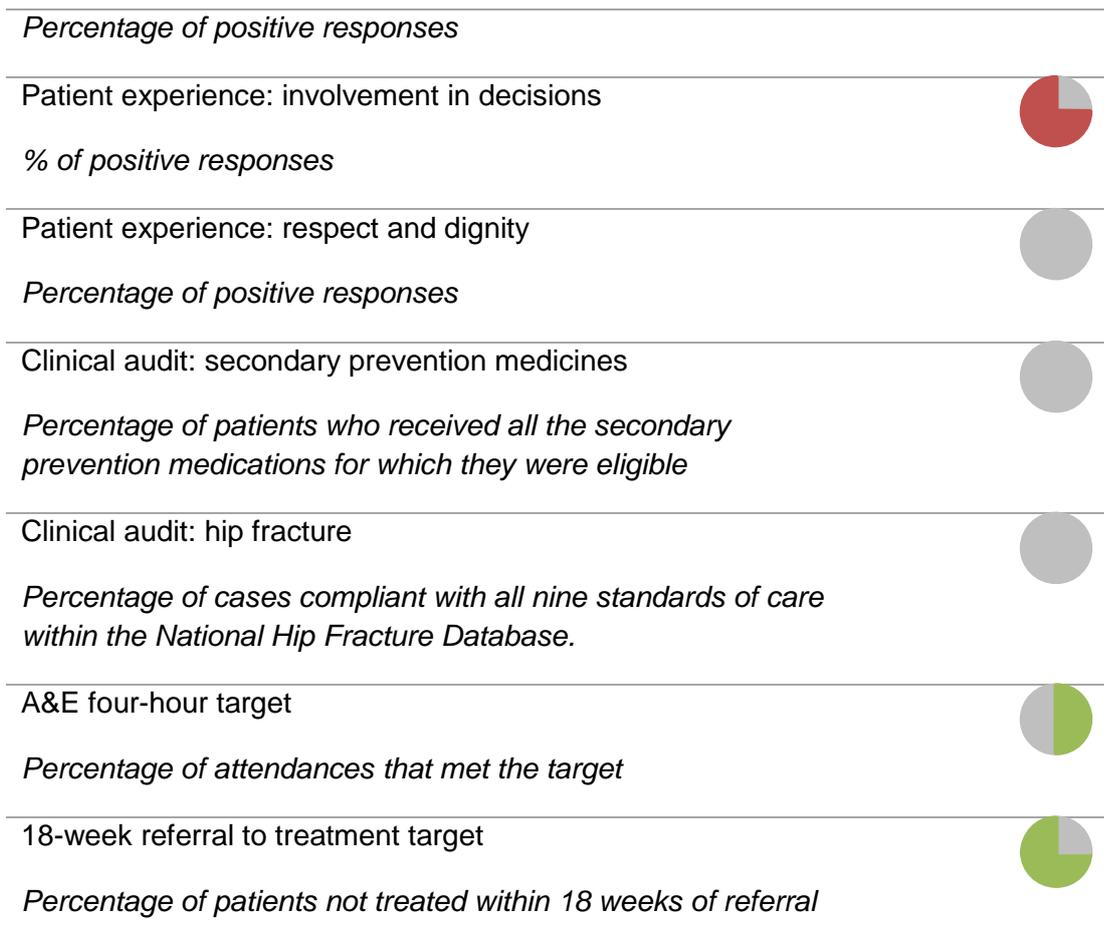
1. there was a statistically significant linear relationship between provider size (operating revenue/number of beds) and each indicator
2. larger providers as a group (over £300 million and over 700 beds) performed better or worse on average than the group of smaller providers.

We have summarised our findings from the 2012/13 data in Table 7. The circles show the results for each of the two tests for both size measures of beds and operating revenue.

**Table 7: Relationship between size and clinical indicators, 2012/13\***

Indicator	Are smaller worse? (Small better / Small worse / No difference between small and large)
Summary hospital-level mortality indicator (SHMI)	
Hospital standardised mortality ratio (HSMR)	
CQC proportional risk score <i>Number of identified risks as a proportion of potential risks for the provider</i>	
30-day emergency readmissions <i>Percentage of patients readmitted within 30 days of discharge</i>	
Methicillin-resistant Staphylococcus aureus (MRSA) cases per 10,000 beds	
C. difficile cases per 10,000 beds	
Staff friends and family test (staff FFT) <i>Percentage of positive responses</i>	
Patient friends and family test* (FFT) <i>Percentage of positive responses</i>	
Patient experience: composite	

also does not control for other factors that may impact clinical quality, meaning that any results may not be capturing the true relationship between scale and quality.



**KEY:**

Relationship / Size	Income	Beds
Is there a difference between small and large groups?		
Is there an overall relationship with size?		

\* Patient FFT analysis (Q1) and CQC proportional risk score (Q2) conducted on 2013/14 data.

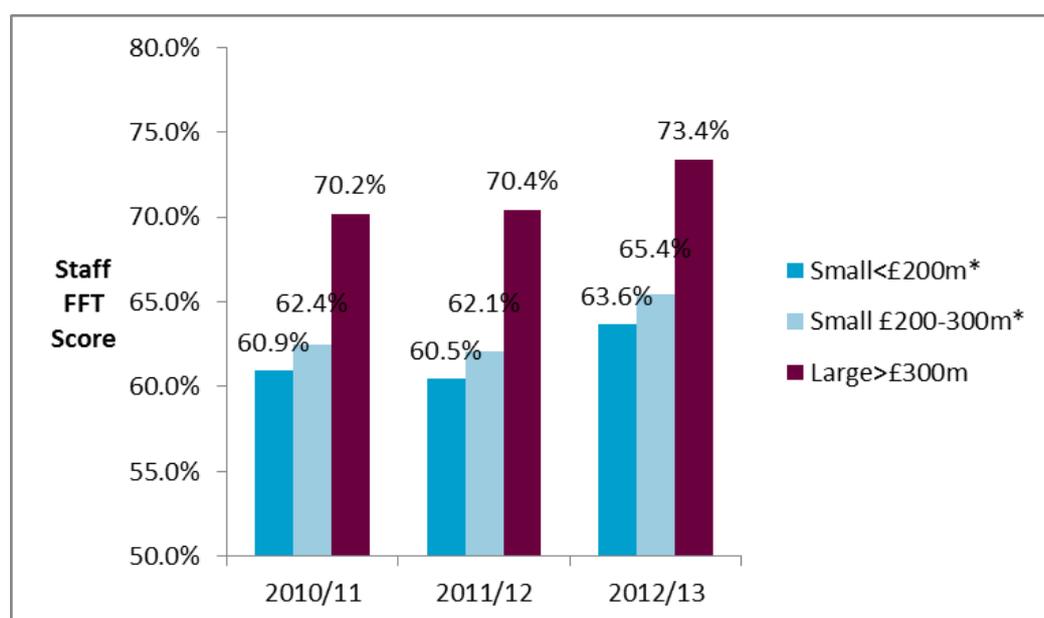
As shown in Table 7, the analysis does not present a consistent picture. On some measures larger providers seem to perform better than smaller ones, but on other measures the reverse was true or there was no relationship. When we do detect a relationship, the statistical significance is not always constant across all years.

## The staff friends and family test

One indicator for which we found some statistically significant differences between providers of different sizes was the staff friends and family test (staff FFT).<sup>35 36</sup>

Larger providers performed consistently better on this measure. That is, their staff were more likely to respond positively to the question 'If a friend or relative needed treatment, I would be happy with the standard of care provided by this organisation'. The differences in mean scores for providers by size are shown in Figure 7.<sup>37 38</sup> We find a similar relationship defining trust size by beds.

**Figure 7: Mean staff friends and family test score, 2010/11 to 2012/13**



Source: HSCIC

How far this result reflects differences in quality between large and smaller providers depends in part on how good an indicator the staff FFT is of quality. For example, it could reflect the different perceptions staff have as well as genuine differences in

<sup>35</sup> The staff FFT score is equal to the percentage of positive answers to the question 'If a friend or relative needed treatment I would be happy with the standard of care provided by this organisation' in the National NHS Staff Survey. A lower staff friends and family test score represents worse outcomes for a provider.

<sup>36</sup> Note the staff FFT guidance for implementation from NHS England states "Staff FFT data is not comparable in the same way as the results of the annual staff survey, but the results may be used alongside other evidence to inform decision making. Available at [www.england.nhs.uk/wp-content/uploads/2014/02/staff-fft-guide.pdf](http://www.england.nhs.uk/wp-content/uploads/2014/02/staff-fft-guide.pdf)

<sup>37</sup> Our significance test of the difference in mean scores for the latest year shows that with a significant difference in the performance of the smallest group and largest for income and between both the smallest and small group and the large group for beds.

<sup>38</sup> This measure was the only one where including multi-sited trusts made a difference to our results. Including multi-sited trusts in this measure significantly reduces the average for the large income trusts to 64.6% in 2012/13. This also leads to no significant differences in the means between size groups.

quality. A more detailed analysis would be needed to draw firm conclusions. This analysis looks only at the correlation between size and outcome and does not control for the effect of other potential factors.

