

Introductory Notes:

This document provides a high level review of clinical evidence in relation to planned care

It is a summary and refers to a wide range of other sources of more detailed information, which themselves refer to detailed research studies and evidence-based reviews. Effectively it is the peak of a very large pyramid of information that sits beneath it.

It intends to begin a discussion with clinicians about “what works” – in essence, how can we use the resources available to us within the county’s hospitals and beyond to provide the best outcomes for patients by reducing mortality and reducing the likelihood of long term illness or disability?

We welcome feedback from clinicians, from patients, from partners – from anyone with an interest in how local hospital services can be the best they can. But, before we ask for feedback we would like to explain a little about what happens next to set this document into context.

This document is just a starting point. It cannot be complete at this stage. Instead, it should prompt discussion and help us to identify areas and issues that we need to look into in more detail. For example, what is missing from this review of the evidence? What else can we learn from in the UK and across the world so that the county’s hospital services are as good as they can be? What else do we need to know in order to make recommendations for the future of services that will best meet the needs of our urban and rural communities?

Through a series of clinical workshops, experiences doctors and nurses with other health professionals will begin to develop a clinical vision of “what good looks like”.

This will then form the basis for wider discussion with patients and communities, focusing on questions such as:

- OK, we have some initial thoughts about “what good looks like”. How does this measure up against your expectations as patients, carers or residents?
- If this is what good looks like, how we are doing in the county’s hospitals? What are the strengths that we can and should build on? Are there weaknesses that we need to address?
- If there are weaknesses, then what are the things that we could do to improve?

So, with this in mind, we would be really grateful for your thoughts on the attached document:

- What other sources of evidence are there that should form part of the foundations of the NHS Future Fit programme?
- How best can we engage with patients and communities in the next stage of the debate?
- Are there any gaps in the evidence base for planned care that we can fill?

Share your thoughts with the NHS Future Fit programme by emailing nhsfuturefit@nhs.net
We look forward to hearing from you.



Central Midlands
Commissioning Support Unit



Rapid evidence review to inform the case for change:
Planned care

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Introduction

This rapid evidence review is presented to inform the case for change for the *Future Fit: Shaping Healthcare Together* programme. This review focuses on planned care; reviews have been completed on acute episodic care and long term conditions/frailty.

In their report, *Learning from Reviews*, the Independent Reconfiguration Panel (2010), note the importance of the evidence base for change and this is supported in a recent report from the Royal College of Surgeons (2013):

“The requirement for, and implications of, service change needs to be thoroughly and exhaustively researched. If services are to be changed, the whole pathway of care for patients with specific conditions must be considered. This should encapsulate how a patient would access services from primary care, to initial secondary care referral, diagnostic tests, hospital treatment, discharge, follow-up and rehabilitation” (RCS, 2013).

The evidence base on best practice service reconfiguration is, however, relatively limited. Spurgeon et al (2010) reported that “the evidence base is not strong enough to guide decisions in specific situations about what care can be safely delivered locally, and what must be delivered in large facilities.” What is known however is that in any reconfiguration there are four interlinked drivers: quality (including safety), workforce, cost and access (Imison, 2011) (Figure 1).

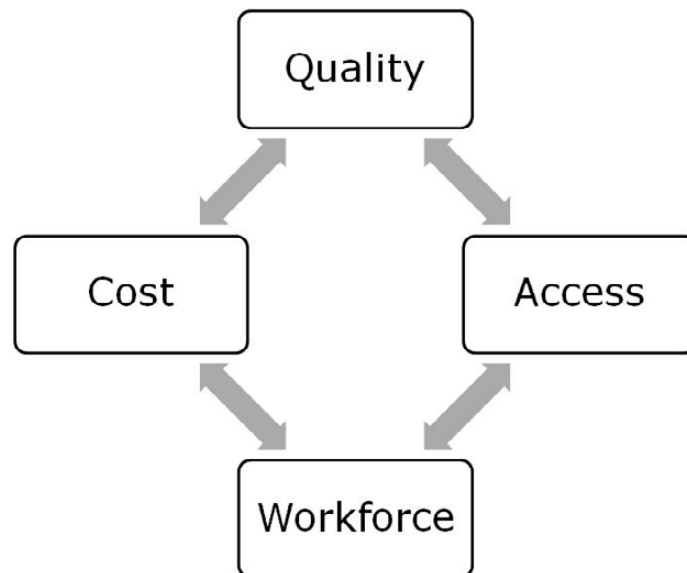


Figure 1

Scope of this review

This review considers a number of key themes identified as important to the case for change in relation to planned care:

- Bringing specialists together

- Consultant-delivered care and decision-making
- Variations in outcomes and experience
- Improving flow
- Enhanced recovery
- Information and technology

The scope of this review has not considered:

- local drivers for change, such as demographic profiles and increasing co-morbidity, as this is informed by the data analysis.

