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Improving length of stay: what can hospitals do?

Research report

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This report by the Nuffield Trust is part of a larger project undertaken by Monitor aiming to find the best ways to improve quality of care across the whole health system in light of recent pressures on the urgent and emergency care system. While reducing emergency admissions is difficult to achieve and hard to sustain, a more effective way to manage the growing demand for beds may be to focus on reducing length of hospital stay – the subject of this report.

There is a significant opportunity to reduce length of hospital stay through improvements in internal processes and the development of alternative services. There are often variations in length of stay, even for patients with similar conditions, and wide variations in the proportion of patients with extended stays. This suggests that improvements could be made. Drawing evidence from the literature together with insights from a number of case studies and a number of senior clinicians and managers, this report explores what approaches to reducing length of stay have been (and could be) effective by providing a set of measures for improving length of stay that are within the control of the hospital itself.

This report complements further work by Monitor published concurrently looking at how to help local health system leaders decide whether to invest in schemes that deliver care closer to patients' homes.

Key points

As the NHS grapples with the dual challenges of shrinking finances and changing population needs, the hospital sector finds itself under particular pressure. Reducing hospital length of stay has the potential to be an effective way of containing the growing demand for beds and releasing capacity in the hospital system. However, there is often significant variation in length of stay between hospitals, suggesting that improvements could be made. Drawing evidence from the literature together with insights from a number of case studies and a number of senior clinicians and managers, this paper explores what approaches to reducing length of stay have been, and could be, effective.

The following principles of good practice emerged:

- **Focus on flow.** Successful approaches to reducing length of stay are based on careful mapping of how patients flow through the hospital and into the wider system beyond. They establish key measures of flow and take time to collect and analyse the data at ward level. They also have a clear understanding of the operational processes and staffing mix that underpin clinical pathways. Success is the result of multiple complementary changes, including both the design of how patients flow through the system and the development of new care delivery models. There is no simple solution.
- **Get the basics right.** Many of these are well known but are not uniformly implemented. They include: setting expected dates of discharge; planning discharge from the point of admission; identifying potentially complex discharges; creating standardised pathways for common patient types that are based on evidence and clinical consensus; structured ward rounds; end-of-life planning; and ensuring good communication for smooth handovers and transitions.
- **'Bundle' approaches together.** No single approach will achieve sustained reductions in length of stay. Approaches should therefore include a focus on internal hospital flow, alternative out-of-hospital provision and patient safety. Many effective approaches are within a hospital's control to change – but they often require changes in culture and existing processes, or they require services and resources to be redesigned or reallocated. Additional funding is not always necessary.
- **Maintain a rapid pace for decision-making and patient progress** in the hospital through proactive patient management and early and continuous senior decision-making, underpinned with good information systems linked to daily actions.
- **Ensure active support for discharge seven days a week.** Several factors contributing to unnecessarily prolonged lengths of stay are more pronounced at weekends, such as variable staffing and service levels in hospitals and variable access to community services. During each day there will be spikes in demand, and hospitals should continue to analyse and align staffing rotas. Seven-day ward rounds and ward rounds involving senior decision-makers that are timed to match patterns of admissions should help to facilitate early discharge.
- **Large-scale top-down change is often not required.** Instead, those hospitals that have been effective at reducing length of stay have change management approaches in place that are based on continuous improvement, experimentation and staff involvement. Staff need time and space to explore and test ideas, and changes in existing systems and culture are usually required. Support from board level is important, but the key seems to be to devolve responsibility to staff and allow them freedom to test out changes as part of their daily work.

Introduction

Reducing the pressure on hospital bed capacity is one of the key challenges currently facing the NHS. While reducing emergency admissions is difficult to achieve and hard to sustain, a more effective way to contain the growing demand for beds may be to focus on reducing length of hospital stay. There is still a significant opportunity to reduce length of hospital stay through improvements in internal processes and the development of alternative services. There are often significant variations in length of stay, even for patients with similar conditions, and wide variations in the proportion of patients with extended stays. This suggests that improvements could be made.

This report from the Nuffield Trust is part of a larger project undertaken with Monitor designed to test the potential for reducing admissions and length of stay in hospital and the impact this could have on the costs of hospital care and the wider costs of local systems.

The report provides a set of measures for improving length of stay that are within the control of the hospital itself. We have not included a number of interesting examples of cases where hospitals have taken over elements of post-hospital care, home care and other types of outreach that emerged in the Nuffield Trust's review of the literature and case study collection. These are picked up in a companion report compiled by Monitor as part of the wider project they have led.

There has been extensive use of audit tools such as the Medical Care Assessment Protocol (MCAP) by the Oak Group and Greater Manchester Commissioning Support Unit looking at the potential for patients to be cared for in alternative settings (Kalant and others, 2000). Monitor and the Nuffield Trust have been given access to these data, which typically show that 20 to 25 per cent of admissions and 50 per cent of bed days do not 'qualify' for the use of an acute bed and could be treated at a different, usually lower, level of care to meet medical needs (Oak Group, 2014). It should be noted that this does not necessarily mean that the patient should have been transferred or that the use of the admission or bed day was unavoidable.

A striking and typical finding of this data is that up to 50 per cent of the reasons for patients not needing to remain in the hospital were under the direct control of the hospital itself and often relate to internal processes, decision-making and organisation. There is also an element related to avoidable harm, the management of end of life and the pre-planning of elective care, which is also amenable to hospitals taking action to reduce stay length. This is where this report focuses its attention.

