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Implications for policy and practice

Can NHS hospitals do more with less?

Research summary

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The NHS needs to make unprecedented efficiency savings over the next four years up to 2015. *Can NHS Hospitals Do More With Less?*, a study drawing on UK and international published research on the factors known to impact on hospital efficiency – and six case studies of NHS organisations that have improved their performance – has been published by the Nuffield Trust. Drawing on the original research, this Nuffield Trust research summary outlines the implications for NHS policy and practice, and cites a number of tried and tested measures that could be used to increase the efficiency of hospitals while avoiding unpopular decisions to ration patient care.

Key points

- The Government's objective is to reduce avoidable hospitalisation and shift more care into the community. To achieve this in a time of austerity, hospitals will need to move beyond increasing activity, as they have done in the past, and consider radical solutions such as closing beds, reducing staff numbers, and supporting and caring for patients in the community.
- International comparisons suggest that the average length of stay in hospital is longer in England than in many other countries. There is also significant variation in the performance of different hospitals.
- Whereas all hospitals should strive to improve their efficiency, priority should be to find ways of bringing the worst performers up to the level of the best. Commissioners should give far stronger incentives to local hospitals to adopt evidence-based, efficient practice. Only when such efficiencies have been levered from hospitals will commissioners be able to justify to patients and the public the need to limit access to health services.
- The costs of staff are the single biggest item of expenditure in hospitals, so how they are deployed holds the key to improving efficiency. Evidence suggests that optimising nurse and medical staffing levels, and ensuring the right skill-mix, are vital to ensuring high performance.
- The use of information technology to improve hospital processes holds significant potential for both reducing costs and increasing productivity. But again, rates of adoption vary widely across hospitals, with higher rates associated with academic health centres with a history of innovation in the use of technology.
- Independent analysis of 'back office' functions (such as finance, human resources, estates management, information management and technology, governance and risk) in the NHS has suggested that at least £600 million (of a total of £2.8 billion) could be saved each year if all NHS bodies were able to 'simplify, standardise and share' their practice in this area.
- Merging hospitals will not automatically lead to efficiency savings – the evidence suggests efficiency gains will not be made unless beds and services are closed.

- There is evidence that the NHS could make significant savings on its procurement of consumable products, if all organisations bought the same volume and type of products at the lowest available price.
- Process re-engineering and tools such as service-line reporting and 'Lean' techniques can be costly in management and staff time, so should be targeted on those services with relatively high reference costs.
- Evidence suggests that the introduction of Payment by Results has contributed to shorter lengths of stay and may have contributed to higher levels of activity in hospitals. The new NHS Commissioning Board should look carefully at how Payment by Results might be modified to reduce avoidable use of hospitals and encourage effective care in the community.
- NHS commissioners and providers will need clear direction from the NHS Commissioning Board on how to respond to advice from the National Institute for Health and Clinical Excellence (NICE) on optimal practice, 'not to do' recommendations, cost-saving technologies, and 'invest to save' initiatives. The Commissioning Board should find robust ways of holding clinical commissioning groups and providers to account for making such productivity improvements.
- The study reaffirms the crucial role that good management in general, and certain management practices in particular, play in achieving higher productivity. But that is not enough. Better information and stronger incentives to encourage the necessary creativity and boldness are also needed, to change clinical and management practice.
- It is clear from this analysis that enough is known about what can be done to make efficiencies. The challenge is how to encourage and support hospitals and other NHS providers to act in the right way, and to focus on changing clinical and management practice.

The Quest for NHS Efficiency

The NHS is facing one of the most significant financial challenges in its history, with efficiency savings of at least 4 per cent per year now required. This Nuffield Trust research programme aims to help the NHS respond to the financial challenges ahead by examining how health services can improve productivity and deliver more for less. It is informed by rigorous analysis of existing UK and international research evidence, and sets out practical recommendations for managers, clinicians and policy-makers about how the NHS can improve productivity and respond to what has been dubbed the 'Nicholson challenge'.

This research summary is based on original research in the report *Can NHS Hospitals Do More With Less?* by Jeremy Hurst and Sally Williams. To download the full report or further copies of this summary, visit www.nuffieldtrust.org.uk/publications

Introduction

The NHS in England needs to make unprecedented efficiency savings over the next four years to bridge a gap between a virtual freeze in real-terms funding, and rising demand and costs. This gap is estimated to be £20 billion to 2015, which would mean 4 to 5 per cent per annum in efficiency gains. This requirement outstrips historical rises in NHS productivity. While productivity measures in health care only provide a partial measure of performance, Office for National Statistics data suggest that productivity in health care in the UK after quality adjustment declined by an average of 0.2 per cent per year from 1996 to 2009 (Hardie and others, 2011).

The chances of achieving the estimated level of efficiency gains will depend critically on the hospital sector. Hospital care currently accounts for around half of PCT spending, has been the locus of much of the deterioration of productivity in the NHS in recent years (Hardie and others, 2011) and is central to government plans to release resources for the NHS.

With this challenge in mind, the Nuffield Trust commissioned a comprehensive study – *Can NHS Hospitals Do More With Less?* – which draws on UK and international published research on the factors known to impact on hospital efficiency. The study considered technical or productive efficiency, defined as the ratio of outputs to inputs (or costs). Ideally, the measurement of technical efficiency should include measures of the quality of care, as well as volume. However, in most studies, measures of quality are either incomplete or missing. The study also included a small survey of senior managers and clinicians in six NHS trusts that had managed to 'turn around' their performance following financial difficulties. This entailed interviews with a total of 25 executive clinicians and managers in four hospital trusts and two mental health trusts in England. These organisations were selected for the lessons they could offer, having apparently increased their productive efficiency. Senior managers in the primary care trusts who commissioned from the six trusts were also interviewed during this part of the research.