The following points should be noted:

- this is a rapid high level review to fit with the timescales required; more systematic and comprehensive can be completed focusing on themes of interest, if required;
- the review focuses on general messages for planned care and has not focused on specific conditions or populations; additional reviews focusing on particular aspects of planned care can be provided if required;
- interventions which have a weak or uncertain evidence base are not necessarily ineffective - the evidence is too limited to draw firm conclusions. This highlights the need for robust evaluation of local implementations to strengthen the evidence base;
- there is often considerable variation in definitions and composition of services; where information is available, we have indicated variations in practice;
- it can be difficult to synthesise evidence across different settings or where research has focused on a specific aspect of service delivery or a particular population.

Bringing specialists together

The Royal College of Physician's Future Hospitals Commission published a report last year making 50 recommendations (Future Hospitals Commission, 2013) for how hospitals should adapt to meet changing needs of patients. The report includes recommendations around a new principle of care, including the suggestion of specialist medical teams working across the whole hospital and out into the community. The report recommends a restructuring of care, based around the following:

- a Medical Division, "responsible for all medical services across the hospital" led by a Chief of Medicine
- Acute Care Hub, "to bring together the clinical areas of the Medical Division that focus on the initial assessment and stabilisation of acutely ill medical patients" focusing on patients likely to remain in hospital for less than 48 hours. The Commission suggest most of Level 1 beds would be located within this Hub. The Hub would be led by the Acute Care Coordinator, which would be a senior clinician.
- Clinical Coordination Centre, acting as a command centre responsible for managing patient information.

The report suggests that workforce needs to be organized around:

- Specialisation of care
- Intensity of care
- Coordination of care

Within the hospital, buddying is recommended as a way of reducing silo working, encouraging greater coordination between surgical and medical care.

The Royal College of Surgeons of England (2013) has recently issued guidance on the reshaping of services:

1. Reshaping of services should be based on sound clinical evidence that it will be beneficial to patients and staff, rather than it being considered for purely economic or administrative reasons.
2. There is clinical evidence that concentrating specialist surgical services into fewer, larger centres of excellence can save lives in certain circumstances. It is right that the NHS should look at the long-term benefits when considering any reorganisation.
3. Reshaping of surgical services should only take place where improvements in the quality of care are needed and can be realised. In some cases, there will be an evidence base that suggests service change will produce better outcomes for patients; in other cases, the reshaping of services might need to occur because surgical units are unable to meet minimum standards for safe service provision.
4. More consideration needs to be given to how to support communities in rural areas who need access to good emergency surgery. Strengthening of ambulance services and emergency care networks will ensure that patients needing immediate access to emergency surgery or other specialised services can be routed appropriately and promptly.
5. The requirement for, and implications of, service change needs to be thoroughly and exhaustively researched. If services are to be changed, the whole pathway of care for patients with specific conditions must be considered. This should encapsulate how a patient would access services from primary care, to initial secondary care referral, diagnostic tests, hospital treatment, discharge, follow-up and rehabilitation.

6. The views of patients must be sought early on. Patients must be involved not just in responding to a consultation about service change, but in understanding and building the case for change and putting together the potential options for consultation.

7. Patient transport is key to the public's sense of security and belief in the reshaping of services. The most common cause for concern is transport links between the 'local' hospital and an element of the service that may be moved to another location. It is important that a transport infrastructure is in place for any reshaped service.

8. Commissioners and providers involved in service change need to ensure that the quality of service is maintained before, during and after the service change takes place. This may involve offering services in parallel, in two or more separate locations, while the service change is implemented. Commissioners also need to ensure that any removal of services brought about by reshaping does not affect the stability of related services.

The relationship between volume and outcomes

Dudley et al (2000) found an association between higher volume and better outcomes - however, they questioned whether this was due to the practice makes perfect theory (skills are highly developed by performing the same procedure more frequently) or because units with good outcomes receive more referrals. Murray and Teasdale (2005) also question the difference between hospital volume and specialist volume, noting that more studies have explored hospital volume. The question relates to the volume of the hospital in general or specific to the procedure of interest - in other words, is high volume in general associated with better outcomes. The authors cite Urbach and Baxter (2004) who suggest that volume in general is more important than volume for the specific procedure.

Halm et al (2002) published a review including 135 studies; 118 comparisons (70% of total) indicated a statistically significant association between volume (physician and hospital) and outcomes; no study documented an association between higher volume and poorer outcomes. The same proportion of studies reported significant associations between outcomes and hospital volume (71%) and between outcomes and physician volume (69%). Although the evidence supports the proposition that higher volume is associated with better outcomes, the consistency and magnitude varies - the most apparent differences were noted in pancreatic cancer surgery, oesophageal cancer surgery; paediatric cardiac surgery; and surgery for unruptured abdominal aortic aneurysm. There was inconsistency with how case mix was adjusted for; of those studies who did adjust, some were based on administrative data and some on clinical data. Those using clinical data to adjust for risk were less likely to report a positive effect of hospital volume on outcomes. The authors highlight some of the limitations in the research reviewed: there is a tendency to focus on a snapshot in time rather than trends over time, which doesn't allow for changes in caseload and case mix over time; the studies used differing definitions of "high" and "low" volume; and the authors cannot exclude the risk of negative publication bias. One theory for the difference in outcomes is that high volume hospitals or physicians may use effective treatments more frequently.