Methods

The following approaches were used to reach these findings.

- We undertook a high-level review of the literature, which included a library scan of articles that included key words in relation to hospital flow and length of stay. This is not a comprehensive thematic literature review; rather, it seeks to set out examples that have had an impact and to complement the modelling developed by Monitor for reflection and discussion within hospitals and the wider system.
- We collected case study material from hospitals that had made significant improvements in length of stay over the last five years from an already high-performing position and conducted interviews with local staff including local clinicians, managers and commissioners.
- We tested the conclusions that were drawn from the above material at a workshop of clinicians and managers who are working on this issue.

The key approaches, opportunities and generic principles on improving flow detailed in this report have been drawn from the literature scan, from lessons learnt in hospitals that have put in place systems aimed at improving flow, and from interviewees who have been involved in hospital redesign and improving hospital flow. Although we have been careful in selecting sources and interrogating the case studies it is important to recognise that the context in which the intervention or service model has been applied can often be a key determinant of the outcome.

Findings

1. Getting pathways right

Case study hospitals and much of the literature emphasise the importance of focusing on approaches to improve patient flow through the hospital post-admission and developing a culture of proactive patient management.

The following approaches were highlighted as having a positive impact on improving flow and length of stay.

Early senior input

Senior leadership and decision-making early in a patient's journey through the hospital has been shown to be an important part of any strategy to reduce length of stay. A senior decision-maker is often defined as a clinician who can establish a diagnosis, define a care plan and discharge a patient without routine reference to a more senior clinician (Emergency Care Intensive Support Team, 2011). Such early input from a senior clinician can help to reduce initial admissions and to reduce adverse outcomes, ensuring that the patient is treated appropriately (National Confidential Enquiry into Patient Outcome and Death, 2009; Emergency Care Intensive Support Team, 2010; 2012; Cochrane and others, 1998; Keogh, 2013). A UK study of senior review in the emergency department reported that senior review of 556 patients reduced inpatient admissions by 11.9 per cent and reduced admissions to the acute medical unit by 21.2 per cent (White and others, 2010).

Patient moves

Multiple patient moves within the hospital, particularly if it is an older patient, can increase length of stay and stall patient flow. Research has found that patients can be moved four or five times during a hospital stay, often with incomplete notes and no formal handover (Cornwell and others, 2012; Royal College of Physicians, unpublished). Each patient move can add one or two nights to length of stay, and patients that are outliers (i.e. not on the most appropriate speciality ward for their condition) can lead to length of stay increasing by an average of 2.6 days (Emergency Care Intensive Support Team, 2010; Royal College of Physicians, 2012a; Alameda and Suárez, 2009). Intra- and inter-hospital transfers of older people at night can also increase the risk of delirium and, as a result, increase length of stay (Royal College of Physicians, 2012b).

Tracking patient progress through the hospital

In order to reduce the risk of uncoordinated care, real-time systems that show a patient's estimated discharge date and what investigations the patient is waiting for that day can be helpful – particularly if there is a feedback loop to ensure activities (for example, tests, investigations and physiotherapy input) have taken place. Visual systems to show the patient's progress against plan were found to be valuable in case study hospitals that have implemented patient tracking systems. These systems do not need to be technology based – a whiteboard can be easily updated and changed as the system develops.

There have been few large-scale studies on systems that track patient progress through hospitals. However, individual hospital case studies and interviewees highlighted the value of constant visibility of patient progress when supported by proactive multidisciplinary team patient management.

When e-tracking systems are linked to prompts they can enable more accurate and earlier identification of deterioration before serious consequences develop (Schmidt and others, 2014; Greengross and others, 2014a; 2014b; Smith and others, 2008), and improve the accuracy and completeness of transfer summaries (Maurice and others, 2014). However, e-systems that use prompts or alerts can result in 'alert fatigue': clinicians have been found to override or ignore 49 to 96 per cent of all alerts – the important along with unimportant ones (Baysari and others, 2014; van der Sijs and others, 2006).

Proactive multidisciplinary patient management embedded through rounds

Many of the published papers describing successful attempts to reduce length of stay stress the importance of proactive and multidisciplinary care. Patients who are managed proactively by a multidisciplinary team (particularly patients with complex needs or the frail elderly) do better than those cared for in a traditional way and so would be less likely to have a protracted length of stay (Landefeld and others, 1995; Milisen and others, 2001).

Proactive patient management is almost always multidisciplinary, with team members reducing the number of unnecessary days (Barisonzo and others, 2013; O'Mahony and others, 2007; Allder and others, 2010a; Ahmad and others, 2011, NHS Institute for Innovation and Improvement, 2011). The NHS Institute for Innovation and Improvement has outlined the evidence on and value of proactive patient management through their productive ward programme, which found that wards can increase direct patient care time by 41.6 per cent. Releasing time enables staff to progress care and proactively manage systems.

The number of unnecessary days in a hospital stay can be reduced through twice-daily multidisciplinary rounds and decision-making (Singh and others, 2012; Emergency Care Intensive Support Team Urgent, 2010). Some successful hospitals have an early morning round that provides an action list for the ward coordinator and a mid-afternoon round to review new admissions and check on the progress of patients. These are underpinned with clear multidisciplinary protocols of care.