This summary of the study outlines measures that could be used to increase the efficiency of hospitals and identifies some implications for policy and practice. It is clear from this analysis that enough is known about what can be done. The challenge is how.

Hospital efficiency and what determines it

The adoption of efficient processes, such as providing a high proportion of elective (non-urgent) surgery on a day case basis, reducing length of stay and adopting cost-effective new technologies and organisational practices, depends on a range of factors. In the hospital these include:

- effective leadership
- knowledge of efficient practices
- good management and clinical engagement
- easily accessible and robust information on activity, costs and quality of care.

These, in turn, will depend on external factors, such as financial incentives, extent and type of performance management and regulation, availability of guidance and evidence-based information on what works, information about how the hospital is doing relative to others, and the availability of cost-effective technologies.

Most of the academic literature reviewed for this study focuses on relative rather than absolute efficiency – identifying what appear to be the most efficient hospitals and how far others fall short in percentage terms. The research is confined largely to observational studies rather than controlled trials or longitudinal studies that link efficiency to its supposed determinants over time. Nevertheless, it is clear that factors influencing efficiency in hospitals lie partly within hospitals themselves, and also in the environment in which they operate.

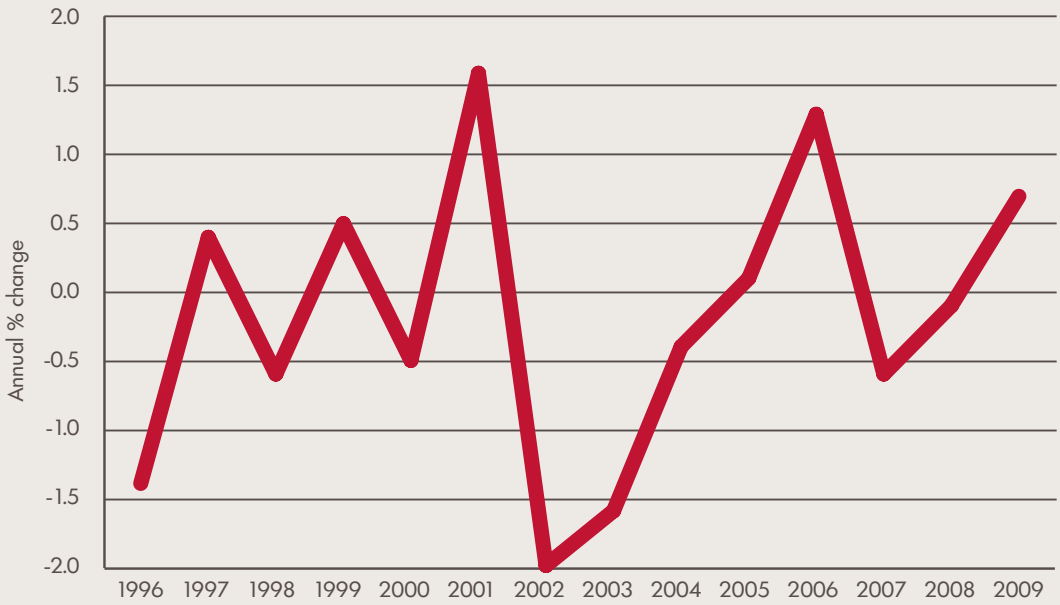
Key findings: the external environment

This section summarises how a range of external factors, such as financial pressure, technology, introduction of new payment methods, procurement and performance management, impact on hospital efficiency.

Financial pressure

Crude productivity in hospitals tends to fall when resources grow rapidly – as they did in England from 2000 to 2011 – and tends to rise when resources have grown slowly or fallen in real terms, because activity is increased or maintained despite budget constraints. This can be seen in Figure 1, which charts productivity growth in health in the UK from 1996 to 2009. However, little or nothing is known about the impact on quality in health care when productivity increases as a result of rising activity and constrained or reducing funding.

Figure 1: Productivity growth in health in the UK, 1996–2009



Note: Productivity growth is defined as the growth in the ratio of the volume of quality-adjusted outputs (activity) to the volume of inputs

Source: Hardie and others, 2011

The Government's aim during the current freeze is to restrain the growth of hospital activity and shift care towards the community. If that happens, hospitals will need to redouble their efforts to reduce costs if productivity is to rise – for example, by closing additional beds, reducing numbers of staff and making efforts to support patients in the community to reduce the risk of avoidable hospitalisation. Furthermore, careful monitoring of the quality of care will be required, in order to ensure that productivity does not come at a cost in terms of patient and carer experience (Smith and Charlesworth, 2011).

Technological change

The introduction of new technologies is a major determinant of improvements in quality-adjusted productivity in health care over the medium and longer term. Some new technologies can lower costs if resources are fully released from the older technologies that they displace, and if the cost falls as they mature – which happens, for example, when pharmaceutical patents expire. New technologies may also reduce the need for staff.

Regarding new technologies for treating patients, the evidence shows that it is often difficult to reap cost savings if the technologies treat conditions for which there was previously no treatment or no effective treatment (for example, renal dialysis and coronary artery bypass graft) – and hence address unmet demand for care – and they tend to be introduced at premium prices. Furthermore, interventions focused on prevention will most likely only release efficiency gains in the long term.

> the introduction of new technologies is a major determinant of improvements in quality-adjusted productivity

A systematic review and evidence report of the impact of health information technology on the quality, efficiency and costs of health care (Chaudhry and others, 2006; Shekelle and others, 2006) concluded that while such technology improves quality by encouraging adherence to guidelines, enhancing disease surveillance and preventative health work, and decreasing medication errors, too much of the available evidence was drawn from a small number of academic medical centres using bespoke systems developed over many years and not enough from a wider range of hospitals and using commercially available systems. This highlights the dangers of relying on a small number of 'early adopters' as an indication of how technology might assist quality and efficiency efforts – studies of wider-scale implementation across a range of types of hospital are more useful as an indicator of potential health system gains, but such studies appear to be scarce.