## Mortality

We also looked at summary hospital-level mortality indicator (SHMI) and hospital standardised mortality ratio (HSMR) mortality indicators. However, we should be cautious about drawing conclusions from these indicators.<sup>39</sup> Debate over their use has centred on issues around differences between providers being driven by 'depth of coding'<sup>40</sup> and the proportion of patients classified as in need of palliative care.<sup>41</sup>

Our findings suggest there may be a linear relationship between these rates and income (with larger performing better) but for most providers of all sizes, mortality rates are consistent with the level expected. Figure 8 presents the scores for SHMI for different size groups (as measured by income) in a funnel plot. The upper and lower limits identify providers with rates estimated to be 'above or below expected'. This shows wide variation in performance across the size groups, with no clear pattern of one group consistently performing worse. Of the five providers with mortality rates that appear higher than expected on this measure one had income of less than £200 million per year, three had income of between £200 million and £300 million per year and one had income of more than £300 million per year. We see similar variation when analysing HSMR using the same method.<sup>42</sup>

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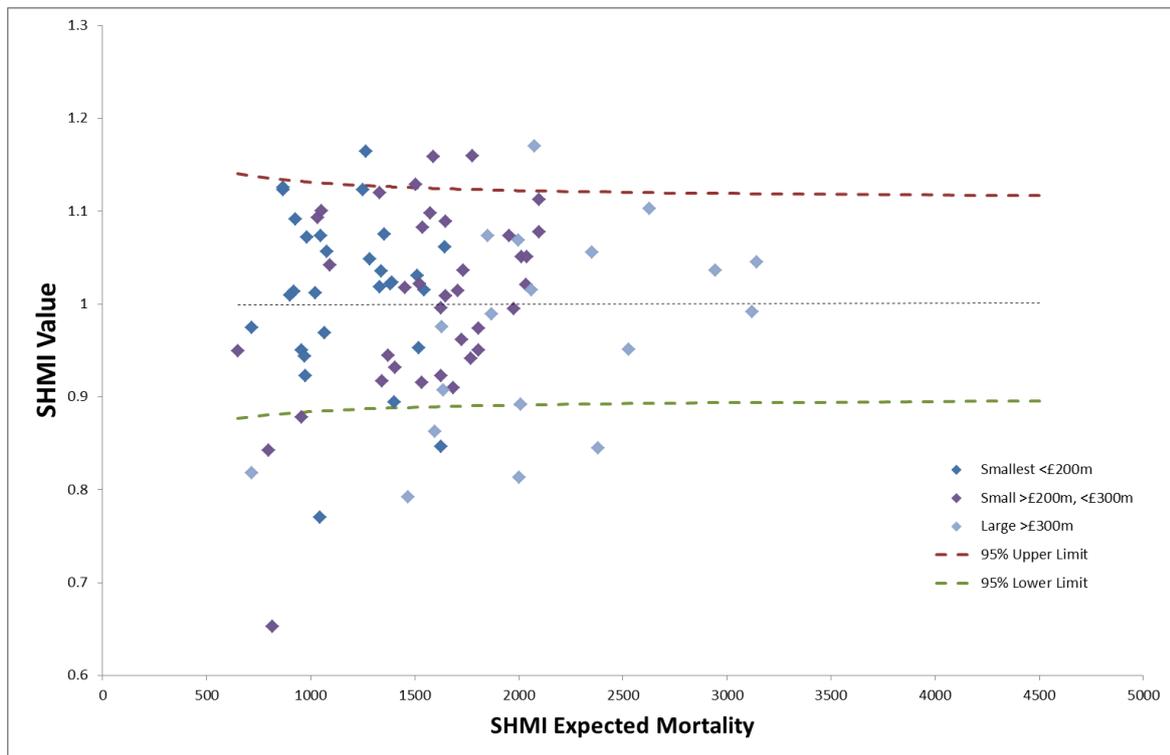
<sup>39</sup> Professor Nick Black has been asked to look into mortality indicators and is due to report in December 2014. However, he has already been reported as noting weakness in the measures, for example because they do not entirely take into account factors such as burden of illness and can be skewed by factors such as the availability of hospice care in the area. See [www.bbc.co.uk/news/health-26329750](http://www.bbc.co.uk/news/health-26329750)

<sup>40</sup> For a discussion see Nigel Hawkes (2010) Patient coding and the ratings game - *BMJ*2010;340:c2153. Available at: [www.bmj.com/content/340/bmj.c2153?view=long&pmid=20418546](http://www.bmj.com/content/340/bmj.c2153?view=long&pmid=20418546)

<sup>41</sup> See for example: [www.telegraph.co.uk/health/healthnews/10728189/Fears-that-hospitals-are-covering-up-death-rates.html](http://www.telegraph.co.uk/health/healthnews/10728189/Fears-that-hospitals-are-covering-up-death-rates.html)

<sup>42</sup> Six smallest trusts (of 29), two small (of 37) and two large (of 19) had above expected HSMR rates. There were also fewer larger providers performing better than expected than smaller (<£300m) providers.

**Figure 8: Summary hospital-level mortality indicators (SHMI) by provider income, 2012/13**



Source: SHMI (HSCIC)

Again, the limitations of our analysis and the mortality indicators mean caution should be exercised when interpreting these results.

Overall we looked at a range of provider-level indicators covering experience, effectiveness and safety. As noted above, on some measures larger providers seem to perform better than smaller ones, but on other measures the reverse was true or there was no relationship. When we do detect a relationship the statistical significance is not always constant across all years.

### Scale might become a more important factor in the future

All acute providers are under pressure to deliver more for less. Demand pressures have increased as a result of an ageing patient population which has more complex needs. There is a desire to increase the quality of care stemming from the findings of the Francis report, increased patient expectations, and evidence of the benefits of consultant-delivered care. At the same time, financial pressures are increasing with providers expected to find year-on-year cost savings.

While providers of all sizes are coming under increased financial pressure, we may have started to see a trend towards smaller providers performing worse financially. One of the drivers of this may be the trend towards more intensive staffing models.

This trend could be creating economies of scale that could make it more difficult for smaller providers to remain financially sustainable.

### More intensive staffing models

Pressures on staffing costs have come from a number of sources including:

- reviews that have highlighted the importance of the relationship between staffing and quality such as the Keogh review on urgent and emergency care, and the Francis and Berwick reviews
- the European working time directive (EWTD) and New Deal
- recommendations for senior doctor cover over seven days in acute care, and for some services 24/7.

The Francis report and the Berwick reviews highlighted the important relationship between staffing and quality. The impact of this trend towards increased staffing levels on providers is reflected for foundation trusts in an increase in spending on staff. Monitor's recent report on the performance of the foundation trust sector in 2013/14 confirmed that an additional 24,000 members of staff were hired in the past year.<sup>43</sup> This is three times the planned number which suggests that in part it was driven by providers responding to the Francis report and Keogh review. Most new staff were nurses, healthcare assistants and others supporting frontline services.

The National Institute for Health and Care Excellence (NICE) is developing guidance on safe nurse staffing levels for adult inpatient wards in acute hospitals.<sup>44</sup> Although the draft guidance specifies no single staff-to-patient ratio that can be applied across wards, it suggests that patients are at increased risk of harm if a nurse regularly has to care for more than eight people on a ward during the day. Where this issue arises, it suggests that the trust should "consider increasing the ward nursing staff establishment". The Safe Staffing Alliance,<sup>45</sup> which is made up of key nursing leaders and practitioners, has suggested that a 1:8 ratio is the level at which care is considered to be unsafe and is not a recommended minimum. For nurses to be able to treat patients with compassion, dignity and respect, the Safe Staffing Alliance believes that higher levels are needed.

We also learned from our qualitative research that the dual impact of the EWTD and the New Deal have acted to put pressures on the number of doctors needed to provide care and meet training needs. For example, the Academy of Medical Royal

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<sup>43</sup> Monitor board paper. Performance of the foundation trust sector: year ended 31 March 2014. Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/314615/BM1447\\_Q4\\_NHS\\_FT\\_performance.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/314615/BM1447_Q4_NHS_FT_performance.pdf)

<sup>44</sup> NICE (2014), *Safe staffing for nursing in adult inpatient wards in acute hospitals*. NICE safe staffing guideline: draft for consultation, 12 May to 10 June 2014.

<sup>45</sup> Safe Staffing Alliance: [www.safestaffing.org.uk/](http://www.safestaffing.org.uk/)

Colleges suggests that, as a result of the EWTD, providers will need at least eight to ten doctors per specialty for each of the two tiers of junior doctor cover to provide 24/7 care and meeting training needs.<sup>46</sup>

Alongside this, there is a growing evidence base to support greater levels of senior staff involvement in patient care. For example:

- The Academy of Medical Royal Colleges has summarised evidence around the benefits of consultant-delivered care<sup>47</sup> and found among other things that: “Numerous reviews by expert clinicians have concluded that patients have increased morbidity and mortality when there is a delay in the involvement in their care of consultants across a wide range of fields including in acute medicine and acute surgery, emergency medicine, trauma, anaesthetics and obstetrics . . .”.
- Dr Foster found a correlation between senior staff at weekends and mortality, concluding that: “More senior staff per bed at weekends is associated with a lower weekend emergency mortality rate (HSMR)” and “More senior doctors as a percentage of all doctors are associated with a lower weekend emergency mortality rate.”<sup>48</sup>

Such evidence has led the Academy of Medical Royal Colleges to suggest standards on providing seven-day consultant-presence care.<sup>49</sup> NHS England’s seven-day service clinical standards, although broader than consultant cover, also reflect a desire to improve care at the weekend through increased consultant assessment of patients.<sup>50</sup> This view is evident in recommendations from other Royal Colleges. For example, the Royal College of Physicians recommends that acute medical units have at least 12-hour, seven-day consultant presence.<sup>51</sup> In some services, such

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<sup>46</sup> Academy of Medical Royal Colleges (2004), *Implementing the European Working Time Directive: A Position Paper from the Academy of Medical Royal Colleges*.