Similarly, hospitals emphasised the need to have *clear deterioration assessments* that are linked to the board/ward rounds, so that patients in need of additional interventions and review are picked up early before they deteriorate further. Clinical deterioration can happen at any point in a patient's illness, or care process, but patients are particularly vulnerable following an emergency admission to hospital, after surgery and during recovery from a critical illness. The National Patient Safety Agency (NPSA), now part of NHS England, had previously developed a checklist (NPSA, 2007a) to support hospitals in improving the care and safety of acutely ill patients, which was incorporated into the National Institute for Health and Care Excellence (NICE) guidance (NICE, 2007).

Learning from case study hospitals and interviewees highlighted the need to establish a *culture of constantly challenging the view that the patient needs to be in hospital.* Using daily rounds to ensure that the care plan is on track, potential discharges are progressed and challenge the patient's need to stay in hospital.

Case study hospitals and interviewees highlighted the value of reviewing the ward round processes to ensure they were as effective as possible, and that all members of the multidisciplinary team should have a clear input into the round. The joint Royal College of Physicians and Royal College of Nursing (2012) report on ward rounds provides guidance on good practice in this area.

Seven-day rounds and supporting services

The length of stay of patients admitted on a Monday or Tuesday is, on average, around 2 days shorter than the length of stay of those admitted on Friday or at the weekend (Emergency Care Intensive Support Team, 2010). Several of the factors that contribute to unnecessarily prolonged lengths of stay are more pronounced at weekends, such as variable staffing and service levels in hospitals and variable access to community services (Keogh, 2013).

In the course of each day there will be spikes in demand and hospitals should continue to analyse and align staffing rotas – for example, case studies highlighted a demand from elderly care admissions in the late afternoon between 3pm and 8pm. Similarly, analysis of one acute trust found that two thirds of the frail older patients arrived on the medical assessment unit after 6pm, when covered by more junior staff, despite patients initially presenting to their GP or the emergency department within normal working hours (Health Foundation, 2013).

Increasing senior review and seven-day working does usually require investment in numbers of staff. However, one of the case study hospitals managed to stretch occupational therapy services to seven-day working with only minimal additional investment (Nuffield Trust, 2014).

Therapy services available seven days a week can reduce length of stay and support increased weekend discharging of patients (NHS England, 2013; Robinson and others, 2014). An Australian study found that increasing physiotherapy input over the weekend (in this case a Saturday) led to a 3.2-day reduction in hospital length of stay and a reduction in the length of time that physiotherapy was needed (Brusco and others, 2007).

Planning for discharge

Effective discharge planning and timely transfers of care can reduce the length of hospital stays and reduce readmissions (Shepperd and others, 2003; Khanna and others, 2012). However, levels of discharges vary significantly across the week; there are often more admissions than discharges from Sunday to Wednesday and then a recovery period where discharges exceed admissions from Thursday to Saturday (Royal College of Physicians, 2012a). Similarly, there are usually fewer discharges over the holidays and Christmas period (Allder and others 2010b; Jasinarachchi and others, 2009).

Establishing *discharge coordinators* to progress transfers and establish positive working relationships with health and social care partners across the week has been found to be effective in improving patient flow in case study hospitals. However, the case studies indicate that care needs to be taken to avoid creating a situation in which ward staff think that they are absolved of primary responsibility for organising and managing discharge.

Figure 1: Mayo audit tool, Northumbria Healthcare NHS Foundation Trust

Northumbria Healthcare NHS
NHS Foundation Trust

Northumbria Mayo Audit Tool

Date _____ Completed by _____

Trust Number _____

Ward _____

Age

☐ 0-44	0 points
☐ 45-64	4 points
☐ 65-79	6 points
☐ 80+	8 points

Prior Living Status

☐ In facility	0 points
☐ With others	4 points
☐ Lived alone	6 points

Disability

☐ No significant disability[1]	0 points
☐ Slight disability[2]	4 points
☐ Moderate or greater disability[3]	6 points

Self-Rated Walking Limitation

☐ Yes	0 points
☐ No	4 points

Total Points

If Total Points = 15 or greater, refer to H@H

[1] Able to carry out normal activities independently
[2] Not requiring assistance but limited in some/all of their previous activities
[3] Requiring help to any degree with personal care, mobility, communication