In a study comparing health information technology in the Department of Veterans Affairs' health system in the United States (US) with those in the private sector (Byrne and others, 2010) it was estimated that while spending proportionately more on information technology than the private health care sector, the Department of Veterans Affairs achieved higher levels of information technology adoption and quality of care. Furthermore, over $3 billion of cumulative benefits net of investment were estimated to have been made, albeit that the organisation's integrated structure and governance were deemed to have been key factors. This underlines the importance of receptive context for new innovations, and the risks of looking to technological solutions in isolation from wider organisational developments (Pettigrew and others, 1992).

Blank and Van Hulst (2009) assessed the impact of 63 groups of health care innovations and found that only one – the adoption of information and communication technology for hospital processes – both saved costs and led to statistically significant efficiencies. This, together with the evidence from US studies, suggests that most promise lies in the use of information technology for hospital processes, when seeking to use technology to improve hospital efficiency.

Competition

A number of UK and US studies have suggested that a degree of competition between hospitals increases productivity. However, the type of competition matters. A 1998 study of the introduction of price competition between NHS hospitals in the internal market in the 1990s found it had some impact on prices and, eventually, costs (Propper and Soderlund, 1998). A further study found, however, that while one, observable, measure of quality (waiting times) fell, another, less visible measure (mortality) rose, suggesting that price competition risks compromising the overall quality of service delivered unless other protections are in place (Propper and others, 2008). These authors also concluded that the value of the mortality deterioration probably outweighed that of the waiting time improvements, so that overall efficiency probably fell.

More recent studies of the fixed price competition between hospitals introduced in the NHS in England by the 'second internal market' in 2004 (Cooper and others, 2010; Gaynor and others, 2010) suggest that competition has left costs unchanged, but lowered both length of stay and mortality – implying a possible increase in efficiency. It seems that different types of competition may affect hospital behaviour in different ways, and further research is needed to understand what it is exactly that affects hospital behaviour and why.

Payment methods

Many countries, including England, have introduced national, fixed-price, case-based payment systems for hospital care, based on diagnostic-related groups or health care resource groups. Studies in a number of countries suggest that when these payment methods replace global budgets for hospitals (as in England) or retrospective fee-for-service payments (as in the US), there are improvements in efficiency indicators such as length of stay and cost per admission (for example, Coulam and Gaumer, 1991; Gerdtham and others, 1999; Farrar and others, 2007).

> studies suggest that case-based payments may lead to improvements in efficiency

However, these payment systems may have undesirable side-effects, such as: encouragement of unwanted as well as wanted hospital activity (although this can be countered by paying lower or zero rates for marginal activity); increasing transaction costs; encouraging 'cream skimming', where providers pick the healthiest (cheapest) patients to treat; and encouraging hospitals to 'upcode' (by claiming for treatments coded as more complex and better priced than those they actually carried out). While across England as a whole there is no evidence of systematic upcoding (Audit Commission, 2011), it is clear that there has been increasing hospital activity over the last decade, some of which may have been stimulated by the introduction of Payment by Results. This would have helped to reduce waiting times but might also have helped to discourage the shift of some care to the community. Paradoxically, Payment by Results seems to have acted to increase the productivity of hospitals, but may have done so partly at the expense of efficiency across whole patient pathways in the wider NHS. The NHS Commissioning Board, in its role of designing payment methods, may wish to review the impact of Payment by Results and further develop payment methods that help reduce avoidable hospital costs.

More recently there has been experimentation across the developed world with other payment methods to encourage greater technical and allocative efficiency. These include a variety of 'pay for performance' incentives (such as Commissioning for Quality and Innovation (CQUIN)), and bundled payments to encourage more integrated care and for providers to take on the financial risk of patient care across a pathway between home and one or more health care facilities (thus giving hospitals financial incentives to reduce avoidable hospitalisation). Evidence is still emerging as to the impact of these new payment methods and this should be watched carefully by the NHS Commissioning Board.

Performance measurement, and management

Within hospitals, there is evidence that performance measurement is associated with higher productivity (see 'Leadership, management and organisational culture' on page 12).The impact of public or external reporting of performance data and targets on performance and productivity of health care providers is, however, unclear, with inconsistent messages emerging when multiple studies are reviewed (Marshall and Romano, 2005; Fung and others, 2008).

For example, studies have suggested that the 'star ratings' introduced to the NHS in England in the early 2000s improved performance on key targets such as waiting times. However, there was evidence of 'gaming' by hospitals as they sought to hit specific targets, and a reduced focus on issues that were not covered by the ratings, thus making the impact on overall efficiency unclear (Bevan and Hood, 2006). Two US studies (Hibbard and others, 2003; 2005) concluded that hospitals with public reporting of the quality of care had engaged in more quality improvement activities and were more likely to have improved outcomes. These authors argued that this was on account of the importance of reputation to those leading and working in the hospitals.

The strength and nature of the external performance management of hospitals are clearly effective in achieving targets, some of which are intended to improve efficiency (Propper and Wilson, 2003; Propper and others, 2007). But the drawbacks of too much 'terror' are also documented (Bevan and Hood, 2006; Bevan, 2010), in particular in strengthening a culture of caution, reducing creativity and risk taking, and an excessive focus on meeting targets rather than necessarily on increasing efficiency.