<sup>47</sup> See Academy of Medical Royal Colleges (January 2012), *The Benefits of Consultant-delivered Care*. Available at: [www.aomrc.org.uk/doc\\_view/9450-the-benefits-of-consultant-delivered-care](http://www.aomrc.org.uk/doc_view/9450-the-benefits-of-consultant-delivered-care)

<sup>48</sup> Dr Foster – *Inside your Hospital* (2001-2011) – page 20. Note that senior doctors include “both consultants and senior registrars”. Available at: [http://drfosterintelligence.co.uk/wp-content/uploads/2011/11/Hospital\\_Guide\\_2011.pdf](http://drfosterintelligence.co.uk/wp-content/uploads/2011/11/Hospital_Guide_2011.pdf)

<sup>49</sup> Academy of Medical Royal Colleges (Dec 2012), *Seven Day Consultant Present Care*. Available at: [www.aomrc.org.uk/doc\\_view/9532-seven-day-consultant-present-care](http://www.aomrc.org.uk/doc_view/9532-seven-day-consultant-present-care)

<sup>50</sup> See for example Standards 2 and 6 in NHS England’s *NHS Services, Seven Days a Week Forum Clinical Standards*. Available at: [www.england.nhs.uk/ourwork/qual-clin-lead/7-day-week/](http://www.england.nhs.uk/ourwork/qual-clin-lead/7-day-week/)

<sup>51</sup> RCP (October 2012) *Acute care toolkit 4: Delivering a 12-hour, 7-day consultant presence on the acute medical unit*.

Available at: [www.rcplondon.ac.uk/sites/default/files/documents/acute-care-toolkit-4.pdf](http://www.rcplondon.ac.uk/sites/default/files/documents/acute-care-toolkit-4.pdf)

See also [www.rcplondon.ac.uk/press-releases/patients-deserve-better-out-hours-care-says-rcp-president](http://www.rcplondon.ac.uk/press-releases/patients-deserve-better-out-hours-care-says-rcp-president)

as emergency medicine, the expectation is that experienced doctors should be involved 24/7.<sup>52</sup>

In some cases this has led to recommendations for the number of consultants needed per service. For example, the Royal College of Paediatrics and Child Health stipulates that “All general acute paediatric rotas are made up of at least ten WTEs<sup>53</sup>, all of whom are EWTD compliant”.<sup>54</sup> For maternity services the recommendations around consultant hours are based on the number of births at the unit (see Table 8).

All providers may find standards that increase consultant presence hard to comply with. For example, Table 8 shows compliance with recommended standards of consultant presence for maternity services, assessed by the National Audit Office. This shows that no larger units complied in 2012, whereas 76% of units with 2,500 to 4,000 births per year complied.

**Table 8: Maternity services compliance with consultant presence standards, Sept 2012**

Births per year <sup>55</sup>	Recommended minimum consultant presence per week (hours)	Total number of obstetrics units	No. of compliant units (%)
2,500 – 4,000	60	59	45 (76)
4,000 – 5,000	98	31	10 (32)
5,000 +	168	26	0 (0)
<b>TOTAL</b>		<b>116</b>	<b>55 (47)</b>

*Adapted from NAO report Maternity services in England, Nov 2013<sup>56</sup>*

Smaller providers are likely to find it increasingly hard to keep pace with these changing recommendations and expectations around workforce. Input-based standards, such as minimum consultant numbers, or other pressures to increase the levels of staff coverage, can increase the fixed costs associated with the provision of a service and increase the minimum efficient scale of that service.

<sup>52</sup> See for example: The College of Emergency Medicine (2008), *The Way Ahead 2008-2012*, p.7: “The College recommends that workforce planning should ensure the presence of a senior ED doctor (ST4 or above) as a clinical decision maker 24/7.”

<sup>53</sup> WTE: working time equivalent.

<sup>54</sup> RCPCH (April 2011), *Facing the Future: Standards for Paediatric Services*. Available at: [www.rcpch.ac.uk/system/files/protected/page/RCPCH%20Facing%20the%20Future%20-%20Standards%20for%20Paediatric%20Service%20April%202011%20V2\\_1.pdf](http://www.rcpch.ac.uk/system/files/protected/page/RCPCH%20Facing%20the%20Future%20-%20Standards%20for%20Paediatric%20Service%20April%202011%20V2_1.pdf)

<sup>55</sup> 35 obstetric units were excluded from this analysis in the National Audit Office report because they had fewer than 2,500 births in 2012. The 168 hours level is equivalent to 24 hours a day, seven days a week.

<sup>56</sup> National Audit Office (November 2013), *Maternity services in England*. Available at: [www.nao.org.uk/wp-content/uploads/2013/11/10259-001-Maternity-Services-Book-1.pdf](http://www.nao.org.uk/wp-content/uploads/2013/11/10259-001-Maternity-Services-Book-1.pdf)

This is supported by the analysis set out in the Frontier Economics/BCG report for Monitor on the economies of scale and scope in acute hospital services.<sup>57</sup> This project modelled the costs of delivering best practice care, based on Royal College standards for core services such as A&E and maternity care. The modelling suggested economies of scale significantly above those likely to exist today, driven primarily by the numbers of doctors required in those services and in support services to provide 24/7 cover. The Healthcare Financial Management Association (HFMA) study for NHS England on seven-day services supports this finding. This found that the costs of implementing seven-day acute and emergency services are likely to be greater for smaller acute providers.<sup>58</sup>

Workforce pressures on smaller providers sit alongside other trends in how non-specialist acute providers deliver care and how they operate. These include, in particular, consolidating specialist care into fewer, larger centres and improving out-of-hospital care to avoid acute attendances and admissions.

### Consolidation of specialist care

One driver of increasingly consolidated services has been evidence that volumes of procedures relate to clinical outcomes for some procedures. There is an established body of academic literature reporting the positive relationship between volumes outcomes and quality for some procedures. For example, a report prepared for the advisory group to the National Framework for Service Change, NHS Scotland, concluded that:

" . . . There is now a core of studies of adequate methodological quality to establish striking volume/outcome associations in certain complex high risk surgical procedures and more modest but clinically relevant effects in a wide range of common procedures . . . "<sup>59</sup>

Such evidence could see services consolidated into fewer, larger centres. We have heard from some stakeholders that this evidence tends to be strongest for the surgical treatment of high-risk patients with complex needs, such as vascular surgery, cardiac surgery, transplantation and specialist cancer surgery.<sup>60</sup> In a

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<sup>57</sup> Frontier Economics and BCG (August 2012), *A study investigating the extent to which there are economies of scale and scope in healthcare markets and how these can be measured by Monitor*. Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/303160/Monitor\\_Economies\\_of\\_Scale\\_and\\_Scope\\_-\\_FINAL\\_REPORT\\_0\\_0.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/303160/Monitor_Economies_of_Scale_and_Scope_-_FINAL_REPORT_0_0.pdf)

<sup>58</sup> NHS services, Seven Days a Week Forum (2013) *Costing seven day services - The financial implications of seven day services for acute emergency and urgent services and supporting diagnostics*, p.4. Note this was based on eight volunteer providers and so may not be representative of the wider NHS. Available at: [www.england.nhs.uk/wp-content/uploads/2013/12/costing-7-day.pdf](http://www.england.nhs.uk/wp-content/uploads/2013/12/costing-7-day.pdf)

<sup>59</sup> Gordon D Murray and Graham M Teasdale (February 2005), *The Relationship between Volume and Health Outcomes Report of Volume/Outcome Sub-Group To Advisory Group to National Framework for Service Change NHS Scotland* Available at [www.sehd.scot.nhs.uk/nationalframework/Documents/VolumeOutcomeReportWebsite.pdf](http://www.sehd.scot.nhs.uk/nationalframework/Documents/VolumeOutcomeReportWebsite.pdf)

<sup>60</sup> See for example Table One *Summary of the results of systematic literature search and evaluation on the association of annual hospital volume with mortality rate* in Gandjour, md, phd, Angelika

submission to this project the Royal College of Physicians concluded on volume and outcomes relationships that:

“Most of the available evidence is in relation to surgical procedures where the activity and the outcome are perhaps easier to measure, than in medical disciplines. Despite this, the evidence is still inconsistent with some studies suggesting that smaller units often perform better and there is a paucity of advice available regarding the optimal size or volumes for services . . .”<sup>61</sup>

Smaller providers may be less likely to be affected by this trend if:

- they do not deliver the types of services for which the evidence base around volumes is strongest
- they already deliver services at volumes above the threshold identified for providing high quality care.

Understanding the impact on smaller acute providers would require identifying the services most likely to be affected by any changes in commissioning.

Our quantitative analysis indicates that reducing the number of services at some smaller providers could improve their financial performance. This would have to be balanced against any adverse consequences of reducing services. For example, providers have told us that losing specialist services can have a significant effect on their ability to recruit consultants.

### **Better out-of-hospital care to prevent attendance and admissions**

A second trend affecting smaller providers is the increased emphasis on moving care closer to home. Over recent years there has been a desire to move care out of the acute setting and into the community. This is seen as vital to improving quality for patients, relieving demand pressures on acute hospitals and reducing costs across the system. This is reflected in NHS England’s planning guidance, which states as an ambition “reducing the amount of time people spend avoidably in hospital through better and more integrated care in the community, outside of hospital”.<sup>62</sup> To help achieve this policy goal, the Department of Health has established the Better Care Fund, which will provide £1.1 billion from the healthcare budget to fund a transformation in integrated health and social care.<sup>63</sup>

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Bannenberg, md, and Karl W. Lauterbach, md, dsc. (2003) Threshold Volumes Associated With Higher Survival in Health Care A Systematic Review *Medical Care Volume*, 41, Number 10, pp.1129–1141.