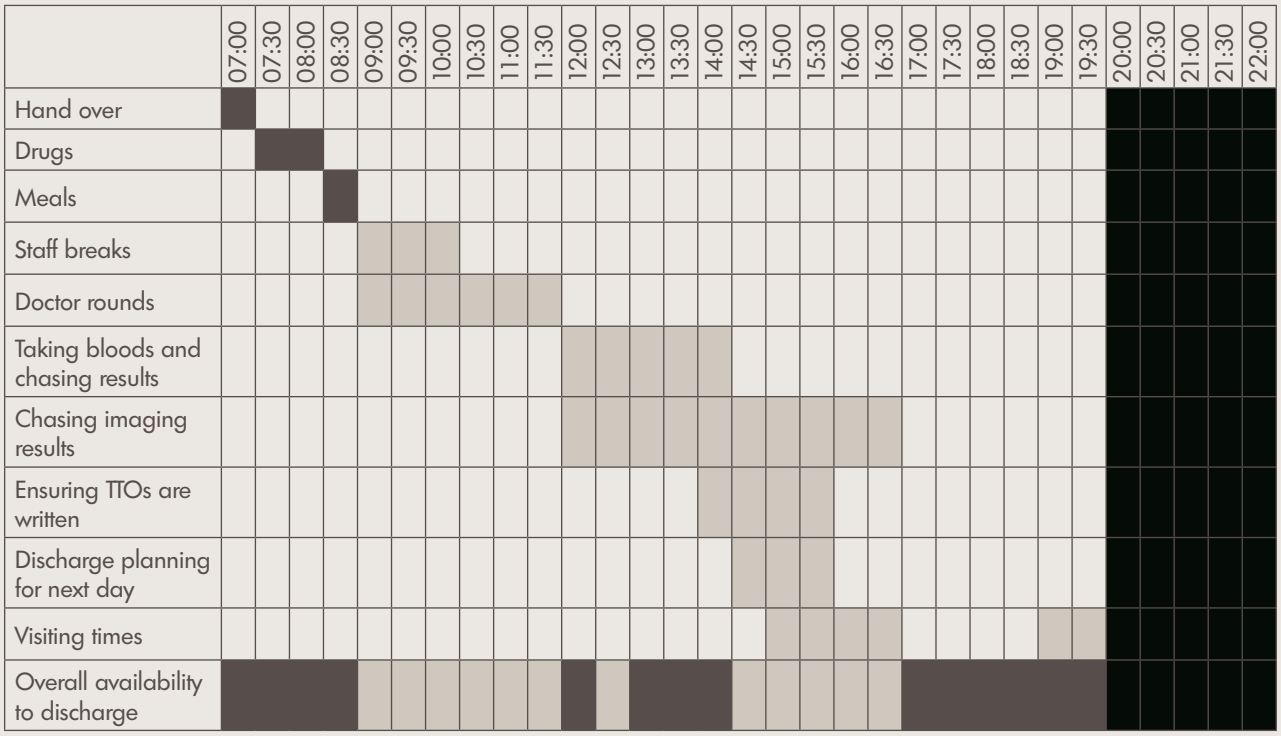
H@H = Healthcare at Home service

Case study hospitals have found that *early identification and active case management of patients at risk of complex discharge on admission* can reduce length of stay – sites used simple tools such as the Blaylock assessment (Mistiaen and others, 1999) or Mayo tool (illustrated in Figure 1) (Advisory Board Company, 2014). On identification these patients are given a comprehensive geriatric assessment (CGA) and tracked through the hospital, while district nurse and other community services are lined up in parallel for transfer back into the community services.

Case study hospitals that have implemented *nurse-led discharge* have found that equipping the senior nursing staff to facilitate discharge, once defined medical criteria have been reached, can enable more timely transfers, particularly at weekends. Case study hospitals highlighted that there should be a focus on ensuring documentation and arrangements are in place before the estimated date of discharge to allow for early discharge if the clinical criteria are met earlier. They also found that cultural barriers to enacting criteria-led discharge are considerable and that patients can still wait for formal ward rounds.

One issue that receives little attention in the literature but that arose in discussions with interviewees and workshop attendees is the variable levels of availability of nursing staff to facilitate transfers and availability of wider support services, such as pharmacy and transport. Figure 2 shows an exercise to plot this, providing evidence of significant constraints in a typical ward (Jones, 2012) and illustrates the number of other tasks that compete for nurses' time and attention.

Figure 2: Nursing availability to discharge from wards



TTO = 'to take out', indicating the medicines given to patient on discharge from hospital stay.

Lean Enterprise Academy (2009)

Standardisation of practice and enhanced recovery programmes

Enhanced recovery programmes (ERPs) and hospital clinical pathways are structured, multidisciplinary care plans that detail essential steps in the care of certain patient groups or patients with a specific clinical problem. They aim to link evidence to practice and optimise clinical outcomes while maximising clinical efficiency. They are often used to identify the expected standards of care and are increasingly used in commissioning frameworks to promote standardisation of practice.

Standardisation of ERPs and clinical pathways has been found to reduce length of stay and costs across a range of conditions (Nicholson and others, 2014; Rotter and others, 2010; Royal College of Physicians, 2013; Paton and others, 2014), for example:

- Heart failure: ERP reduced length of stay by 3.9±2.2 vs. 6.1±2.8 days (Discher and others, 2003)
- Total knee arthroplasty: early ambulation was associated with a statistically significant reduction in the adjusted average length of stay (-0.44 days) (Pua and Ong, 2014).
- Colorectal surgery: length of stay decreased by 2.5 days (Adamina and others, 2011).

In addition, standardisation of pathways can

- reduce readmissions and reoperations
- decrease mortality and morbidity
- improve pain control
- improve cost containment
- improve patient satisfaction (Adamina and others, 2011; Branagan and others, 2010; Chelly, 2007).

However, they are not consistently used and practice is not consistently audited against standards, which suggests scope for improvement (Walter and others, 2006).