Procurement

Analysis of NHS spending on procuring consumables has shown significant variation in prices paid by hospitals for goods (with an average variation of 10 per cent and many examples of variation of over 50 per cent) and a lack of data by which organisations can benchmark the prices they pay. This analysis by the National Audit Office (2011) suggests that an average of £900,000 per annum per NHS or foundation trust could be saved if organisations bought the same volume and type of products at the lowest available price. Furthermore, the National Audit Office suggests that with rationalisation of the approach to procurement (for example, moving from small ad-hoc orders to larger, less frequent ones), total procurement savings to the NHS could reach at least £500 million, or over 10 per cent current expenditure. This again reveals significant and unexplained variation in NHS management practice in England.

Back office functions

Independent analysis of back office functions (for example, finance, human resources, estates management, information management and technology, governance and risk) in the NHS has suggested that at least £600 million (of a total of £2.8 billion) could be saved each year, if all NHS bodies were able to 'simplify, standardise and share' their practice in this area (NHS Confederation Foundation Trust Network, 2010). This analysis drew on evidence from prior work by HM Treasury (2009), which identified the potential to save 20 to 30 per cent of back office expenditure across the public sector, and the importance of reducing fragmentation of such services, collecting better information, undertaking systematic review of their cost and function, and seeking uniformity of provision.

The work by the NHS Confederation Foundation Trust Network asserted that shared services held considerable promise as a route to efficiency, with the following benefits being highlighted: cost savings; lower investment costs; better information and data; improved customer service; a focus on adding value; and providing a basis for robust comparisons of performance and processes across organisations. This study advocated a move to shared services for back office functions, a focus on benchmarking performance, the inclusion of such data in reports to NHS boards, and the publication of key performance indicator data on back office functions by NHS organisations, as part of plans to improve efficiency.

Key findings: hospital operational processes

There is a wealth of evidence as to what can improve technical efficiency within hospitals (NHS Institute for Innovation and Improvement, 2006), outlined below.

Focus on quality of care

Many (mainly cross-sectional) studies in the US have found positive statistical associations between quality of care provided and efficiency in hospitals. This may be due to an indirect link – for example, because both are associated with good management and rapid technology diffusion – rather than due to a direct link. There is a paucity of studies on this in the UK and this is a big gap that should be addressed. Anecdotal evidence from the fieldwork in this study found that the 'turnaround' trusts had generated significant savings from improving safety, with one organisation reporting that it had saved more than 200 lives, 16,000 bed days and £7.8 million by reducing infection rates.

£7.8m

amount one trust reportedly has saved by reducing infection rates

Increasing day surgery and reducing length of stay in hospital

International comparisons suggest that average length of stay in hospital is longer in England than in many other countries. Also, there is notable variation in the performance of hospitals and significant scope for this to be reduced. Work cited by the NHS Institute[1] points to as much as a three-week variation in length of stay in NHS hospitals following standard surgery, and the potential of £2.4 billion in productivity benefits if all providers and commissioners matched the performance of the top quartile in relation to its Better Care Better Value indicators (of which reducing length of stay is one).

Work examining how to improve hospital efficiency by reducing length of stay (NHS Institute, 2011) points to the need to consider: the day on which patients are admitted for surgery (for being in hospital over a weekend lengthens stay); exploring how hospitals can put in place discharge arrangements that work seven days a week and throughout the day (for most hospitals report significantly fewer discharges over weekends); benchmarking length of stay at consultant/health care-related group and ward level; mapping patient processes to identify bottlenecks; and planning the discharge date and arrangements with patients prior to elective admissions.

Mergers and reconfiguration

A small number of studies have investigated rigorously the effect of hospital mergers on the efficiency of hospitals: the results fail to find statistical significance or are mixed. However, certain factors are known to be an important source of efficiency – for example, operating hospitals at the right scale and with an optimum mix of departments. There is a large literature on the effect of size on unit costs in hospitals. Reviews (for example, Aletras, 1997; Posnett, 1999) suggest that cost per case declines as hospitals increase in size to about 200 beds and steadies between 200 and 600 beds. Above approximately 600 beds, diseconomies of scale set in, possibly because larger hospitals become more difficult to manage. All of the studies concerned make either no measurement or incomplete measurement of the quality of care, or the impact of the weakening of competition due to consolidation.

1. See http://reducinglengthofstay.org.uk/latestdevelopments.html

However, from a whole-system viewpoint, if the scale of operations is to be changed, it is for policy-makers to weigh the likely trade-offs that exist between clinical quality, cost per case, access for patients and competition as hospitals increase in size (Bloor and others, 2000).

Improving staff productivity

Staff account for 65 to 70 per cent of total costs in the NHS, and how this resource is deployed is the single biggest factor influencing efficiency in the NHS. There is evidence in the literature that staff productivity can be raised by reducing the use of agency staff, cutting overtime, improving occupational health services for NHS staff and taking other measures to reduce sickness absence. The Boorman Review of Health and Wellbeing of NHS Staff (Hassan and others, 2009) identified that the NHS in England has a comparatively high average of working days lost per staff member per year – 10.7 compared with 9.3 across the public sector. Other studies point to the importance of healthcare organisations benchmarking their workforce data against others, and using this as a way of reducing spare capacity among staff (for example, Fogel, 2004).

7%

amount of staffing reduction if all trust FCE: staff ratios came up to the average

Work by the NHS Institute (2006) reveals the potential to be drawn from benchmarking, revealing that finished consultant episodes (FCEs) and patient admissions per consultant vary by over 100 per cent between NHS trusts. The NHS Institute analysis concludes that if all trusts with below-average FCE: staff ratios came up to the average, then consultant staffing could be reduced by 7 per cent nationally. It highlights the value of local analysis of consultant productivity as a way of identifying trends and drivers affecting productivity at trust and specialty level, and suggests that this be reported to NHS boards on a regular basis. For example, such analysis may point to work needing to be done in respect of the use of locum and temporary staff, sickness and other absence, the balance of consultants' time spent on patient and non-patient care commitments, and issues of custom and practice.