<sup>61</sup> Royal College of Physicians written response to Monitor during the research project.

<sup>62</sup> One of seven ambitions: [www.england.nhs.uk/wp-content/uploads/2013/12/5yr-strat-plann-guid-wa.pdf](http://www.england.nhs.uk/wp-content/uploads/2013/12/5yr-strat-plann-guid-wa.pdf) (see page 8).

<sup>63</sup> The total Better Care Fund is £3.8bn – for a full breakdown of where these monies come from see the Kings Fund (2014) *Making best use of the Better Care Fund Spending to save?*, p.2. Available at:

This could have a more significant impact on smaller acute providers than larger ones if more of their work was moved out of hospital, reducing the volume of patients, and providers were unable to reduce their corresponding costs. Understanding the impact of this policy is likely to require some additional modelling work. However:

- reductions in activity may be offset by demographic changes as long as funding is still associated with activity
- smaller acute providers may be well placed to respond by exploring new ways to integrate primary, community and even social care with acute services.

## The need for change

These trends mean that expectations of the role of smaller providers and how they deliver care need to change. We can see that some of this change is already in train as providers are identifying new models of care and responding creatively to addressing challenges.

### New service models

For some smaller providers, the best response may be a re-design of the services they offer. In particular, this may mean working differently with community providers to deliver better out-of-hospital care or even re-focusing their activities towards co-locating with primary, community and social care alongside delivering lower risk urgent and elective care. Most providers we spoke to had strategies that were intended to provide more integrated care pathways or to increase the proportion of care delivered closer to their patients' homes.

We also heard that some trusts are reconfiguring services to best meet the challenges in their local areas. For example, Gateshead Health NHS Foundation Trust is to open a new emergency care centre in November 2014 which will provide dedicated facilities for non-elective patients and support re-designed patient pathways. The facility will provide a single entry point into the hospital for all emergency admissions, and will include specialist children's facilities, a walk-in facility for minor cases, and a 48-bed short-stay unit catering for medical admissions and frail older patients. Specialist diagnostic equipment will be embedded within the emergency care centre. It will also have access to a wide range of medical and surgical specialties, which should help to facilitate prompt access to the appropriate care and treatment.

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[www.kingsfund.org.uk/sites/files/kf/field/field\\_publication\\_file/making-best-use-of-the-better-care-fund-kingsfund-jan14.pdf](http://www.kingsfund.org.uk/sites/files/kf/field/field_publication_file/making-best-use-of-the-better-care-fund-kingsfund-jan14.pdf)

In another case, Yeovil District Hospital NHS Foundation Trust is working with Somerset Partnership NHS Foundation Trust (a community services provider), Somerset County Council, Somerset Clinical Commissioning Group and the South West Commissioning Support Unit on a project to develop a model of integrated care, called the Symphony Project. The project is designed to establish greater collaboration between primary, community, mental health, acute and social care, and aims to both improve services for patients and boost efficiency. It is centred on the needs of individual patients, with a particular focus on patients with complex conditions.

### **Alternative ways providers are responding**

There are other ways in which providers are responding to the developing challenges. For example, we were told of many different ways in which providers are working around staff shortages and responding to other recruitment needs.

This included:

- conducting international recruitment campaigns, particularly for qualified nurses and for junior and middle doctors in some specialties
- developing new roles and re-designing existing roles, eg new roles for advanced practitioners in diagnostic areas, hybrid roles for nurses and therapists that include hospital and community care skills or new roles for physician associates
- employing a pool of trained nurses who may be used to address shortages in staff and skills mix without relying on agency staff
- making joint appointments with neighbouring providers
- offering flexible working, learning and development benefits and other support to staff.

Providers also appear to be responding to the challenges through the increased use of networks and/or partnerships. We heard from both providers and experts that network solutions and collaborative working arrangements are important, and in some circumstances could become increasingly so if the acute sector is to deal with the challenges ahead. Nearly all the providers we heard from told us that they are working with other providers in partnerships or networks to:

- address workforce shortages
- ensure comprehensive service provision (particularly of specialist services)
- achieve additional efficiencies
- and/or develop integrated care.

New technologies such as telemedicine might also help. For example, Airedale Hospital NHS Foundation Trust runs a centre for telehealth: a video-based clinical consultation platform for outpatient and follow-up appointments. The system was introduced in 2006 and was first used in prisons. It has since been expanded to include nursing and residential care homes as well as supporting people with Chronic Obstructive Pulmonary Disease (COPD) in their own homes. It is now being considered for other services such as mental health, pain management and end-of-life care. Airedale Hospital NHS Foundation Trust told us that this service has led to a 69% reduction in A&E attendances from care homes and a 60% reduction in A&E attendances from COPD patients in the past 12 months. The system is currently in approximately 15 prisons and 220 nursing homes and supports around 3,100 patients.

### **Responses will need to be tailored to local circumstances and to take account of wider constraints**

Although some providers can start to adapt to respond to the pressures in the system, the sector's response must also be grounded in the realities of constraints in the system and tailored to reflect the local areas in which they are operating and the local constraints that they are facing.

#### **Access**

In remote and rural areas, questions of access may be of high importance. All commissioners may need to consider the access their patients have to a range of healthcare services, including patient preferences about travelling further for treatment and whether there might be circumstances and some services where it is better for patients not to travel over longer distances.<sup>64</sup>

The right balance will need to be struck between quality risks and access risks. We can see from our analysis that there is already significant variation across the country in terms of patient access. Our mapping work (see Figure 2) shows that across all 185 acute hospitals that currently have a type 1 A&E, 45 sites are located over 30km from the next nearest A&E with five sites being over 60km away. This distance from other providers, combined with patients already travelling further for services could mean that a broader set of services need to be offered at these more isolated hospitals. These hospitals might be able to demonstrate quality even if their size or degree of isolation makes some standards more difficult or costly to meet. Commissioners and providers will need to consider carefully the right set of services that are needed in these areas.

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<sup>64</sup> See Nicholl, J. et al (2007), 'The relationship between distance to hospital and patient mortality in emergencies: an observational study', *Emergency Medicine Journal*, 24: 665-668.

## Workforce

Our qualitative evidence showed a strong consensus that acute providers are finding it difficult to recruit to a range of roles, and that the key factor driving recruitment problems is a national shortage of appropriately skilled clinical staff. Analysis of the questionnaire responses show that 21 of 25 providers answering the section on recruitment mentioned national shortages as one of the reasons for problems with recruiting.<sup>65</sup>

In addition, in some areas it is also apparent that meeting guidelines on consultant-delivered care would be near impossible with the current numbers of consultants. This is illustrated by the Royal College of Paediatrics and Child Health analysis which argues that to meet the Facing the Future Standard, 4,853 consultant paediatricians would be needed (assuming no reconfiguration of services), but that there are currently 3,084 WTE consultant paediatricians in the UK.<sup>66</sup> The report concludes:

“...If there is to be a consultant-delivered, high quality and safe standard of care then a significant expansion in consultant numbers is needed, somewhere between 50% and 60%. This indicates that reconfiguration alone only has a minor impact on the identified consultant gap...”<sup>67</sup>

Taking the constraints of workforce shortages into account will mean balancing them against the pressures to improve quality of care through increasing staff numbers. Understanding the potential impact of these workforce shortages and how they might be managed should be an important part of our future work.

## Other local and provider specific characteristics

Our analysis is intended to help inform and support providers and commissioners as they plan for the future. However, the work we have done should sit alongside providers' and commissioners' experience and knowledge of their local areas. This is not least because there are limitations to the application of our conclusions to the specific circumstances of any individual provider.

Our conclusions are based on the data and information available, but it is clear from our analysis that beyond these indicators sits a much more complex and nuanced picture. There are many 'softer' aspects that may affect a provider's performance that we have been unable to capture.

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<sup>65</sup> Monitor questionnaire: Q15 (b) Where you face difficulties in recruiting staff with the right skills or mix of staff, what are the main factors driving this problem? Please explain, in particular setting out whether you think these issues are driven by national shortages or by specific issues at your trust

<sup>66</sup> This included 1,331 WTE general paediatricians, plus sub-speciality and academic paediatricians.

<sup>67</sup> *Facing the Future: A Review of Paediatric Services*, (April 2011). This report modelled the potential implications of RCPCH standards for paediatric services in the UK. Available at: [www.rcpch.ac.uk/system/files/protected/page/FTF%20Full.pdf](http://www.rcpch.ac.uk/system/files/protected/page/FTF%20Full.pdf)

## Our next steps

Monitor's job is to inform and support providers and commissioners so they can make the local decisions they need to that are in patients' best interests. Our next steps will be to work with the health sector, our national partners and experts to:

1. Help identify the new models of care that can better address the underlying causes of financial challenge at individual providers and in specific local health economies. This will include understanding the economic impact of moving care out of hospital and the extent to which it might generate savings for commissioners.
2. Identify and share other approaches to addressing the constraints faced. Providers both in the NHS and internationally are adapting and innovating to improve care for patients and increase the efficiency of provision by using staff, technology and networks differently. We will explore ways to better share this evidence.
3. Examine the constraints themselves. We should better understand the factors that are affecting change, such as workforce issues, clinical specialisation or increased staffing levels and consider how best to balance competing objectives.

## Annex 1: Methodology and data

This annex sets out the general methodology used to analyse the challenges facing smaller acute providers. It also describes our approach to assessing the drivers of performance, including the model, dataset and results of our econometric analysis. The final section contains a table of data sources and definitions.