Therapy interventions to improve flow and support transfer to alternative settings

Therapy interventions can reduce length of stay and play a critical part in MDT care through the approaches outlined above, such as proactive patient management, supporting enhanced recovery programmes, and reducing complications (such as maintaining mobility and preventing falls (College of Occupational Therapists, 2015), pressure ulcers and respiratory infections (Stern and Jayasekara, 2009)). Therapy services can also enable recovery at home services for acute adult patients, reducing the overall length of stay of patients in hospital in the following ways:

- **Older people:** A systematic review of the available literature found that older patients who undertake a multidisciplinary program or exercise program improved more on physical functional tests, were less likely to be discharged to a nursing home and had a reduced length of stay (Kosse and others, 2013). Systematic reviews have consistently found that physiotherapy can reduce length of stay by one day (Peiris and others, 2011; de Morton and others, 2007).

- **Supporting recovery at home:** Evidence suggests that there is a reduction in hospital length of stay when home-based multidisciplinary early supported discharge is used instead of usual care, particularly for hip fractures and stroke (NICE, 2011a; Zidén and others, 2008; Department of Health, 2009; Fearon and Langhorne, 2012; Langhorne and others, 2007). Therapy interventions can provide services to support patients moving from hospital to home and enable recovery at home after a stroke, fall, injury, onset of mental ill health, or at the end of life (Rexe and others, 2012).
- **Intensity in rehabilitation:** Intensity of therapy input in rehabilitation units can impact on length of stay; this could be transferable to some acute patients in hospitals, such as stroke patients (Slade and others, 2002).
- **Pre- and post-surgery:** Studies have also found that exercise programmes before surgery can reduce length of stay and reduce complications (particularly in cardiac surgery) (Hoogeboom and others, 2014; Hulzebos and others, 2012; Santa Mina and others, 2014). Similarly, a review of evidence found that early mobilisation and therapy interventions post hip or knee joint replacement surgery can result in a reduced length of stay of about 1.8 days (Guerra and others, 2014; College of Occupational Therapists, 2012).

Working with partners: transferring complex patients out of hospital

The literature, case study sites and the workshop of clinicians and managers highlighted the need for effective communication and close working between partners (be they NHS or social care), patients and carers at the point of transfer out of the hospital. If the transfer is of poor quality it can result in increased patient readmission, so it is vital to improve communication and relationships with partners, have clear guidelines and patient communication to support people post-discharge (Hesselink and others, 2014). The findings in this area can be summarised as follows:

- **Work with partners from the basis of assumed trust and professionalism.** Recognise that some approaches (especially for the frail elderly) cannot be achieved solely by the hospital and will require closer working with other health and social care providers. Many of the case study hospitals that have been more successful in reducing length of stay benefitted from the ability to directly alter services that enable discharge and early supported discharge, either by being integrated care organisations, being co-located with close relationships, or by directly commissioning community or social care services.

  Many of the case study sites minimised the number of negative interactions with partners, such as moving away from imposing delayed transfers of care fines and unnecessary assessments and moving towards a single trusted assessor supported by a single streamlined assessment documentation process.

- **Keep care packages open.** Some of the case study sites referenced social care packages remaining in place for 2–5 days as being important factors in enabling discharge.
- **Have a single point of access.** Having a single point of access for community (and ideally social care services) enables easier transfers.
- **Share decision-making.** Case study sites that were successful in improving discharge planning moved away from ‘discharge’ to ‘care transfer’ – where community, social care and acute teams share core links and decision-making points.

Co-location of social services and community staff within the discharge planning team in the hospital or fully integrated discharge support teams can improve discharge planning. Rotating staff through partner services can also promote a better understanding of the role of each sector and its pressures (Royal College of Physicians, 2012b).

Participants in the workshop, the interviewees and case studies highlighted that a simplified assessment, documentation and forms surrounding patient transfers with all partners trusting a single assessor can reduce length of stay. Many of the case study hospitals had a dedicated discharge resource that developed strong links to partners and enabled easier transfers of patients.

2. Targeted care

Care that is focused on particular patient groups or conditions can be helpful in reducing length of stay. There is evidence that establishing a specialist or designated unit within the hospital can improve length of stay, reduce mortality and reduce costs (Rimar and Diers, 2006; Czaplinski and Diers, 1998). In addition, approaches that target patients with dementia and/or frailty can have beneficial outcomes.

Designated short-stay units

As well as units that focus on a particular condition, units that deliver a particular type of care have been shown to have an impact on length of stay. Hospital case studies and interviewees emphasised that short-stay acute units are successful when they:

- concentrate specialist clinical and therapist skills
- give access to timely senior decision-makers
- follow clear clinical guidelines and standards
- pull patients from the emergency department or other assessment units
- maintain a momentum of rapid assessment and treatment
- ensure that diagnostic and structural processes are optimised.

Short-stay observation and assessment units that follow the defined Royal College of Physicians standards (Royal College of Physicians, 2012c) can reduce length of stay and prevent a full admission (Cooke and others, 2003; Vork and others, 2011). Some units are successful in discharging upward of 65 per cent of patients before the third night in hospital (Emergency Care Intensive Support Team, 2010). However, readmission rates should also be actively monitored, as there has been some evidence that short-stay units can result in higher numbers of readmissions (Juan and others, 2006). Ensuring critical review and clinical audit of these services is essential for ensuring they are adding value to the patient pathway and supporting appropriate, timely discharge. Interviewees suggested that there should be robust review of units that mirror or duplicate the function of the emergency department, to ensure that they are effective, don't protract stays, have a positive patient experience and appropriately identify and manage complex patients.