There is evidence that lower nurse staffing levels are associated with greater nurse job dissatisfaction, higher 'burnout' and increased turnover. A review of evidence carried out by the US Association for Health Care Research and Quality (Kane and others, 2007) concluded that the use of higher-skilled nurses was associated with lower hospital-related mortality, inpatient cardiac arrest and other adverse events. Others, in the US (for example, Needleman and others, 2006) demonstrate a clear business case for improving nursing skill-mix, rather than necessarily increasing actual staffing levels. This challenges the conventional wisdom that diluting skill-mix would improve efficiency. It should, however, be noted that evidence on the use of nurse practitioners as substitutes for medical staff is equivocal in respect of cost-effectiveness, and research into the use of hospitalists in the US is similarly inconclusive in respect of their impact on overall efficiency.

Key findings: leadership, management and staff engagement

This section explores the impact that strong leadership, management and staff engagement can have on hospital efficiency.

Leadership, management and organisational culture

It is difficult to find robust evidence of the impact of leadership on hospital efficiency. This is because it has been difficult to define and measure leadership. In this study, the role of boards in bringing about improved quality and efficiency in healthcare organisations was used as a proxy for leadership.

A study of the cultural characteristics of 'high-'and 'low-' performing hospitals in the NHS (Mannion and others, 2005) – as measured according to their star ratings – suggested that, in general, high-performing trusts had: a corporate management structure, in which middle management was strong and empowered; accountability that was clear; rewards that were related to performance; information systems that were highly developed; and it being taboo not to hit targets. Low-performing trusts were the mirror-image of this, with: a pro-professional management orientation; weak middle management; opaque accountability; and a taboo on challenging senior management.

Bloom and Van Reenen (2010) explored the relationship between human resource (HR) management practice and organisational productivity and concluded that probably there was a causal connection in relation to certain types of HR management, such as individual and group incentive pay. In similar vein, West and others (2002) carried out research into HR practice in 61 hospitals in England and found a strong association between the quality of HR management practice and patient mortality, with better HR practice being associated with lower overall mortality. West and others concluded that this relationship was associated with the extent and sophistication of staff appraisal, sophistication of training for staff, and the percentage of staff working in teams.

Clinical engagement

There is a significant volume of literature that associates hospital productivity with cooperation and engagement between general managers and doctors. For example, a review by Burns and Muller (2008) of US literature on hospital–doctor collaboration typifies much of this literature in citing the behavioural skills considered critical to productive hospitals. These skills include: frequent and candid communication; doctors' trust in hospital executives; clinical leadership development; transparency of hospital finances to doctors; and consistent clinical and executive leadership over time.

Service-line reporting in foundation trusts in England appears to improve strategic planning of clinical services, as set out in Audit Commission case study evidence such as that of the Liverpool Heart and Chest Hospital (Audit Commission, 2009). Here systematic use of service-line reporting was found to have led to more robust clinically led decision-making based on sound financial and activity information – one example being annual savings of £35,000 from a review of stapling practice for thoracic closure. Service-line reporting is being used by trusts (and in particular foundation trusts, following strong advocacy of the approach by Monitor) in their work to try to improve efficiency and quality of care.

Nurse staffing and skill-mix

There is a growing number of studies that link higher nurse/patient ratios and richer nurse skill-mix, to improved patient outcomes and nurse satisfaction. There are also studies that suggest that certain features of nurse management (for example, a participatory management style, flexible working schedules, planned orientation of staff and a decentralised organisational structure) are similarly associated with both healthy recruitment and retention of nurses, and positive patient outcomes (for example, Scott and others, 1999; Kutney-Lee and others, 2009). Research in the US (Friese and others, 2008) has pointed to reduced mortality and improved patient outcomes where there is a positive and healthy nurse working environment, rich nursing skill-mix, and careful measurement and management of nursing workload. There is, however, a dearth of evidence as to how this relates to costs and efficiency.

> Research in the US has pointed to reduced mortality and improved patient outcomes where there is a positive and healthy nurse working environment

Process re-engineering and pathway redesign

Over the past two decades, a great deal of attention has been paid in the US and UK to 'process re-engineering' in hospitals, drawing on experience from private sector firms. The intention is to undertake fundamental redesign of work processes in hospitals to achieve radical improvements in volume, quality and cost performance of services. Many of these processes continue to be pursued in the NHS today, such as redesign of clinical pathways, and establishing revenue and cost accounts at departmental level (service-line reporting).

Research reveals, however, that this has met with mixed success. A US review of evidence on hospital re-engineering declared that outcomes were 'decidedly equivocal' (Walston and others, 2000), given that some re-engineered hospitals were revealed to have lower productivity. Others, however, showed improvements in productivity following re-engineering – this was where other appropriate management changes had been put in place alongside the service redesign work, such as codification of new processes, utilisation of process teams to see through implementation, and involvement of the chief executive in clinical change. Walston and others concluded that the process of change was perhaps as important as the actual instrument of re-engineering.

Several of the 'turnaround' trusts interviewed for this research had re-engineered patient pathways, mainly focused on individual wards or departments. The emphasis in recent years has been on 'Lean' techniques that entail process re-engineering with significant engagement of employees in the search for better ways of working, and on satisfying the wants of consumers. It may be that focusing such effort on specific services makes more sense than attempting whole-organisation change, thus being able to tailor the approach to the team, service and departmental culture.

Conclusion

The overriding message from this review of the evidence on hospital efficiency is that much is known about the topic, and about those areas requiring specific and sustained management attention. Most striking is the extent to which there is well-known variation in efficiency between hospitals in England across a range of basic metrics, including length of stay, day case rates, and use of information technology to support clinical processes. Furthermore, this unexplained and significant variation extends to basic management practices such as the procurement of consumable goods and the organisation of back office functions.