The project has focused on the 142 general (non-specialist) acute NHS foundation trusts (FTs) and NHS trusts providing patient care in the financial year 2012/13. We included only general acute trusts as specialist, mental health, ambulance and other non-acute providers are likely to face different challenges, and their model of provision too different to be comparable. Privately owned providers have also been excluded from our analysis as they provide a substantially different service mix. To provide a comprehensive analysis, we have covered a broad range of potential drivers of acute provider performance. This has necessarily limited the depth of analysis on each issue.

The analysis has been designed to compare smaller providers with larger ones across various measures and characteristics. We also did econometric analysis to isolate the relationship between scale and financial performance, and to identify other potential drivers of financial performance that may be unrelated to scale, that are neither a direct result of, nor highly correlated with, provider size. Understanding why these factors might drive performance is not the focus of our project, although we discuss the results of our analysis in places.

We wanted to understand whether smaller acute providers face systematic challenges. Before launching this project, we identified a range of factors that might drive differences in financial performance. We also looked at additional factors that our quantitative and qualitative work suggested might be important. We tested whether all of our potential drivers of performance were related to size or financial performance, and whether the relationships were likely to be material in explaining any differences in financial performance between smaller and larger providers.

Evidence we have used to test these drivers has included:

1. qualitative evidence gathered from structured face-to-face and telephone interviews with 26 acute providers, 14 responses to Monitor's call for evidence and 28 responses to Monitor's questionnaire to acute trusts
2. quantitative evidence from national datasets, including Hospital Episode Statistics (HES), the NHS Trust Development Authority (NHS TDA) Financial Information Management Systems (FIMS), Monitor's annual planning review (APR) data, the Health and Social Care Information Centre (HSCIC), Care Quality Commission (CQC), Department of Health (DH) reference costs data, as well as published research.

## Limitations

Although we tried to gather a diverse range of evidence, there are several limitations to our approach. These issues include:

1. **Unobservable factors.** Some factors, such as features of local health economies or specific characteristics of trusts, will naturally be less observable than others, but might still be important in determining the performance of acute trusts. For example, we were not able to develop good measures of the ways in which different providers within a local health economy work together, nor the ways in which clinicians and management work together within a provider.
2. **Data comparability.** A dataset has been assembled that includes both NHS FTs and NHS trusts. However, it has been difficult to adjust some variables to ensure that all the information, particularly relating to financial indicators, is comparable. For example, it could be that non-recurrent funding is reflected differently in the accounts of NHS FTs and NHS trusts. If any systemic differences between NHS trust and NHS FT accounts were randomly distributed across the size distribution they should not affect our results, but we are unable to test for this. To control for this, at least partially, we have included an indicator variable for FT status in our econometric analysis.
3. **Breadth.** We looked at a broad range of potential issues spanning workforce, local health economies, clinical outcomes and trends, operational factors and financial outcomes. The breadth of the issues covered has limited the depth and detail in which we were able to explore each one. We chose this approach to systematically look for indicators of issues rather than pre-judge which issues we should focus on in detail.

## Measures of size

The size of a trust can be measured in several different ways. In consultation with stakeholders we found that the most cited measures were the number of general and acute hospital beds and trust income.<sup>68</sup> We have used these in two ways: to group individual trusts into different size categories for descriptive purposes; and to group trusts into size categories for analysis of variation between groups.

We defined smaller trusts as those with operating revenue under £300 million in the 2012/13 financial year, and the smallest trusts as those with operating revenue under £200 million. This threshold was chosen to capture NHS FTs with a very low or negative EBITDA% in 2012/13 (table 1).

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<sup>68</sup> Inpatient spells and a site weighted spells measure have also been included in the multivariate econometric modelling.

**Table 1: The six very challenged smaller acute foundation trusts 2012/13**

Foundation Trust name	Operating Revenue 2012/13 in £ millions	EBITDA% 2012/13
Milton Keynes Hospital	£162.5	1.6%
Mid Staffordshire	£159.1	-5.0%
Peterborough and Stamford Hospitals	£223.1	-5.6%
University Hospitals of Morecambe Bay	£262.0	-3.0%
Heatherwood and Wexham Park Hospitals	£232.3	-1.8%
Bolton	£282.1	-3.2%

Source: APR 2012/13

Size categories based on bed numbers were chosen to be roughly similar in size to these income-based categories, with about 50% of trusts in the smaller category, and 25% of trusts in the smallest category. However, several trusts do not appear in the same group for both measures.<sup>69</sup> Some had a bed number below our cut off but an income level above the cut off, and vice versa. This is to be expected and could be due, for example, to differences in providers' activity mixes, with different services needing different combinations of inpatient beds and outpatient activity. The results of our analysis of clinical indicators are provided on single-site acute trusts only. We used this subset of trusts to limit the unobservable influences of trust structure on our outcomes measures, as a range of clinical indicators is not available at hospital level.

**Table 2: Size and number of trusts in each category 2012/13**

	Smaller				Larger	
	Smallest		Small		Large	
	Category	Count (single site)	Category	Count (single site)	Category	Count (single site)
Operating Revenue	<£200m	30 (29)	£200m to £300m	45 (37)	>£300m	67 (19)
Overnight Beds	<450	31 (30)	450 to 700	47 (37)	>700	64 (18)

Source: Beds - NHS England general and acute overnight beds 2012/13; Operating revenue (income) – APR/FIMS 2012/13

<sup>69</sup> 54% of trusts are categorised in the same smaller and larger category for income and beds, 40% of trusts are categorised in the same smallest small or large category for both beds and income. 89% of single site trusts are categorised in the same smaller and larger category for income and beds, 67% of single site trusts are categorised in the same smallest small or large category for both beds and income. There are several reasons to not expect consistency between total revenue and beds measures of income eg differences in non-clinical revenue sources and different service models.

## Identifying differences between the performance of small and large acute trusts

Using income and beds as measures of size, we analysed a broad range of clinical and financial indicators to assess the relative performance of smaller trusts. We chose a set of indicators for each<sup>70</sup> to get a clearer picture of trust performance. Financial metrics were adjusted where appropriate for comparison between NHS trusts and NHS FTs and presented these grouped by FT status as well as the overall acute sector. Clinical metrics include process indicators (eg referral to treatment) and outcome indicators (eg mortality).

For the outcomes metrics we explored the relationship between performance and size through:

1. Linear relationships across the full range of metrics using a simple linear regression, noting statistical significance of the slope relationship.
2. Summary statistics (mean, median and percentile values) for beds and income size groups. Testing for statistically significant differences in means with t-tests which assumed unequal variance between the samples.
3. Where available, short time series of the variable (3 to 4 years) for the 142 current acute trusts. Grouping and testing of mean differences within and between years to evaluate trends in the clinical and financial outcomes.

Weak relationships between variables and size are noted for several reasons, for example, linear relationships being statistically significant but differences in group means not (or vice versa); or where the relationship did not exist for all size measures, for example where we found a relationship with income but not with beds.

## Identifying drivers of performance for smaller trusts

Having considered the overall clinical and financial performance of trusts, we next looked at whether smaller acute providers were challenged across a range of other factors, such as workforce. We set out below the framework with which we approached our assessment of these drivers, with details of the indicators that were used as a starting point for more detailed analysis.

1. **Does the potential driver differ in magnitude between small and large trusts?** The techniques used to assess the general performance indicators were used to analyse the relationship between the prevalence of a potential driver/challenge and size (eg do smaller providers have a higher locum rate?).
2. **If so, does this difference seem to be related to financial performance?** The relationship between financial performance and the driver or challenge (for example, staff vacancy rates) was also analysed as above.

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<sup>70</sup> A full list can be found in the “indicator definitions and data sources” section below.

**3. If so, what is the possible financial materiality of this effect?**

Even if there is a clear theoretical and empirical link between a driver and financial performance, we have assessed the magnitude of the impact, which may not always be material.

**4. If so, does this relationship hold in our econometric analysis of financial performance?**

Controlling for other observable characteristics of a trust and its local health economy, we attempted to estimate the effect of individual factors on trusts' financial performance. See below for a fuller description of our econometric model.

Table 3 shows a selection of the key indicators used in our analysis.

**Table 3: Results summarised by main indicator** (  Yes  No  Weak  Not possible to test robustly)

Issue	Main indicator(s) used to test	Relationship with scale	Impact on financial performance
<b>Economies of scale</b>	Average costs (reference cost index)		
<b>Economies of scope</b>	Number of specialities		
<b>Operational challenges</b>	Number of major sites (measured as those operating with an A&E)		
<b>Higher volatility in financial performance</b>	Volatility of EBITDA% across time		
<b>Attracting workforce (medical and managerial)</b>	Locum rates for medical staff		
	Vacancy rates for medical staff		

	Staff stability index: medical and managerial staff		
<b>Poorer quality estate</b>	Backlog maintenance costs		
	Floor area unsuitable for patient care		
<b>Impact of a private finance initiative (PFI)</b>	Whether a provider has a PFI building		
<b>Commissioners are less well funded</b>	Distance from target		
<b>Less able to bargain effectively with their commissioner</b>	<i>Not tested directly</i>		
	We looked at share of main commissioner activity		
<b>Less able to attract central funding</b>	<i>Not possible to test quantitatively</i>		
<b>Impact of payment systems including tariff</b>	Share of non-elective activity; share of NHS clinical revenue from tariff services		
<b>Provision of services such as specialist care, teaching or R&amp;D that may attract larger margins</b>	Revenue share from education and training; R&D; and from nationally commissioned specialist activity		
<b>Amount of competition</b>	Number of competitors within various distances		

<b>Quality of primary, social and community care</b>	Patient satisfaction with their GP, number of GPs per capita		
	Delayed discharge attributed to social and community care issues		
<b>Nature of links to other providers</b>	Distance from nearest other provider's A&E		
	Distance from nearest major trauma centre		
	Rural/urban location		

## Econometric analysis

We estimate a simple econometric model to identify which factors appear to be the most important drivers of the financial performance of acute trusts, informed by our qualitative and quantitative evidence. Our econometric work involves modelling trust-level financial performance (EBITDA as a percentage of operating revenue) as function of scale, as well as other factors that are likely to influence financial performance. These include a number of characteristics specific to the trust, the level and nature of demand, and the local health economy.