Murray and Teasdale (2005) suggest that the relationship between volume and outcomes is "likely to be most clear in circumstances where the condition is complex and its treatment associated with high risk [...] Furthermore, the relationship between increased volume and

improved outcome in these circumstances is likely to be continuous, with improvement even at relatively high levels of experience. One exception may be if the volume becomes excessive, so that penalties of "overwork" lead to deterioration in outcome. For more common, less complex procedures, the improvement in outcome with increasing volume is likely to diminish beyond a certain threshold".

Spurgeon et al, in their review of 2010, note: "In sum, the balance of evidence from the systematic reviews undertaken suggests a modest case for a connection that is probably at least in part causal, even if some part is artefactual, between volume and outcomes for some important surgical procedures. What it does not provide is unambiguous evidence that only hospitals that can offer levels of activity above particular threshold levels can provide acceptable standards of care, not least because there is clear evidence that some larger volume centres do show poor outcomes". This perspective would seem to be supported by a review of the same year (Glanville et al, 2010) which reviewed secondary evidence to explore possible relationships between volume (hospital and specialist) and outcomes. Glanville et al suggest that whilst there does seem to be a general consensus that higher procedure volume leads to superior outcomes, in many cases, there is no evidence to support this. Where evidence does exist, researchers have been reluctant to suggest policy changes and volume thresholds. As with Halm et al, the review highlighted differences in definitions of "low" and "high" volume and a number of studies reviewed have failed to adjust for case mix. There may be a correlation between lower mortality rates and higher volumes; however, the authors note issues with using mortality as an outcome measure (it does not take into account post-discharge mortality, differences could be explained by differing discharge policies; and is not appropriate for lower risk procedures. There is little information in the literature about a causal link between volume and outcomes. Some authors have hypothesised why outcomes may appear improved in higher volume centres, including, better adherence to clinical guidance and ability to deal with complications.

Glanville et al also note that "clinical risk is intimately related to cost, in that where volume of activity is low, a safe configuration without a changed model of care requires more consultants and is expensive. It is possible, with more resources, to provide clinically safe services at small sites, and this use of resources is a political decision. A safer solution can be a lower-cost solution only where it is possible to bring services together in a larger centre, which considerations of access and cultural significance may prevent."

Ham et al (2012) discuss the issues around location of care and the relationship between volume and outcomes, citing evidence supporting the concentration of services in higher volume units and an association with better clinical outcomes (e.g. lower mortality rates); examples include vascular surgery, paediatric heart surgery; and stroke services. The current focus on 7 day working is also a driver for the concentration of services to optimise availability

of senior clinicians. A&E and maternity services are noted as being particularly contentious; however, Ham et al acknowledge that current service models are unsustainable due to workforce shortages. There is also an emphasis on providing care at the most appropriate location; for example, it is recognised that a hospital setting is not the best option for frail elderly patients and patients at the end of life. However, a lack of integration is often a barrier to providing alternatives to hospital based care.

"In future, some services that are currently delivered in district general hospitals will move to specialist centres, where the evidence shows that this will deliver better outcomes. A strong argument can be made for hospitals in future to work increasingly as part of networks to provide the public with access to the right care in the right place. These networks will link district general hospitals with each other and with specialist hospitals to enable care to be provided locally where it can and in specialist centres where appropriate. The development of cancer and cardiac networks, and the establishment of academic health sciences centres and networks in some areas, foreshadow this way of working." (Ham et al, 2012)

Pickering et al (2014) conducted a systematic review comparing triage and direct transfer to a specialist centre with initial transfer to a local hospital for 3 clinical conditions: multi system trauma, head injury and stroke. The evidence found was very limited and did not demonstrate improved outcomes for either pathway; the evidence found suggests outcomes are better for stroke patients transferred to a specialist centre if thrombolysis is only available at such a centre.

Palmer (2011), in his review of reconfiguration in South East London, notes evidence to support larger units serving a wider catchment area with better outcomes and improved cost effectiveness, pointing to examples A&E, maternity and neonatal services, hyper-acute stroke units and heart attack centres.

Imison (2011) reviewed hospital efficiency and found that "One of the most comprehensive assessments of hospital efficiency from the NHS Centre for Reviews and Dissemination (Aletras 1997) suggested that optimal hospital size lay between 200 and 600 beds. Normand (1998) suggested that there is no good evidence to demonstrate that closing small hospitals saves money but that merger of particular services (eg, intensive care, accident and emergency (A&E) services, cardiac surgery) could improve quality and save money. NHS London (Judd 2010) argues that the recent reconfiguration of stroke services has achieved improvement in quality as well as significant cost savings."