There is a wide body of evidence and support to guide hospitals in how they might address the variation in practice highlighted above. This comes from national organisations such as the NHS Institute for Innovation and Improvement, the Audit Commission, the National Audit Office, Monitor and the NHS Confederation. On top of this, as this current study has revealed, there is a significant body of international research evidence, which gives clear pointers about 'top tips' for improving and assuring hospital efficiency, including in relation to ensuring richness of skill-mix, maximising the use of information technology for hospital processes and focusing Lean technology approaches on those areas of activity with high reference costs.

The main questions raised by this study are why, when so much is known about what drives and can improve hospital efficiency, did quality-adjusted productivity decline from 2006 to 2009; did the UK perform relatively weakly on some international comparisons; and did so much variation persist across, and sometimes within, individual hospitals? The reasons are probably multiple and will include: in some areas a lack of data; conflicting incentives; suboptimal management and governance; and a lack of clinical engagement.

Financial austerity is likely to concentrate minds over the coming two years, as will further advances in the availability and linking of data particularly on costs at patient level, and reforming payment incentives. The new commissioning structures proposed in the Health and Social Care Bill 2011 also give cause for hope. First, the NHS Commissioning Board could forge a different relationship with clinical commissioning groups, which allows co-production and innovation in service delivery. Second, clinical commissioning groups could find new ways of exerting leverage on hospitals, for example in setting explicit standards in contracts, which require local hospitals to work towards being in the top quartile for length of stay, day case rates, and administrative areas such as procurement, in working to reduce avoidable hospitalisations for patients, and in using information on patient experience to wrest changes in quality and responsiveness of care provided.

The NHS Commissioning Board and NICE will be able to support clinical commissioners in developing such contract standards, and the new Commissioning Outcomes Framework needs to connect the best evidence on hospital (and other) performance with clear indicators against which commissioners and providers can measure progress towards agreed outcomes, including process measures such as length of stay. Furthermore, given the lack of evidence about how efficiency can be pursued without compromising quality, clinical commissioners will need guidance and support as to how they might best assess service quality alongside efforts to extract increased productivity from hospitals. Examples might include: rates of infection; measures

of patient and carer satisfaction; occurrences of pressure sores; evidence of patient malnutrition; analysis of patient complaints; and hospital cleanliness reports.

Despite the evidence presented, this study reveals a lack of systematic enquiry about the practice of hospital efficiency in the NHS in England, and of studies of attempts to address known variation of management and clinical practice within and across hospitals, along with the effects of such work on the quality of patient care. This lack of a recent and current evidence base will become more important as time goes on.

Priorities for developing this evidence base include: the relationship between skill-mix and staffing levels and hospital efficiency (and quality); the role of new payment mechanisms in encouraging more efficient and consistent clinical and managerial practice; the impact of introducing new technologies (and abandoning those they replace); and understanding more clearly the effect of competition on the efficiency and performance of hospitals. A systematic review of the funds spent on research into hospital clinical and administrative processes is needed, so that any reorientation can be made to ensure the building of a useful and timely evidence base.

In the final section of this research summary, the implications of this research for policy and practice in the NHS are set out, for policy-makers and for practitioners.

Implications

Implications for policy: setting the context for improving efficiency in hospitals

1. The NHS Commissioning Board, with Monitor, should develop better metrics for measuring system-wide efficiency, productivity and quality, learning from the Atkinson Review (Atkinson, 2005).

2. Previous improvements in efficiency during budgetary contractions have relied mainly on increases in hospital activity, which could be suppressed this time round. The NHS Commissioning Board with clinical commissioning groups should set the standards expected of hospitals at least in the areas of day surgery rates and reducing length of stay, and the standard expected of hospitals, primary care and community providers in reducing avoidable hospitalisation. These could form part of the new Commissioning Outcomes Framework and its associated indicators being developed by NICE.

3. Monitor, the new system regulator, should as part of its compliance role, scrutinise better what works regarding increasing efficiency in hospitals, and make sure that promising innovations are tracked or evaluated. Monitor should work with the Care Quality Commission to conduct value for money studies in hospitals, for example around procurement and back office functions. Monitor and the Care Quality Commission should influence priorities for NHS research and development funds in this respect, along with the NHS Commissioning Board.

4. The NHS Commissioning Board should build the evidence base underpinning payment reform (including further developments of tariff, CQUIN, the Quality and Outcomes Framework, and the quality premium for commissioners and how they interact) into its overall framework for commissioning by clinical commissioning groups, particularly in areas of care that are associated with rising demand and admissions, for example urgent care and emergency medicine. This means collating existing research and influencing the development of new research,

as well as ensuring that the potential benefits from analysis of routinely collected administrative data on activity and costs are better exploited than at present. For example, the requirement, set out in the NHS Operating Framework 2012/13, for commissioners to link the use of the NHS number to contractual payments should help to track the impact of payment reform on the costs of patients with chronic conditions needing better-coordinated care to avoid costly hospitalisation. Similarly, Monitor should build the evidence base for the impact of changes in prices with respect to efficiency and quality. The evidence base should be used in discussions between the NHS Commissioning Board and Monitor when developing the strategy on contract currencies and pricing.

5. The NHS Commissioning Board should give clear guidance to clinical commissioning groups on the adoption of new technologies and how they should respond to and use the advice from NICE – in particular, its guidance on optimal practice, 'do not do' recommendations and cost-saving technologies.

6. Such direction needs to be backed up by monitoring by the NHS Commissioning Board of progress in implementing such recommendations, along with the provision of support and advice for clinical commissioners (and for clinical networks and senates) on how to change the practice of individual clinicians, teams and services. The NHS Commissioning Board should monitor and report publicly on unexplained clinical and administrative hospital practice variations by clinical commissioning groups. Clearly, the future role of the NHS Institute for Innovation and Improvement is relevant here.