Potential drivers included in the final model are considered statistically significant when there is a low probability that the observed association with financial performance is driven by chance.<sup>71</sup> We estimate our econometric model for four different measures of trust size: operating revenue; number of general and acute beds; number of inpatient spells; and the average number of patient spells at each site within the trust. Where a variable appears as statistically significant across various measures of size and for individual years within our four-year data set, we have put more weight on the robustness of the relationship.

<sup>71</sup> Hence, describing a relationship as being 'statistically significant at the 1 per cent level' implies that there is only a 1 per cent chance that the estimated relationship was observed by chance.

Using a four-year panel of data for 142 general (non-specialist) acute trusts, we estimate a simple linear regression model, with EBITDA% modelled as a function of size and other characteristics.

- Trust-specific characteristics, such as the size of the trust, number of sites, workforce characteristics, etc.
- Demand-specific characteristics, such as the non-elective share of activity at the trust, case-mix and age of the provider's patients.
- Environment-specific characteristics, such as the location of the trust, distance from other acute providers, number of GPs in the catchment area and other characteristics of the local health economy.

Estimating a pooled model, clustering errors at the trust-level and estimate heteroskedasticity-robust (White) standard errors.

### Variables considered/inclusion

Table 4 provides a brief description of the variables that we considered were relevant to include in the model to explain the financial performance of acute trusts, and the reason for their use or exclusion. These are in addition to our various scale and scope variables.

**Table 4: Variables considered for inclusion in the econometric analysis**

Factor	Included in final model?	Varies over time in our data set? <sup>72</sup>	Reason for exclusion
<i>Trust-specific characteristics</i>			
Number of A&E sites	Yes	No	Included
Number of acute sites	No	No	Not significant in any model and A&E sites may capture 'hot' site costs better
Tariff share of clinical revenue	Yes	Yes	Included
Education and R&D as % of revenue	No	Yes	Not significant
Specialist spells as % of total spells	No	Yes	Not significant

<sup>72</sup> For some measures that are likely to vary over time, such as the average age of inpatients, but where this variation is unlikely to be substantial, we have used data for 2012/13.

Reference Cost Index	Yes	Yes	Included
Market Forces Factor	Yes	Yes	Included
Locum rate	No	Yes	Not significant
PFI indicator - binary	Yes	No	Included
Backlog maintenance cost as % of revenue	No	No	Not significant
<b><i>Demand-specific characteristics</i></b>			
Case-mix indicator	Yes	Yes	Included
Average age of inpatients	No	No	Not significant
Non-elective activity as % of total activity	No	Yes	Not significant
Change in A&E admissions since 2008/9 (%)	No	Yes	Not significant
Private patient income as % of total revenue	No	Yes	Not significant
<b><i>Local health economy characteristics</i></b>			
Distance to nearest A&E	Yes	No	Included
Distance to nearest Major Trauma Centre	No	No	Not significant
Number of acute providers within 30km	No	No	Not significant
GPs per 100,000 people in catchment area	No	No	Not significant
GP Quality	No	No	Not significant
Community and social care-related delayed discharge	No	No	Not significant
Income deprivation index	No	No	Not significant

## Estimated model

Table 5 provides the full set of results for our final econometric model.

**Table 5: Econometric analysis of EBITDA%, 2008/09 – 2012/13**

	(1)	(2)	(3)	(4)
Trust size – Operating revenue (millions)	0.003**			
Trust size – Spells (thousands)		0.006		
Trust size – Gen & acute beds			-0.008	
Trust size – Weighted average site activity (thousands)				0.010
More than one A&E sites	-0.975**	-0.918**	-0.723*	-0.697*
Scope – Number of consultant specialties at trust (workforce)	-0.081**	-0.038	-0.010	
Scope – Average number of specialties at site (HES data)				-0.033
Tariff share of revenue	-3.866***	-4.293***	-4.374***	-3.959**
Urbanity of catchment	-2.377	-2.257	-1.882	-2.337
Distance to nearest A&E	-0.006	-0.011	-0.011	-0.012
PCT/CCG Funding level	4.091	4.564	4.044	3.688
PFI Dummy	1.407***	1.442***	1.453***	1.422***
Case-mix index	-0.005	0.006	0.014	0.007
MFF	5.831	6.686	5.831	10.27**
London dummy	-2.045**	-2.094**	-2.106**	-2.564***
RCI	-0.079**	-0.071**	-0.073**	-0.080**
FT Status	-0.460	-0.474	-0.424	-0.463

2010/11 dummy	-0.342	-0.295	-0.269	-0.292
2011/12 dummy	-1.103***	-0.986***	-0.969***	-0.945***
2012/13 dummy	-1.761***	-1.669***	-1.570***	-1.987***
Constant	15.25**	12.93*	13.29*	9.875
Number of observations	557	557	555	550
Adjusted R-squared	0.16	0.15	0.14	0.15
Prob>F	0.0000	0.0004	0.0004	0.0001

Note: Level of significance: \*\*\* = 1%, \*\* = 5%, \* = 10%.

The factors that our econometric analysis identifies as being related to financial performance are:

- **Size** does not appear to be an important driver of financial performance over this period, with only our revenue measure of size showing a statistically significant relationship.
- Having **more than one site with an A&E** appears to be associated with worse financial performance, though this is not highly statistically significant in all specifications. This result could be interpreted in a number of ways:
  - It could be driven by the high costs of providing unplanned care in A&E and related services, especially across more than one site
  - It could be that some past mergers have combined providers that are performing poorly financially, so we observe some poorly performing, multi-site trusts for historical reasons, rather than because operating multiple A&E departments is a driver of poor performance
- Having a **PFI** is positively related to financial performance, which may underline the importance of estate quality. It may, alternatively, reflect the likelihood that, in some cases, better performing trusts may be more likely to have been allowed to sign PFI contracts.
- **Higher tariff share of clinical revenue** is related to worse performance and appears to be among the more robust findings (see robustness tests below). This could be due to a number of reasons. For example, if tariff is not wholly cost-reflective for some services, then this could lead to providers that are more reliant on tariff income to have worse financial outcomes. Alternatively, it may be that providers with a higher share of non-tariff revenue in their income are those with a greater ability to negotiate favourable non-tariff contracts with their commissioners.
- **Having more consultant specialties (wider scope)** appears to be negatively related to financial performance, though this is not a robust finding in all versions of

our model. Also, using a measure of scope based on HES activity data does not give a similar result – either at the trust or site-level.

- **Reference Cost Index** appears to capture efficiency reasonably well, as it is negatively related to financial performance. It does not appear to be correlated with trust size, confirming that economies of scale are not strong drivers of trusts costs and financial performance, based on the data we have examined.

For 2012/13, our model explains about 25 per cent of variation in trust financial performance, though when data for earlier years – 2009/10 to 2011/12 - are included, this falls to about 17 per cent. This relatively low R-squared<sup>73</sup> implies that there are many trust-specific, unobserved or unobservable factors driving providers' financial performance.

## Robustness tests

We have tested the robustness of our findings, by:

- Estimating our model with an alternative measure of financial performance - operating surplus/deficit as a percentage of operating revenue - as the outcome or dependent variable, which found that there was some evidence of a positive relationship between size and performance, though only for two of our four measures of size, i.e., operating revenue and average number of spells per site
- Excluding the largest trusts, which found that our results were not sensitive to the exclusion of larger trusts
- Restricting our analysis to provider with only one acute site (84 trusts), which confirmed that size does not appear to be the key determinant of performance, while also suggesting that our findings on diseconomies of scope are not robust across our sample
- Testing for provider-level economies of scale more directly by modelling trust-level Reference Cost Indices as a function of the other explanatory variables in our model, which showed that size does not appear to be an important driver of cost efficiency either
- Excluding data for six trusts that have recently been formed as the result of mergers,<sup>74</sup> which slightly strengthens the evidence that size is related to performance

## Limitations of the econometric analysis:

As with any econometric analysis, there are a number of possible limitations:

- i) There is no 'typical' provider and so it is unlikely that there is a single, true model of a provider's financial performance which we can then estimate with a high degree of precision. As our R-squared of less than 0.25 suggests, there are many provider-specific and LHE-specific factors that are likely to drive financial performance that we cannot fully capture in an econometric model.

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<sup>73</sup> R-squared is a measure of the proportion of the variation in our outcome or dependent variable that is explained by the model that we have estimated.

<sup>74</sup> These were: Barts Health; Central Manchester University Hospitals; Hampshire Hospitals; South London Healthcare; Western Sussex Hospitals; York Teaching Hospitals.

- ii) High levels of multi-collinearity (e.g., a provider's share of activity that is specialist spells and its operating revenue are quite highly correlated) may make it difficult to assess accurately the financial impact of some possible drivers identified, as it is hard to disentangle the distinct effects of different characteristics when they are typically observed at the same providers.
- iii) Our analysis allowed us to assess which factors were related to hospital performance, but not whether these factors impacted different sized trusts in different ways, as dividing our data set into smaller subsets would result in relatively small sample sizes. For example, our econometric analysis showed that keeping size and other factors constant, the number of type 1 A&E units a trust runs is associated with worse financial performance. It did not estimate whether a smaller provider running a second A&E site units sees a greater negative impact than a larger trust running a second A&E site.