There have been debates about the volume and mixture of workload required to ensure financial sustainability in pathology, laboratory testing and also radiology, although not always directly in relation to emergency care. These are services identified as being necessary to

support emergency care (either on-site or networked) and there are some brief references made to the financial implications (“destabilisation”) of moving high volume, routine work or elective care away from a hospital which needs to retain the higher level specialist work in support of a range of specialties (Gouldie and Goddard, 2011).

Scale of services

Our earlier review on acute episodic care includes summaries of the evidence relating to scale of services. This has not been included here for brevity and can be provided separately if required.

Consultant delivered care and decision making

Imison (2011) concludes that workforce pressures are likely to be one of the most significant drivers of reconfiguration in the short and medium term.

The Royal College of Physicians commissioned a report (Lambourne et al, 2012) on consultant input into acute medical admissions which concluded:

- hospitals in which admitting consultants have no other fixed clinical commitments while on acute take had a lower adjusted case fatality rate
- hospitals in which the admitting consultants work blocks of more than 1 day had lower excess weekend mortality
- hospitals in which there were two or more acute medical unit (AMU) ward rounds per day reviewing all patients on the unit had a lower adjusted case fatality rate for patients with a hospital length of stay of more than 7 days
- hospitals where the admitting consultant was present for more than 4 hours for 7 days per week had a lower 28 day readmission rate
- hospitals in which there were two or more AMU ward rounds per day on weekdays and admitting consultants work blocks of more than 1 day had a lower adjusted case fatality rate (ie less excess mortality).

The Temple report (Temple, 2010) points to evidence supporting consultant-delivered care (defined as “consultant 24-hour presence, or ready availability for direct patient care responsibility”) and improved outcomes in patient safety, clinical care, patient satisfaction and resource management.

The Future Hospitals report (Future Hospitals Commission, 2013) highlights the issue of continuity of care in the management of acutely ill patients: "The overriding objective should be continuity of care for patients, coordinated and delivered by a single consultant-led clinical team. The provision of care to any single acutely ill patient should be confined, as far as possible, to a single ward or adjacent wards to facilitate continuing care by the same team on successive days. The principle of continuity of care with a single team should also apply to successive clinical contacts with hospital-based services for the same index clinical problem; for example, follow-up in the community, outpatient department or ambulatory emergency care centre once a patient has left hospital".

The report suggests new roles as part of a new model of care: the Chief of Medicine, responsible for the standard and direction of care across the hospital and associated community services; the Acute Care Coordinator, a senior clinician managing the Clinical Coordination Centre (see earlier chapter); and a Chief Resident, leading liaison between junior doctors and senior clinical managers.

The report also addresses logistics in delivering this new model of care, proposing:

- annualised medical job plans with blocks of time dedicated to acute service
- capacity organised to meet at least two-thirds of maximum demand
- coordinated job plans for teams
- rotation through individual services and multidisciplinary team meetings to improve understanding of the whole system of care
- documented standard operating procedures.

In practice

Fielding et al (2013) report on a project in Southampton comparing outcomes for 260 general medicine patients managed by two consultant delivered multidisciplinary teams (CD MDT) and 150 patients by a standard consultant led team of junior doctors (from December 2011 to April 2012). The study found reduced length of stay in the CD MDT teams (4-5 days versus 7 days, $p < 0.001$) and no differences in readmission rates, patient safety or mortality. The CD MDT team comprised a pharmacist, a medical nurse acting as case manager and a medical assistant. The study was particularly interested in exploring the extension of consultant delivered care beyond the first 24-48 hours. The study was limited in that patients were not randomly allocated to teams so there may be differences in case mix which may have influenced findings. Subjective comments from participants noted improved communication and decision making; and improved knowledge of the health system and resources available.

A retrospective study, in 2009 at Wrexham Maelor Hospital (Sen et al, 2012) analysed activity data over a year, comparing workload and admission rates between consultants, middle grade doctors and senior house officers. The results, although limited, suggest that consultants saw more patients; during night shifts, they admitted fewer (25.2% vs 30.3%, $p = 0.026$), had fewer leaving without treatment (1.6% vs 5.1%, $p < 0.001$), discharged more outright (59.8% vs 47.5%, $p < 0.001$), referred fewer to clinic (5.7% vs 6.6%, $p = 0.49$) and had a faster turnaround time ($p < 0.001$: Priority 2, 3 and 4) for every triage category. However, the study was limited and it should be noted that not all comparisons were statistically significant.

White et al (2010) conducted a study in a teaching hospital to explore the impact of senior clinical review - 556 patients underwent senior review during the study period. During this time, inpatient admissions were reduced by 11.9% (95% CI 7.2% to 18.2%) and admissions to the acute medical assessment were reduced by 21.2% (95% CI 13.5% to 30.8%). Inappropriate discharges were prevented in 9.4% (95% CI 6.2% to 13.7%) and appropriate use of outpatient facilities led to a 34.6% increase in appointments. The authors suggest this impact may be due to improved risk assessment from greater experience; clinical judgement; confidence in clinical assessment; and knowledge and utilisation of alternatives to admission. Junior doctors will often seek advice from specialists by phone; the early involvement of senior consultants

prevented 61.5% of such phone calls. The authors acknowledge limitations of the review; possible bias was introduced as observation will change behaviours.