7. Evidence suggests that public reporting of performance can play a role in shaping clinical and managerial practice, even if it appears to be less significant in affecting the choices made by patients and carers. At a time of severe financial constraint in the NHS, robust and comprehensive assessment of progress towards addressing unexplained variation in hospital practice will be important in assuring the public that the NHS is working in an increasingly efficient manner. Such assurance is a prerequisite for commissioners seeking to argue for any restrictions to the funding of treatments, by demonstrating robust and evidence-based management practice.

8. Along with measurement and reporting of progress in achieving greater hospital efficiency, there should be nationally defined assessment of the quality of NHS care, reported at organisational, departmental and clinician levels, going beyond the current outcomes framework. This will be important as a way of assuring patients and the public that necessary efficiencies are not compromising the experience of service users.

Implications for practice: making efficiency happen locally

This study suggests that the quality of local general and clinical management will be absolutely critical if hospitals are to make an appropriate contribution to the estimated £20 billion savings needed.

1. Effective leadership of NHS organisations at board level is critical, with quality being of paramount concern to board members and on board agendas. Measures of quality must be examined in parallel to data about financial performance, and benchmarking data about clinical and managerial practice. In this way, productivity will be considered in the round, and not in a crude 'financial versus activity' mode.

2. Cooperation between managers and clinicians is vital to ensuring that an organisation's culture is supportive of efficient and high-quality service delivery. Organisational and management development must continue to receive financial and wider NHS support during the coming few years, including in the areas of data collection, analysis and interpretation, and the overall management of change.

3. Rather than opting for vacancy freezes and lowering skill-mix, there is a need for strategic thinking about nurse staffing in a way that assures a higher ratio of qualified or senior staff, albeit with smaller numbers overall. Increasing skill-mix appears to be a way of mitigating overall reductions in staff numbers, and of assuring improved productivity of nursing care and enhanced patient outcomes.

4. This research yielded favourable reports on improving day case surgery rates, reducing average length of stay, service-line reporting, Lean production, standardising procurement practice, sharing back office functions and ensuring maximum use of information technology to support hospital processes. There is a need to target re-engineering interventions, along with tools such as service-line reporting and patient-level costing, on those services with relatively high reference costs and especially if there are also concerns about service quality.

5. Merging hospitals will not automatically lead to efficiency savings, so managers and clinicians should proceed cautiously. The evidence suggests that efficiency gains will not be made unless beds and services are closed, while there are diseconomies of scale in merging and managing very large organisations beyond 600 beds. There is evidence of improvement in quality for many services by consolidating care in specialist centres. Where such mergers of services or hospitals need to happen, it is critical that the management of the HR implications is given the highest priority, for without this, many of the promised benefits of merger will not be realised.

6. NHS hospitals have at their disposal a significant base of evidence on which to make significant efficiency improvements, and should invest in organisational capacity to access, interpret and use this evidence as part of local business planning at trust, directorate and service levels. This will entail close working with clinical commissioners and the NHS Commissioning Board, to avoid 'reinventing the wheel' in reviewing evidence, and ensuring that maximum value is extracted from the significant range of national support resources available.

References

Aletras V (1997) *The Relationship Between Volume and the Scope of Activity and Hospital Costs. CDR Report No.8 Part II.* NHS Centre for Reviews and Dissemination, University of York.

Atkinson T (2005) *Atkinson Review: Final Report. Measurement of Government output and productivity for the national accounts*. Palgrave Macmillan.

Audit Commission (2009) *Liverpool Heart and Chest Hospital NHS Trust – Service line reporting and service line management. KLOE 2.1.* London: Audit Commission. www.audit-commission.gov.uk/health/goodpractice/financialmanagement/Pages/91001liverpoolheartchesthospital.aspx . Accessed 21 December 2011.

Audit Commission (2011) *Improving Coding, Costing and Commissioning: Annual report on the Payment by Results data assurance programme 2010/2011*. London: Audit Commission.

Bevan G (2010) 'Performance measurement of "knights" and "knaves": differences in approaches and impacts in British countries after devolution', *Journal of Comparative Policy Analysis: Research and Practice* 12(1–2), 33–56.

Bevan G and Hood C (2006) 'Have targets improved performance in the English NHS?', *British Medical Journal* 332(7538), 419–22.

Blank JL and Van Hulst BL (2009) 'Productive innovations in hospitals: an empirical research on the relation between technology and productivity in the Dutch hospital industry', *Health Economics* 18(6), 665–79.

Bloom N and Van Reenen J (2010) *Human Resource Management and Productivity: CEP Discussion Paper no. 982.* London: Centre for Economic Performance, London School of Economics and Political Science.

Bloor K, Barton G and Maynard A (2000) *The Future of Hospital Services: Management updates.* London: The Stationery Office.

Burns LR and Muller RW (2008) 'Hospital–physician collaboration: landscape of economic integration and impact of clinical integration', *The Milbank Quarterly* 86(3), 375-434.

Byrne CM, Mercincavage LM, Pan EC, Vincent AG, Johnston DS and Middleton B (2010) 'The value from investments in health information technology at the US Department of Veterans Affairs', *Health Affairs* 29(4), 629-38.

Chaudhry B, Wang J, Wu S, Maglione M, Mojica W, Roth E, Morton SC and Shekelle PG (2006) 'Systematic review: impact of health information technology on quality, efficiency, and costs of medical care', *Annals of Internal Medicine* 144(10), 742–52.

Cooper Z, Gibbons S, Jones S and McGuire A (2010) *Does Hospital Competition Save Lives? Evidence from the English NHS patient choice reforms. London School of Economics Health Working Paper 16/2010.* London: London School of Economics and Political Science.