Separating the elective surgical stream

It may be possible to reduce length of stay by separating out the elective surgical patient flow, ideally establishing a dedicated unit and theatres within the hospital, so that the cultural and operational separation is achieved without loss of linked resources and services such as critical care, anaesthetics and back-room services such as administration, sterile services and laundry.

The Royal College of Surgeons (RCS) recommends separating elective surgical admissions from emergency flows through the use of dedicated beds. Separating the elective flow can result in a separate culture around the unit focused on improving the elective stream, a more predictable workflow, increased senior supervision, earlier investigation, earlier definitive treatment and better continuity of care, as well as reduced hospital-acquired infections and length of stay. High-volume elective surgical specialties are thought to be particularly suited to being separated out (Royal College of Surgeons of England, 2007; Health Committee, 2013).

There is some evidence that supports this model. Separating the elective surgery can improve efficiencies, avoid cancellations (around 17 per cent of elective surgical operations can be cancelled due to emergency surgery taking priority (Aaserud and Trommald, 2001)) and reduce length of stay (Mayer and others, 2008; Mäkelä and others, 2011). Dedicated units with higher volumes of elective surgery (such as hip replacements) utilising evidence-based surgical practices (and enhanced recovery programmes – see separate section) and technological advances have been found to reduce length of stay and costs (Australian Government, 2011; South West London Elective Orthopaedic Centre, 2009; Hagen and Kjekshus, 2004).

However, benefits to efficiencies, including length of stay, are only likely to be achieved if separation is well planned and well resourced (Royal College of Surgeons of England, 2007; Health Committee, 2013). Also, without a high volume of referred patients the efficiency gains made from having a dedicated unit can be small or even less efficient (Hagen and Kjekshus, 2004).

There are also a number of vital links to other services that an elective site requires such as anaesthetics, radiology, pathology and critical care support (Royal College of Surgeons of England, 2007; Imison and others, 2014).The RCS guidance based on a 2006 survey of surgeons also found that separation of elective surgical services, facilities and rotas is likely to work best when based around a separate unit within the hospital, rather than a completely separate location (Royal College of Surgeons of England, 2007).

Frailty units and services

A long length of stay is associated with particularly poor outcomes for older people, especially those who are frail and suffer from dementia. Being bed-bound can lead to fast deterioration in the health and wellbeing of a patient, and this is particularly true of those with frailty. Early identification and management of frailty is important in preventing deterioration and, therefore, reducing length of stay (British Geriatrics Society, 2014).

The clinical assessment and immediate diagnosis of frail older people is challenging, as they often present non-specifically (with falls, immobility, delirium/dementia, polypharmacy or incontinence, for example), and time pressures may prevent staff from focusing on anything other than the immediate problem (Royal College of

Physicians, 2012b). Having specialists trained in recognising and managing frailty at the front door can reduce admissions: a study in the United States found that a service for the elderly located in the emergency department reduced admissions by 3 per cent (Keyes and others, 2014), provided there are easy to access, timely, credible alternatives to admission.

Identifying frail or complex patients early and giving these patients a CGA and specialist input is associated with shorter lengths of stay and increased chances of living at home. These assessments are likely to increase staff awareness of illness severity, improve management of frailty and facilitate prompt interventions and access to specialist care (Harari and others, 2007; Paterson and others, 2006; Foundation Trust Network, 2012; Ellis and Langhorne, 2005; Trentini and others, 2001; Stuck and others, 1993).

Specialist frailty units (with geriatricians, advanced practice nurses, social workers, pharmacists and physical therapists) are associated with lower lengths of stay (Barnes and others, 2012), functional decline and early readmission rates (Traissac and others, 2011). If there is no separate frailty unit, then medical assessment units and wards should have the capability to identify frail patients and have access to a senior geriatrician to undertake a CGA and provide specialist advice and guidance.

Specialist frailty services that also provide in-reach services to outliers can also reduce length of stay, facilitate patients being transferred onto the most appropriate units and up-skill staff, making them more aware of frailty (Foundation Trust Network, 2012; Harari and others, 2007).

One particular type of specialist unit that has grown in recent years is those specialising in stroke. An analysis of previous studies relating to specialised stroke units in Canada found that overall length of stay associated with specialised care was reduced by eight days (compared to alternative care), and further reductions in length of stay were found in combined acute stroke and stroke rehabilitation units (Foley and others, 2006). Similarly, research in the UK has found that a London hyper-acute stroke unit reduced length of stay by 4.4 days (Brooke and Ames, 2011).

End-of-life care

There are obvious inherent sensitivities relating to discussions of length of hospital stay and end-of-life care. The following section is framed within the context of people's preference to die at home, and evidence that suggests that the quality of inpatient end-of-life care could be improved in hospitals – more than half of the complaints referred to the NHS ombudsman concern end-of-life care (Al-Quirainy and others, 2009).

Although the number of people dying in hospital has declined in recent years, hospitals remain the most common place of death. More than half of all UK deaths still occur in hospital (Ago and others, 2013; Gomes and others, 2012a), and studies have shown that between 78 and 89.6 per cent of people have some hospital care in their final year of life (Georghiou and others, 2012; Lyons and Verne, 2012). Surveys and a systematic review of the literature have consistently found that around two thirds of the population would prefer to die at home and that most do not change this preference, even when their condition deteriorates (Gomes and others, 2013; Shucksmith and others, 2013; Gomes and others, 2012b). Hospices and palliative care units are the second most common preference (29 per cent in England) (Gomes and others, 2012b).