7 day working

A recent BMJ editorial (Kwan and Bell, 2013) highlighted the issue of scheduling elective surgery, in the light of analysis of mortality rates at weekends. They cite analysis by Aylin et al which explores the association between day of elective surgical procedure and 30-day postoperative mortality; the results suggest a higher risk of death for patients whose surgery is scheduled later in the working week.

The issue of mortality rates at weekends was one of the factors which led to the establishment of the Seven Days a Week Forum, in February 2013. Chaired by Sir Bruce Keogh, the Forum has initially focused on urgent and emergency care services, reporting in December 2013 (NHS England, 2013a; NHS Services, Seven days a week, 2013a). The review notes the considerable variation in outcomes (mortality, patient experience, length of stay and readmissions) for patients admitted at weekends; the principle of 7 day working is supported by a range of professional bodies (NHS Services, Seven days a week, 2013b).

The review suggests this variation is likely due to a number of factors including:

- variable staffing levels in hospitals at the weekend;
- fewer senior decision makers (consultant level) on site at the weekend;
- a lack of consistent support services, such as diagnostic and scientific services at weekends;
- a lack of community and primary care services (which could prevent some unnecessary admissions and support timely discharge).

The review acknowledges the need for system change to address the issue of 7 day working: 'one part [of the system] cannot function efficiently at the weekend if other parts don't' (NHS Services, Seven days a week, 2013a). The evidence base report notes the need for improvements in the following areas:

- early consultant input;
- the use of multidisciplinary teams particularly in the care of older people with comorbidities;
- improving handovers between teams;
- access to diagnostic services to aid quicker decision making;
- access to interventional services such as surgery;
- access to mental health services;
- consultant delivered ward rounds;
- improving discharge.

The Academy of Medical Royal Colleges published a report (Academy of Medical Royal Colleges, 2012) on 7-day consultant-availability, proposing 3 standards:

Hospital inpatients should be reviewed by an on-site consultant at least once every 24 hours, seven days a week, unless it has been determined that this would not affect the patient's care pathway.

Consultant-supervised interventions and investigations along with reports should be provided seven days a week if the results will change the outcome or status of the patient's care pathway before the next 'normal' working day. This should include interventions which will enable immediate discharge or a shortened length of hospital stay.

Support services both in hospitals and in the primary care setting in the community should be available seven days a week to ensure that the next steps in the patient's care pathway, as determined by the daily consultant-led review, can be taken.

The Future Hospital report from the Royal College of Physicians (Future Hospital Commission to the Royal College of Physicians, 2013) also supports a transition to 7 day working:

Acutely ill medical patients in hospital should have the same access to medical care on the weekend as on a week day. Services should be organised so that clinical staff and diagnostic and support services are readily available on a 7-day basis. The level of care available in hospitals must reflect a patient's severity of illness. In order to meet the increasingly complex needs of patients – including those who have dementia or are frail – there will be more beds with access to higher intensity care, including nursing numbers that match patient requirements.

There will be a consultant presence on wards over 7 days, with ward care prioritised in doctors' job plans. Where possible, patients will spend their time in hospital under the care of a single consultant-led team. Rotas for staff will be designed on a 7-day basis, and coordinated so that medical teams work together as a team from one day to the next.

NHS Improving Quality is delivering a programme to support 7 day working; there are now 13 early adopter health economies which will inform new models. Their report (NHS Improving Quality, 2013), *NHS services - open seven days a week: every day counts*, features a range of case studies, including the following which report a reduction in A&E attendances or emergency admissions:

- a multidisciplinary team (acute physicians, social care practitioners, physiotherapists and occupational therapists) staffing an acute medical unit at Epsom and St Helier University Hospitals NHS Trust.
- integrated service models developed by Doncaster Metropolitan Borough Council, Rotherham, Doncaster and South Humber NHS Foundation Trust and Doncaster and Bassetlaw NHS Foundation to improve discharge processes and reduce avoidable admissions.

Further case studies (NHS Improvement, 2012) are also available.

Variations in outcome and experience

Patient reported outcomes (PRO) are principally questionnaires which measure different aspects of health and quality of life from the patient's perspective. "The purpose of PROMs is to get the patients' own assessment of their health and health related quality of life – PROMs questionnaires do not ask about patients' satisfaction with or experience of health care services, or seek their opinions about how successful their treatment was" (Devlin and Appleby, 2010).

The growing importance of a patient-centred approach to care is likely to be a driver to the growing interest in measuring patient reported health outcomes. Over the recent years tools measuring patient related outcomes have become more popular; Appleby and Devin (2005) report over the last 30 years in particular have seen a rapid growth in the development and use of patient-assessed health related quality of life (HRQoL) measures. Within the NHS there has become an increasing recognition that the use of patient reported outcomes can be used as a measure of productivity of NHS services. The National Institute of Health and Care Excellence (NICE) have made use of HRQoL measures to inform decisions about health technologies. Furthermore, since April 2009 all NHS health care providers have been required to provide Patient Reported Outcome Measures (PROMs) in four elective surgical procedures: hip replacement, knee replacement, varicose vein surgery and hernia surgery.