Coulam RF and Gaumer GL (1991) 'Medicare's Prospective Payment System: a critical appraisal', *Health Care Financing Review* (annual supplement), 45–77.

Farrar S, Scott A, Ikenwilo D and Chalkley M (2007) *National Evaluation of Payment by Results*. Aberdeen: Health Economics Research Unit, University of Aberdeen.

Fogel P (2004) *Superior Productivity in Health Care Organisations: How to get it, how to keep it.* Baltimore, MD: Health Professions Press.

Friese CR, Lake ET, Aiken LH, Silber JH and Sochalski J (2008) 'Hospital nurse practice environments and outcomes for surgical oncology patients', *Health Services Research* 43(4), 1145–63.

Fung C, Lim Y-W, Mattke S, Damberg C and Shekelle P (2008) 'Systematic review: the evidence that publishing patient care performance data improves quality of care', *Annals of Internal Medicine* 148(11), 111–23.

Gaynor M, Moreno-Serra R and Propper C (2010) *Death by Market Power: Reform, competition and patient outcomes in the National Health Service. Working Paper 10/242.* Bristol: Centre for Market and Public Organisation, University of Bristol.

Gerdtham U, Lothgren M, Tambour M and Rehnberg C (1999) 'Internal markets and health care efficiency: a multiple-output, stochastic frontier analysis', *Health Economics* 8(2), 151–64.

Hardie M, Cheers J, Pinder C and Qaiser U (2011) *Public Service Output, Inputs and Productivity: Healthcare.* Newport: Office for National Statistics.

Hassan E and others (2009) *Health and Wellbeing at Work in the United Kingdom*. London: The Boorman Review, The Work Foundation, RAND Europe and Aston Business School.

Hibbard JH, Stockard J and Tusler M (2003) 'Does publicizing hospital performance stimulate quality improvement efforts?', *Health Affairs* 22(2), 84–94.

Hibbard JH, Stockard J and Tusler M (2005) 'Hospital performance reports: impact on quality, market share and reputation', *Health Affairs* 24(4), 1150–60.

HM Treasury (2009) *Operational Efficiency Programme: Final report.* London: HM Treasury.

Kane R, Shamliyan T, Mueller C, Duval S and Wilt T (2007) *Nurse Staffing and Quality of Patient Care.* Rockville, MD: US Agency for Healthcare Research and Quality.

Kutney-Lee A, McHugh MD, Sloane DM, Cimiotti JP, Flynn L, Neff DF and Aiken LH (2009) 'Nursing: a key to patient satisfaction', *Health Affairs* 29(4), w669–77.

Mannion R, Davies H and Marshall M (2005) 'Cultural characteristics of "high" and "low" performing hospitals', *Journal of Health Organisation and Management* 19(6), 431–9.

Marshall M and Romano P (2005) 'Impact of reporting hospital performance', *Quality and Safety in Health Care* 14(2), 77–78.

National Audit Office (2011) *The Procurement of Consumables by NHS Acute and Foundation Trusts.* HC 705, session 2010–2011. London: National Audit Office.

Needleman J, Buerhaus P, Stewart M, Zelevinsky K and Mattke S (2006) 'Nurse staffing in hospitals: is there a business case for quality?', *Health Affairs* 25(1), 204–11.

NHS Confederation Foundation Trust Network (2010) *QIPP National Workstream: Back office efficiency and management optimisation*. London: NHS Confederation Foundation Trust Network.

NHS Institute for Innovation and Improvement (2006) *Delivering Quality and Value: Focus on productivity and efficiency.* London: Department of Health.

NHS Institute for Innovation and Improvement (2011) NHS Better Care, Better Value Indicators (incorporating opportunity locator): reducing length of stay. http://reducinglengthofstay.org.uk/latestdevelopments.html . Accessed 21 December 2011.

Pettigrew A, Ferlie E and McKee L (1992) *Shaping Strategic Change: Making change in large organisations – the case of the NHS in the 1980s.* London: Sage Publications.

Posnett J (1999) 'The hospital of the future – is bigger better? Concentration in the provision of secondary care', *British Medical Journal* 319(7216), 1063–5.

Propper C, Burgess S and Gossage D (2008) 'Competition and quality: evidence from the NHS internal market 1991–9', *The Economic Journal* 118(525), 138–70.

Propper C and Soderlund N (1998) 'Competition in the NHS internal market: an overview of its effects on hospital prices and costs', *Health Economics* 7(3), 187–97.

Propper C, Sutton M, Whitnall C and Windmeijer F (2007) 'Did "targets and terror" reduce waiting times in England for hospital care?', *The BE Journal of Economic Analysis and Policy* 8(2), article 5.

Propper C and Wilson D (2003) 'The use and usefulness of performance measures in the public sector', *Oxford Review of Economic Policy*, 19(2), 250–67.

Scott J, Sochalski J and Aiken L (1999) 'Review of magnet hospital research: findings and implications for professional nursing practice', *Journal of Nursing Administration* 29(1), 9–19.

Shekelle PG, Morton SC and Keeler EB (2006) 'Costs and benefits of health information technology', *Evidence Report / Technology Assessment,* (132),1–71.

Smith JA and Charlesworth A (2011) *NHS Reforms in England: Managing the transition.* London: Nuffield Trust.

Walston S, Burns L and Kimberly J (2000) 'Does reengineering really work? An examination of the context and outcomes of hospital reengineering initiatives', *Health Services Research* 34(6), 1363–88.

West MA, Borrill C, Dawson J, Scully J, Carter M and others (2002) 'The link between the management of employees and patient mortality in acute hospitals', *International Journal of Human Resource Management* 13(8), 1299–310.

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