### 3 Quality assurance

The team has subjected its analysis to a quality assurance process including:

- i) Internal review of the data work by the colleagues in other teams within Monitor;
- ii) External review of the analysis and conclusions by the King's Fund; and
- iii) External review of the econometric work by Dr. Mauro Laudicella of Imperial College, London and City University, London.

This process provided helpful comments and advice, enhancing the quality and robustness of our analysis and findings.

For further details on our analysis, please contact the Smaller Acutes team at: [SmallerAcutes@monitor.gov.uk](mailto:SmallerAcutes@monitor.gov.uk)

## Indicator definitions and sources

Table 6 sets out the sources and time periods covered for all indicators used within the report, along with their sources and any noteworthy details of their specification. Several sections of the reports underlying analysis are based on the study of indicators that the team themselves constructed. Here we briefly set out definitions of these and any particularly relevant aspects of the methodology of their creation.

**Table 6: Definitions and sources of indicators**

Type	Name	Description	Time period	Source	Comments
Size	Beds	Overnight general and acute beds and occupancy data	2009/10 – 2012/13	NHS England <a href="http://www.england.nhs.uk/statistics/statistical-work-areas/bed-availability-and-occupancy/bed-data-overnight/">http://www.england.nhs.uk/statistics/statistical-work-areas/bed-availability-and-occupancy/bed-data-overnight/</a>	
Size	Operating revenue	Provider-reported operating revenue from EoY APR/FIMS	2009/10 – 2012/13	Monitor/Department of Health (DH)	
Size	Spells	Total number of Inpatient Spells	2010/11 – 2012/13	Hospital Episode Statistics – Admitted patient care	Data used is the first episode of each spell.
Scope	Consultant specialties	A simple count of the number of different post titles of consultants employed by a trust.	September 2013	HSCIC – based on Electronic Staffing Record data	
Scope	Number of specialties	Count of distinct treatment specialties consultants work under.	2012/13	Hospital Episode Statistics – Admitted patient care	This is based on the first consultant's speciality an inpatient comes under at the start of their spell in hospital.
Clinical	SHMI	Standardised hospital (trust-level) mortality indicator	2010/11 – 2012/13	HSCIC	
Clinical	HSMR	Hospital (trust-level) standardised mortality rates	2010/11 – 2012/13	Dr Foster <a href="http://myhospitalguide.drfosterintelligence.co.uk/downloads/data/HG2013-data.zip">http://myhospitalguide.drfosterintelligence.co.uk/downloads/data/HG2013-data.zip</a>	
Clinical	A&E < 4h wait	% of type 1 A&E attendances admitted, transferred or discharged within 4 hours	2010/11 – 2012/13	Department of Health - Unify2 data collection	
Clinical	30-Day Emergency readmissions	Eligible emergency readmissions to a hospital within 30 days of discharge following a planned hospital stay.	2010/11 – 2012/13	NHS England - National quality dashboard	
Clinical	RTT > 18 weeks	Percentage of patients waiting over 18 weeks between referral and treatment	2010/11 – 2012/13	NHS England - National quality dashboard	We note difficulties with treatment target indicators with regards to the potential for specialist trusts to have patients passed to them late in the day and being penalised for it. As our analysis concentrates on general acute providers, this may be less of a concern.
Clinical	Patient Experience - Composite	Percentage positive responses from a selection of questions from the national inpatient survey	2012	HSCIC <a href="https://indicators.ic.nhs.uk/download/Outcomes%20Framework/Data/NHSOF_4b_I00683_D_V6.xls">https://indicators.ic.nhs.uk/download/Outcomes%20Framework/Data/NHSOF_4b_I00683_D_V6.xls</a>	NHS Outcomes Framework - Indicator 4b: Patient experience measured by scoring the results of a selection of questions from the national inpatient survey looking at a range of elements of hospital care.
Clinical	Patient Experience – Involvement in decisions	Percentage positive responses from Q32 of the national inpatient survey	2012	<a href="http://www.cqc.org.uk/public/hospital-intelligent-monitoring">http://www.cqc.org.uk/public/hospital-intelligent-monitoring</a>	Question: "Were you involved as much as you wanted to be in decisions about your care and treatment?"

<b>Clinical</b>	<b>Patient Experience</b> -	Percentage positive responses from Q67 of the national inpatient survey	2012	<a href="http://www.cqc.org.uk/public/hospital-intelligent-monitoring">http://www.cqc.org.uk/public/hospital-intelligent-monitoring</a>	Question: "Overall, did you feel you were treated with respect and dignity while you were in the hospital?"
<b>Clinical</b>	<b>Staff FFT</b>	Percentage positive results	2010/11 – 2012/13	National NHS Staff Survey <a href="http://www.nhsstaffsurveys.com/Page/1019/Latest-Results/Staff-Survey-2013-Detailed-Spreadsheets/">http://www.nhsstaffsurveys.com/Page/1019/Latest-Results/Staff-Survey-2013-Detailed-Spreadsheets/</a>	All staff answering the question "If a friend or relative needed treatment I would be happy with the standard of care provided by this organisation?" We are aware that the method of response differs between trusts, but do not control for this. For more information see: <a href="http://www.england.nhs.uk/wp-content/uploads/2014/02/staff-fft-guide.pdf">http://www.england.nhs.uk/wp-content/uploads/2014/02/staff-fft-guide.pdf</a>
<b>Clinical</b>	<b>MRSA</b>	Rate per 100,000 bed-days for specimens taken from patients aged 2 years and over (Trust apportioned cases)	2010/11 – 2012/13	Public Health England	
<b>Clinical</b>	<b>C. Diff.</b>	Rate per 100,000 bed-days	2010/11 – 2012/13	Public Health England	For specimens taken from patients aged 2 years and over (Trust apportioned cases)
<b>Clinical</b>	<b>Patient FFT</b>	Percentage positive responses	Q1 2013-14	NHS England <a href="http://www.england.nhs.uk/statistics/statistical-work-areas/friends-and-family-test/friends-and-family-test-data/">http://www.england.nhs.uk/statistics/statistical-work-areas/friends-and-family-test/friends-and-family-test-data/</a>	Single question survey which asks patients whether they would recommend the NHS service they have received to friends and family who need similar treatment or care.
<b>Clinical</b>	<b>Clinical audit – Secondary prevention medicines</b>	Percentage of patients who received all the secondary prevention medications for which they were eligible		National Institute for Cardiovascular Outcomes Research (NICOR): Myocardial Ischaemia National Audit Project – UCLH <a href="https://www.ucl.ac.uk/nicor/audits/minap/publicreports/pdfs/minap2013publicreportmedium.pdf">https://www.ucl.ac.uk/nicor/audits/minap/publicreports/pdfs/minap2013publicreportmedium.pdf</a> <a href="http://www.ucl.ac.uk/nicor/datagov/minap/minap_2013">http://www.ucl.ac.uk/nicor/datagov/minap/minap_2013</a>	
<b>Clinical</b>	<b>Clinical audit – Hip fracture</b>	Percentage of cases compliant with all 9 standards of care within the National Hip Fracture Database	2012/13	National Hip Fracture Database	
<b>Clinical</b>	<b>CQC Proportional Risk Score</b>	Output of the CQC Hospital Intelligent Monitoring	Q2 2013-14	CQC <a href="http://www.cqc.org.uk/public/hospital-intelligent-monitoring">http://www.cqc.org.uk/public/hospital-intelligent-monitoring</a>	As provided to national partners
<b>Financial</b>	<b>Cash and Cash Equivalents</b>	EoY liquid assets from trust balance sheets	2009/10-2012/13	Monitor APR (for FTs) NTDA FIMS (for NHS trusts)	For foundation trusts, cash and cash equivalents is calculated as the sum of: <ul style="list-style-type: none"> <li>• Cash with Government Banking Service,</li> <li>• Cash with commercial banks and in hand, and</li> <li>• Deposits and investments (liquid and 'safe harbour').</li> </ul> For NHS trusts, it is calculated as the sum of: <ul style="list-style-type: none"> <li>• Cash with Government Banking Service</li> <li>• Cash with commercial banks,</li> <li>• Cash in hand,</li> <li>• Current investments,</li> </ul> Minus any bank overdrafts with the Government Banking Service or commercial banks.