Variations in outcome and costs among NHS providers for common surgical procedures is recently analysed in an NIHR-funded study (Street et al, 2014). The study uses Hospital Episode Statistics (HES) data combined with reference cost data and PRO data for patients who had these treatments between April 2009 and March 2010. The study found a significantly unexplained variation among hospitals in outcomes for patients undergoing hip replacement, knee replacement or varicose vein surgery, but not for hernia patients. For all four treatments there was a significant unexplained variation in resource use among hospitals. This variation persisted after controlling for a wide range of patient characteristics and is generally robust to the choice of instrument used to measure PRO and to whether resource use is measured by cost of treatment or length of stay.

The report also found that there was no general correlation between resource use and outcomes at hospital level across all four conditions; "Plots of the hospital-specific effects for both resource use and outcomes confirm this conclusion with, for many of the PROM and resource use combinations tested, the general mass of points looking randomly distributed without any obvious systematic relationship". In the cases where a systematic relationship was identified, this tended to be negative. The authors concluded that this suggests that overall there is scope to improve technical efficiency in the provision of elective surgery.

The authors make a number of implications for practice, one of which is 'Learn from good practice and challenge poor practice'. The analysis classified hospitals into four quadrants according to their performance in relation to both their costs and outcomes, having controlled for case mix and hospital characteristics:

High Cost Poor Outcome	High Cost Good Outcome
Low Cost Poor Outcome	Low Cost Good Outcome

The authors found that there are handful of hospitals in the south-east quadrant that perform significantly better than the national average and some hospitals in the north-west quadrant that perform significantly worse than the national average.

Differences may be due to coding practices, working relationships, staff mix, theatre and ward layouts, organisational culture, etc but the authors acknowledge that none of these reasons are observable from routine data and identification requires site visits and qualitative study. Their analysis identifies which of the English NHS hospitals merit a visit and what types of activity the visit should focus on, such as those caring for patients having the particular procedure.

The authors highlight some limitations to the study:

- The analysis of variation in cost and outcomes among NHS providers is based on the HES, and therefore may contain errors if data are missing from the medical record, or extracted and coded inaccurately.
- The study will also be limited by large variation in provider response rates as missing data can lead to misidentification of outliers - only 40.6% of eligible hip replacement patients participate in the baseline survey and provided a complete EQ-5D health profile, with a further 8% dropping out of the subsequent survey

Improving flow

The NHS Institute (2008) describe flow as:

“The progressive movement of products, information and people through a sequence of processes. In healthcare, flow is the movement of patients, information or equipment between departments, staff groups or organisations as part of a patient's care pathway”

Improving patient flow is one way of improving health services. The Health Foundation (2013) has explored the relationship between patient flow, costs and outcomes and has identified the following three key concepts for improving flow:

- The relationship between flow, quality and cost
- Variations between demand and capacity
- Managing variation

The relationship between flow, quality and cost

The Health Foundation (2013) uses the ‘quality triangle’ to illustrate the relationship between patient flow, quality and cost in a system of care:

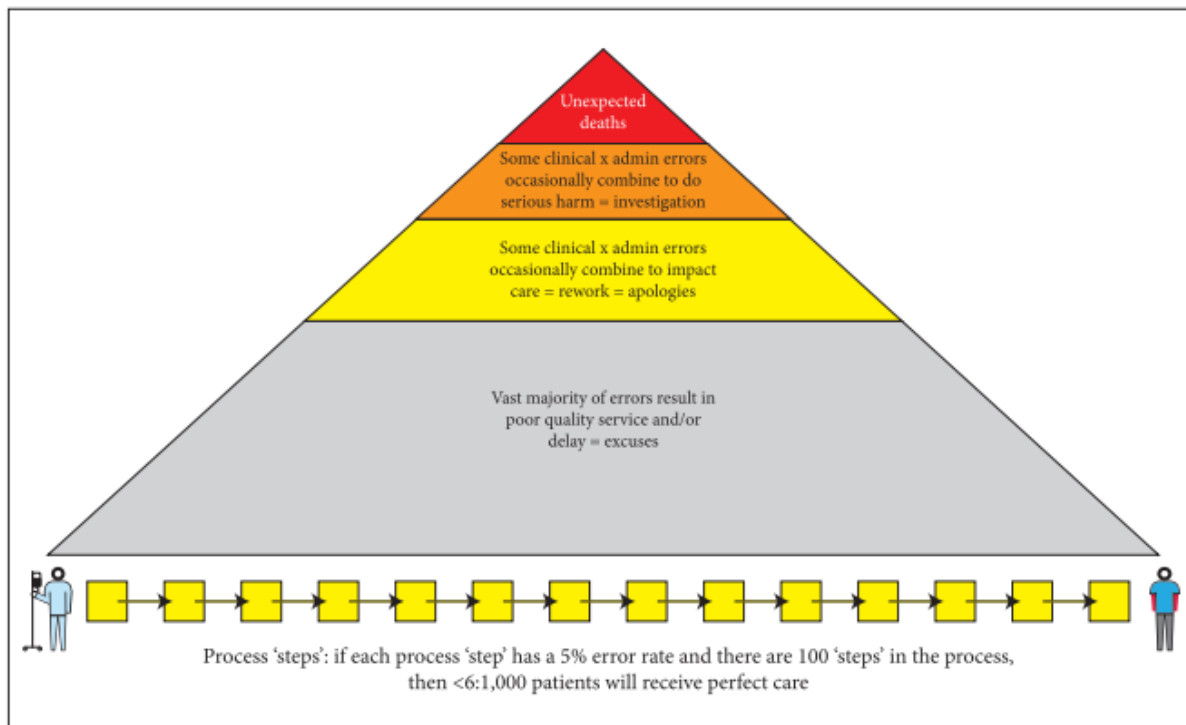


Figure 2

The process, or journey, that a patient experiences is depicted at the bottom of the triangle. Each yellow box represents a task. A patient journey may involve hundreds of clinical and administrative tasks and the same tasks can happen at different times and in different places.

The number of tasks in a process affects the quality of care. If we assume that every task in a 100-step process is performing to the quality standard accepted in clinical trials – ie a 95% probability of it being done correctly – this means that fewer than 6 in 1,000 patients going through that process will receive ‘perfect’ care (the right care, first time, on time, every time, in full).

The grey base of the quality triangle reflects the usual working environment, in which many errors are detected but lead to poor quality service and/or delays. Patients, relatives and staff become so used to this level of quality that it becomes accepted as normal. However, many of these constantly occurring errors are not spotted and corrected (represented by the yellow part of the triangle). These errors can combine to cause a problem which impacts on patient care, such as medication errors, delays or repeated investigations. The same errors can also result in serious harm (orange) and, more rarely, in an unexpected death (the red tip of the triangle). However, there is no way of predicting how and when errors will combine to cause harm. Improving the quality of each task by 1% and removing 10% of tasks in a 100-step patient journey would result in 25 out of 1,000 patients receiving perfect care. This represents a five-fold increase in quality, or a five-fold decrease in risk at the base of the triangle. Ultimately this will impact the small number of serious incidents and unexpected deaths at the top of the triangle.

Based on the theory of the ‘quality triangle’ care pathways should avoid adding assurance checks. The basis for process improvement involves:

- Improving the quality (value) of each task or step
- removing any unnecessary tasks (waste) from the process.

It is important to note that while there is a logical productivity case for improving quality, the Health Foundation warn that the relationship between quality and cost is not linear, often making it difficult to see or realise the full potential contribution of these approaches to overall financial objectives; “‘Wasted’ or non-value adding staff time that is removed from a process can only be released incrementally (usually in Whole Time Equivalents). Similarly, capital costs, such as beds, can often only be released as ‘units’, such as whole wards. Organisations therefore tend to find that financial benefits lag behind the implementation of quality improvement work and are sometimes not realised, as the additional step of taking out capacity is often itself far from straightforward”.

Variations between demand and capacity

Most delays and inefficiencies in the healthcare system are not the result of excess demand or the shortage of resources. Instead, the key issue is a mismatch between when capacity is

available and when demand presents to a service. The Health Foundation describes this as the flaw of averages:

“If service capacity is planned to meet the average demand, patients will have to wait (queue) when demand is higher than average. But when the demand is lower than average, the unfilled capacity cannot be carried forward to the future and is effectively lost”.

The charts below published by the Health Foundation (2013) illustrates the ‘flaw of averages’ and why planning services using average capacity and average demand doesn’t work in practice.