In 2010/11 the average length of stay for people who die in hospital was 12.9 days (Health and Social Care Information Centre, 2011). However, analysis of deaths in English NHS hospitals during the financial year 1999–2000 found that patients who died in hospital spent a median of 23 days in hospital in the three years before death (Dixon and others, 2004).

In 2011 the NHS launched a 'Transforming end-of-life care in acute hospitals' programme. An independent evaluation of eight participating hospitals found a number of strategies that improved end-of-life care and reduced length of stay by 6 days per patient (Ahmad and others, 2013). The programme and wider evidence suggests the following strategies and factors can improve end-of-life care, lead to fewer short admissions and increase home death rates (Al-Qurainy and others, 2009; Murtagh and others, 2012; Lyons and Verne, 2012; Ahmad and others, 2013).

- **Agreement on estimated prognosis:** One of the key factors in managing end-of-life care is to understand when people are approaching the end of life and to recognise when is an appropriate time to plan and discuss for end of life. This involves a clinical agreement on the estimation of prognosis and agreement with the patient and family. The Gold Standards Framework has developed a 'prognostic indicator guide' to assist in this process (National Gold Standards Framework Centre, 2015). Communication with patients and families is central to supporting end-of-life care around estimated prognosis.
- **Educational initiatives:** Education and training can improve care and staff awareness, knowledge and confidence. There are a number of resources and tools available to support staff development, such as: guidance available from the General Medical Council (2010), NICE (2011b) guidance and the Gold Standards Framework (National Gold Standards Framework Centre, 2015).
- **Advance planning discussions:** Planning for the end of life at an earlier stage of illness can enable people to die at home through early preparations and by lining up support for patients and carers, as well as avoiding unnecessary hospital admissions.
- **Supporting carers and family:** Supporting families and carers to enable people to die at home is a critical factor in increasing home deaths; there are a number of patient organisations that provide advice to patients, families and carers on end-of-life planning and care.
- **Use of integrated care pathways:** Integrated pathways (providing a structure to enable the principles of best hospice practice to be adopted within the hospital and across primary care), improved communication with primary care and the use of electronic palliative care systems facilitates improved end-of-life care (Ellershaw and others, 1997; Ellershaw and Ward, 2003).
- **Access to an inpatient palliative care team:** A multicentre, randomised, controlled trial found that patients under a multidisciplinary palliative care service reported greater satisfaction with care and communication, had fewer intensive care admissions and lower total health care costs following hospital discharge (Gade and others, 2008).

3. Hospital-acquired harms

Reducing hospital-acquired harms can reduce length of stay and vice versa. Most of the hospital-acquired harms disproportionately affect the frail and elderly and can lead to rapid decompensation, higher mortality and longer hospital stays.

A focus on the following harms is likely to reduce length of stay, particularly for older patients:

- **Preventing falls:** Older patients are at a greater risk of falling in hospital, and those that have fallen once are at a higher risk of falling again (National Patient Safety Agency, 2007b). Although there are known approaches to reduce the risk of falls in hospitals, there is variable implementation and changes in practices between and within hospitals (National Patient Safety Agency, 2007b).
- **Reducing immobility:** Bed rest was identified as being harmful to patient care and the ability to recover in 1947 (Asher, 1947); it puts patients at higher risk of: skeletal muscle loss; falls; chest infections; delirium; deep vein thrombosis; catheterisation; and pressure ulcers (Knight and others, 2009; Kortebein and others, 2007). Patients that are supported in staying mobile and repositioning are less likely to have extended hospital stays and reductions in their independence (Knight and others, 2009).
- **Reducing hospital-acquired infections generally:** Healthcare-acquired infections (HAIs) can dramatically lengthen a patient's stay in hospital (De Angelis and others, 2011; Dodek and others, 2013; Karagozian and others, 2010) and can increase length of stay by an average of nine to 10 days (Hassan and others, Vrijens and others, 2010). Bundling of a number of different activities prevents HAIs and reduces their prevalence and impact (Muto and others, 2007; Association for Professionals in Infection Control and Epidemiology; McDonald, 2007). NICE (2014) and the Cochrane Library (2013) have published evidence-based guidance on clinically effective infection prevention and control practice.
- **Preventing urinary tract infections:** Older people are more likely to be incontinent and develop a urinary tract infection (UTI) in hospital from having a catheter inserted. Sixty per cent of UTIs relate to catheter insertion and catheter-associated UTIs extend length of stay by six days, increase mortality (Rothfeld and others, 2010), and increase the risk of developing pressure ulcers (All Party Parliamentary Group For Continence Care, 2011). However, 25 per cent of catheters are unnecessary and nurse-led interventions can reduce catheterisation rates by 42 per cent and catheter-associated UTIs by 57 per cent (Fakjh, 2008; Royal College of Physicians, 2012b).
- **Preventing pressure ulcers and managing existing pressure ulcers:** Having a pressure ulcer can result in an increase of hospital length of stay by 4.31 days (Graves and others, 2005) and 80 to 95 per cent of pressure ulcers are preventable by using the SSKIN approach to pressure ulcer prevention (Stop the Pressure, 2014).
- **Improving nutrition and hydration:** Patients malnourished on admission or who become malnourished and/or dehydrated during their hospital stay have longer lengths of stay and are more likely to be readmitted (Agarwal and others, 2013; Caccialanza and others, 2010; Almeida and others, 2013; Robinson and others, 1987; Klek, 2013; Water UK, 2007). Ensuring that patients, particularly older patients, have their nutritional status assessed (for example through the Malnutrition Universal Screening tool (MUST)), are recognised on admission and are provided with aggressive treatment and support can reduce risk of harm and length of stay (National Patient Safety Agency, 2007c).