<b>Financial</b>	<b>EBITDA%</b>	Earnings before interest, taxes, depreciation, and amortization (EBITDA) as a percentage of operating revenue	2009/10-2012/13	Monitor APR (for FTs) DH FIMS (for NHS trusts)	EBITDA data for Foundation Trusts calculated as: <i>operating revenue for EBITDA – operating expenses within EBITDA operating revenue</i>  EBITDA data for NHS trusts calculated as: <i>actual operating position + actual impairments + actual depreciation actual income</i>
<b>Financial</b>	<b>Operating Surplus/Deficit%</b>	Operating Surplus/Deficit as a percentage of operating revenue	2009/10-2012/13	Monitor APR (for FTs) DH FIMS (for NHS trusts)	For foundation trusts, calculated as: <i>operating expenses IFRS, total + operating revenue IFRS, total</i>  For NHS trusts, calculated as: <i>revenue from patient care activities + other operating revenue – (gross employee benefits + other operating costs)</i>
<b>Financial</b>	<b>Capital Expenditure</b>	Investments/expenditures creating future benefits as a percentage of operating revenue	2009/10-2012/13	Monitor APR (for FTs) NTDA FIMS (for trusts)	For foundation trusts, capital expenditure calculated as the sum of the following fields: <ul style="list-style-type: none"> <li>• Property - new land, buildings or dwellings</li> <li>• Property - maintenance expenditure</li> <li>• Plant and equipment - Information Technology</li> <li>• Plant and equipment - Other Property</li> <li>• Plant and equipment - other expenditure</li> <li>• Purchase of investment property</li> <li>• Expenditure on capitalised development</li> <li>• Payments for other capitalised costs</li> </ul> For NHS trusts, is it calculated as the sum: <ul style="list-style-type: none"> <li>• New Build</li> <li>• Maintenance</li> <li>• Equipment</li> <li>• Information Technology</li> <li>• Other</li> </ul>
<b>Revenue sources</b>	<b>Other revenue sources</b>	Trust revenue from non clinical or non NHS service provision	2009/10-2012/13	Monitor APR (for FTs) NTDA FIMS (for trusts)	Other revenue sources included: <ul style="list-style-type: none"> <li>• Private Patient income</li> <li>• Education and Training</li> <li>• Research and development</li> </ul>
<b>Revenue sources</b>	<b>Specialist Activity</b>	Percentage of spells with a Specialised FCE and Percentage Of FCEs that were Specialised	2012/13	SUS data queried by NHSE	

<b>Workforce</b>	<b>Staff stability</b>	Percentage of medical staff that each trust has retained from one year to the next	2008 to 2013	Health and Social Care Information Centre, Provisional NHS Hospital & Community Health Service (HCHS) monthly workforce statistics	Calculated on an annual basis between March 2008 and March 2013
<b>Workforce</b>	<b>Locum rates</b>	Percentage of medical staff employed as locums at each trust	September 2009 to September 2013	Health and Social Care Information Centre, Provisional NHS Hospital & Community Health Service (HCHS) monthly workforce statistics	Metric is a snapshot of the medical staff employed by each acute trust in September for the last 5 years (September 2009 to September 2013)
<b>Workforce</b>	<b>Vacancy rates</b>	The number of vacant medical staff roles compared to total number of medical staff in post	2008 to 2010	Health and Social Care Information Centre, Vacancies Survey, March 2008 to March 2010	
<b>Workforce</b>	<b>Staff numbers</b>	FTE numbers of different medical staff grades employed by each trust (consultants, registrars, etc.)	September 2013	Health and Social Care Information Centre, Provisional NHS Hospital & Community Health Service (HCHS) monthly workforce statistics	Data is a snapshot of the medical staff employed by each acute trust in September 2013
<b>Trust specific</b>	<b>A&amp;E admissions and attendances</b>	Yearly admission and attendance figures for type 1 A&Es	2009/10-2012/13	Department of health (pre-2011) <a href="http://webarchive.nationalarchives.gov.uk/20130107105354/http://www.dh.gov.uk/en/Publicationsandstatistics/Statistics/Perfomancedataandstatistics/AccidentandEmergency/index.htm">http://webarchive.nationalarchives.gov.uk/20130107105354/http://www.dh.gov.uk/en/Publicationsandstatistics/Statistics/Perfomancedataandstatistics/AccidentandEmergency/index.htm</a> NHS England <a href="http://www.england.nhs.uk/statistics/statistical-work-areas/ae-waiting-times-and-activity/weekly-ae-sitreps-2012-13/">http://www.england.nhs.uk/statistics/statistical-work-areas/ae-waiting-times-and-activity/weekly-ae-sitreps-2012-13/</a>	QMAE and WSiAE data
<b>Trust specific</b>	<b>More than one A&amp;E site</b>	Trusts who operate multiple type 1 accident and emergency units on distinct sites	2012	Dr Foster/HES	Sites identified using the 2013 Dr Foster site-level HSMR list of acute (including specialist) hospitals. All acute non-specialist non-community trusts sites with 1000 or more spells; more than 10 deaths within the HSMR basket; 100 or less or NULL beds and 80% of spells having palliative flag were excluded.  Sites with type one adult accident and emergency departments were identified via NHS choices and checked manually using trust websites, collected in <b>2012</b> .
<b>Trust specific</b>	<b>PFI Dummy</b>	Equal to one where a trust has undertaken a private finance initiative project.	2012	Department Of Health <a href="http://webarchive.nationalarchives.gov.uk/20130129110402/http://www.hm-treasury.gov.uk/d/pfi_current_projects_list_march_2012.xls">http://webarchive.nationalarchives.gov.uk/20130129110402/http://www.hm-treasury.gov.uk/d/pfi_current_projects_list_march_2012.xls</a>	On the basis that PFI projects have a significant lead time before the produce patient benefits, only PFIs <b>pre-2009</b> have been included. This does not change the results in any significant way.
<b>Trust Specific</b>	<b>Tariff share of revenue</b>	The proportion of NHS clinical revenue which is paid for on tariff		Monitor APR (for FTs) NTDA FIMS (for trusts)	
<b>Trust Specific</b>	<b>Reference cost index</b>	Index of relative costs of treatment at		Department of Health <a href="https://www.gov.uk/government/publications/nhs-reference-costs-2012-to-2013">https://www.gov.uk/government/publications/nhs-reference-costs-2012-to-2013</a>	
<b>Local health</b>	<b>Inpatient catchment</b>	The number of people most likely to go to a particular trust as an inpatient.	2012/13	Hospital episode statistics – Admitted patient care	Using the proportionate flow method for inpatients and LSOAs as the population unit.

economy	population			Method: YHPHO – proportionate flow method <a href="http://www.yhpho.org.uk/resource/view.aspx?RID=150961">http://www.yhpho.org.uk/resource/view.aspx?RID=150961</a>	
Local health economy	Age of patients	The proportion of patients aged 65 or older	Overall 2009/10-2012/13	Hospital episode statistics – Admitted patient care	
Local health economy	Urbanity of catchment	The proportion of patients coming from an urban area	2012/13	Hospital episode statistics – Admitted patient care	Using the LSOA of each inpatient's home address, identify all patients whose address is in an urban LSOA <sup>75</sup> . Divide this by the number of patients a trust/site treats overall.
Local health economy	Distance to nearest A&E	Distance in kilometres from a trust's least isolated A&E unit to another trusts unit.		Trust website/NHS Choices Google Maps API	Measured only sites with accident and emergency departments. A matrix of straight-line distances was computed between each A&E site and each other trust's A&Es. The shortest straight line distance was then the distance by road and average time between these two sites was obtained using the google maps web service. <b>Trusts with multiple type 1 A&amp;Es:</b> the shortest distance between one of these A&Es and the location of interest. This provides the distance between the trusts least isolated hospital with an A&E and the nearest site of interest. For example, if a trust runs two A&Es; one 10km (15 minutes) from a tertiary centre and one 14km (13 minutes by motorway) away the isolation of the trust overall would be measured using the first distance.
Local health economy	Distance to nearest Major Trauma Centre	Distance in kilometres from a trust's least isolated A&E unit to another trusts unit.		Trust website/NHS Choices NHS England <a href="http://www.nhs.uk/NHSEngland/AboutNHSservices/Emergencyandurgentcareservices/Documents/2012/map-of-major-trauma-centres-2012.pdf">http://www.nhs.uk/NHSEngland/AboutNHSservices/Emergencyandurgentcareservices/Documents/2012/map-of-major-trauma-centres-2012.pdf</a> Google Maps API	Just as above. All 20 Adult major treatment centres counted.
Local health economy	PCT/CCG Funding level	A measure of the distance from target allocation of a trusts commissioners.	2011/12-2013/14	Department of health Expo books <a href="https://www.gov.uk/government/publications/exposition-book-2011-2012">https://www.gov.uk/government/publications/exposition-book-2011-2012</a> Hospital episode statistics – Admitted patient Data DH Provider Assurance Model 7 <sup>th</sup> resource allocation formula <a href="https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/216320/dh_124947.pdf">https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/216320/dh_124947.pdf</a>	The inpatient-spells-weighted % difference between commissioners target allocation and their actual allocation. Where 'i' is a commissioner for trust 'j': $DFT_j = \sum_i \left\{ \left( \frac{\text{allocation}_i - \text{target}_i}{\text{target}_i} \right) \times \frac{\text{spells}_i}{\text{spells}} \right\}$ In 2011/12 target was based on the 7th edition of the resource funding allocation target. This PCT formula includes the deprivation adjustment

<sup>75</sup> Urban LSOAs are in built up areas with a population of more than 10,00 people. An exact definition of built up areas can be found on the ONS website. ([www.ons.gov.uk/ons/guide-method/geography/beginner-s-guide/census/built-up-areas---built-up-area-sub-divisions/index.html](http://www.ons.gov.uk/ons/guide-method/geography/beginner-s-guide/census/built-up-areas---built-up-area-sub-divisions/index.html))

(which we consider as relevant to an acute provider).  
 The indicative distance from targets in 2013-2014 based on the fair shares funding formula. Based on Reference Cost data, this is an index that increases for trusts that have more activity in high-cost HRGs.

<b>Local health economy indicator</b>	<b>Case-mix index</b>	A measure of the level of severity of the patients a trust treats.	2012/13	Department of Health <a href="https://www.gov.uk/government/publications/nhs-reference-costs-2012-to-2013">https://www.gov.uk/government/publications/nhs-reference-costs-2012-to-2013</a>
<b>Local health economy</b>	<b>Market forces factor</b>	Index capturing the unavoidable cost differences of providing healthcare	2012/13	Department of Health
<b>Local health economy</b>	<b>London dummy</b>	All Trusts within the former London SHA	2014	HSCIC



Making the health sector  
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