Dementia and delirium

A hospital stay can often precipitate or exacerbate dementia and episodes of delirium (Tamara and others, 2009; Collier, 2012); however, up to a third of delirium cases are preventable (Inouye and others, 1999; Marcantonio and others, 2011). Patients who develop delirium have high mortality, institutionalisation and complication rates, longer lengths of stay and are also at increased risk of institutional placement after hospital admission compared to non-delirious patients (Royal College of Physicians and British Geriatric Society, 2006; Francis and Kapoor, 1992; Francis and others, 1990; Bhat and Rockwood, 2002; Rockwood and others, 1999; Fick and others, 2013). Similarly, patients with dementia also have longer stays in hospital compared to people without dementia admitted with the same medical condition, and are also at high risk of decompensating (Holmes and House, 2000; Savaray and others, 2004; King and others, 2006; Alzheimer's Society, 2009).

Preventing and managing cognitive impairment on admission can lead to better outcomes for patients and can reduce length of stay (Dementia Link, 2005; Alzheimer's Society, 2009; Foundation Trust Network, 2012). These are outlined in the Dementia Link (2005) delirium toolkit and guidelines developed by the Royal College of Physicians and British Geriatric Society (2006).

Many patients with dementia do not medically need to be in hospital (Alzheimer's Society, 2009). The National Audit Office (2007) carried out a county-wide bed survey in Lincolnshire and found that 68 per cent of people with dementia in the acute hospital were no longer in need of acute care on the day the survey was conducted. Another study reported that 43 per cent of admissions for people with dementia were for pneumonia and UTIs, for which admissions may have been preventable or treatable in the community (Sampson and others, 2009). Providing services for these patients in the community is likely to reduce admission and prevent long stays.

Research has also found that patients with delirium may benefit from more intensive support post-discharge (Rahkonen and others, 2001), as delirium is a common first presentation of an underlying dementing process and may also be a marker of severe illness and comorbidity (Royal College of Physicians and British Geriatric Society, 2006).Having access to a community dementia and delirium service could enable support services to be put in place to improve the patient's outcome and reduce risk of readmission.

Conclusion: design principles

By drawing together evidence from the literature with experience from our case study hospitals, it is apparent that successful approaches share a number of common features:

- **Focus on flow.** Successful approaches to reducing length of stay are based on careful mapping of how patients flow through the hospital and into the wider system beyond. They establish key measures of flow and take time to collect and analyse the data at ward level. They also have a clear understanding of the operational processes and staffing mix that underpin clinical pathways. Success is the result of multiple complementary changes, including both the design of how patients flow through the system and the development of new care delivery models. There is no simple solution. Combining changes in the hospital, assessment processes and the provision of alternatives to hospital are all required. Having a culture of proactive multidisciplinary team patient management and challenge is often critical for management of flow.
- **Get the basics right.** Many of these are well known but are not uniformly implemented. They include: setting expected dates of discharge; planning discharge from the point of admission; identifying potentially complex discharges; creating standardised pathways for common patient types that are based on evidence and clinical consensus; structured ward rounds; end-of-life planning; and ensuring good communication for smooth handovers and transitions. Even basic systems such as ordering transport and rapid turnaround of drugs to take home can make a significant contribution. Establishing clear communication channels with patients and families to manage expectations is also important.
- **'Bundle' approaches together, particularly those targeted at older patients.** No single approach will achieve sustained reductions in length of stay. Approaches should therefore include a focus on internal hospital flow, alternative out-of-hospital provision and patient safety. Many effective approaches are within a hospital's control to change – but they often require changes in culture and existing processes, or they require services and resources to be redesigned or reallocated. Additional funding is not always necessary. One of the main approaches highlighted through the case studies and workshop of clinicians and managers was to develop specialist frail elderly skills and services in order to enable early identification of frailty, prompt treatment and early supported discharge.
- **Maintain a rapid pace for decision-making and patient progress** in the hospital through proactive patient management and early and continuous senior decision-making, underpinned with good information systems linked to daily actions.

- **Ensure active support for discharge seven days a week.** Several factors contributing to unnecessarily prolonged lengths of stay are more pronounced at weekends, such as variable staffing and service levels in hospitals and variable access to community services. During each day there will be spikes in demand, and hospitals should continue to analyse and align staffing rotas. Seven-day ward rounds and ward rounds involving senior decision-makers that are timed to match patterns of admissions should help to facilitate early discharge.
- **Large-scale top-down change is often not required.** Instead, those hospitals that have been effective at reducing length of stay have change management approaches in place that are based on continuous improvement, experimentation and staff involvement. Staff need time and space to explore and test ideas, and changes in existing systems and culture are usually required. Support from board level is important, but the key seems to be to devolve responsibility to staff and allow them freedom to test out changes as part of their daily work.

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