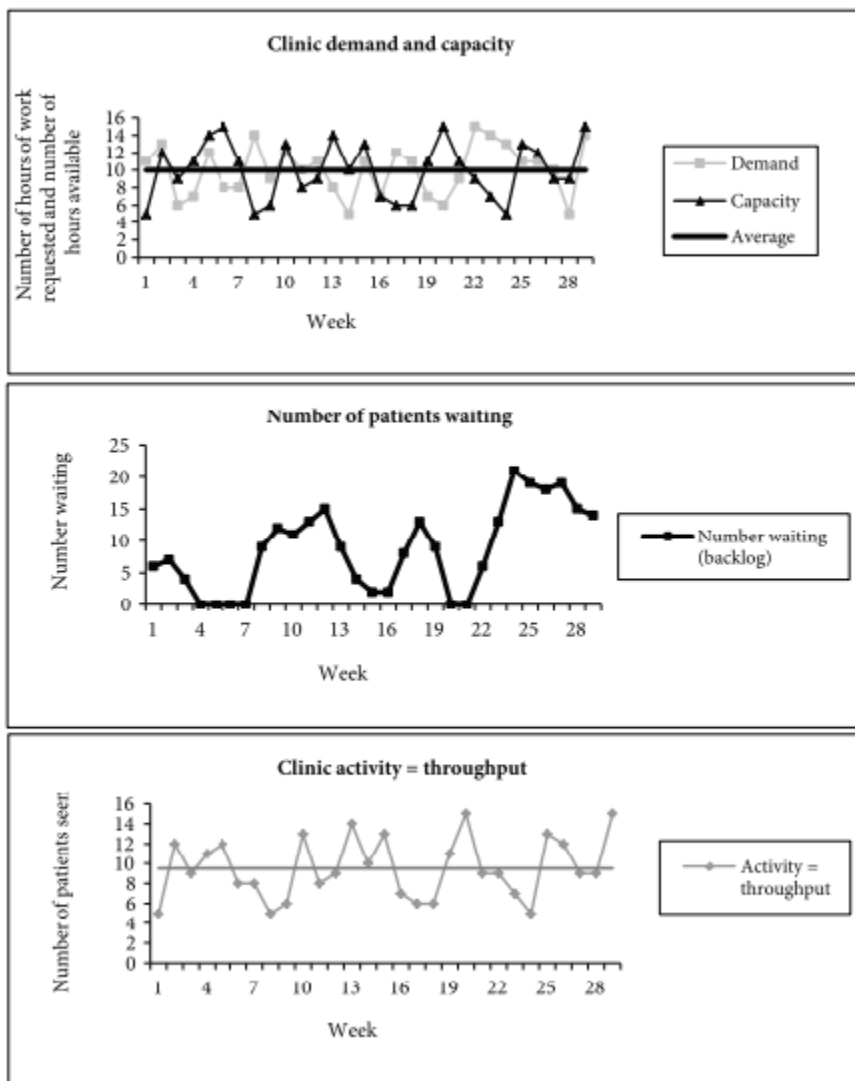


Figure 3

Chart 1: In this example clinic, an average of 10 hours of work per week is required to meet the patient demand (number of people and severity of their conditions). An average of 10 hours of capacity (staff time, equipment and clinic space) is provided to meet the demand. Note the mismatch between patterns of variation in demand and in capacity.

Chart 2: This illustrates the queues that form due to this variation mismatch, which is caused by planning clinic capacity to meet average demand.

Chart 3: As a consequence of ‘lost’ capacity when demand is lower than average, the throughput of the process (ie clinic activity) is equivalent to only 9.5 hours of work per week when the top chart illustrates that the average capacity is 10 hours per week. If only data on activity and waiting times are taken into account, the problem will be misdiagnosed as an overall shortage of capacity.

The Health Foundation states that the mismatch between capacity and demand is a significant problem in healthcare for a number of reasons. Examples relevant to planned care include:

- There is typically a mismatch at every step in pathways that often have many stages. This mismatch creates an amplification effect (also known as the Forrester effect) which means that problems with variation get worse as patients travel down a multi-stage pathway
- When organisations put in place extra short-term bursts of activity to deal with queues (for example with waiting list initiatives or extra activity to respond to winter pressures) this can send surges of work to the next step in the process, increasing the impact and problems associated with the amplification effect.

Managing variation

The Health Foundation (2013) report that if variations in demand are taken into account there should be a surplus capacity or ‘slack’ in the system to adjust for hourly, daily and seasonal changes in demand. This surplus can be misinterpreted as waste, however the authors highlight various benefits from a small investment in ‘slack’:

- Prevents amplification and the distortions in demand that require far larger investments in capacity further downstream.
- Allows for changes in staff capacity due to sickness, training and holidays.
- It gives staff time to monitor and improve services, and to manage any sustained changes to average demand until long-term capacity can be planned to meet it.

The Royal College of Physicians (2010) state that “It must be recognised by both clinicians and managers that occupancy levels temporarily below 85% should be a natural phenomenon and not be automatically regarded as inefficient”, and identify three specific challenges for the effective management of bed capacity that exist:

1. The daily bed cycle, where admission and discharge times mismatch, generates the most immediate problems in relation to perceived bed shortages. Current bed management practices do very little to solve the underlying problem and instead tackle the symptoms. Demand from short stay patients is the most significant factor influencing the problem.
2. The weekly bed cycle does create waste in the system, even though some people regard this as a less important factor. However, at least 20% of capacity is partly wasted because of this problem. Practices to ensure a more level schedule across the week could create significant extra supply that reduces the number of crisis days.
3. These data do not support the notion of increased demand as a single, dominant causal factor for winter bed shortages. There is a temporary change in patient LoS in the December/January period, probably due to reductions in effective discharge capacity, which readily explains the increase in bed occupancy. For the system to effectively limit this problem, investigation, clinical review and discharge practices in hospital and support services out of hospital would need to be more consistently provided during this holiday period.

Lessons learned from the Flow Quality Cost Programme

A number of key lessons from redesigning services and improving patient flow were highlighted through the Flow Quality Cost Programme led by the Health Foundation (2013):

- Looking at problems and potential solutions within health and social care systems through the 'lens' of patient flow will help not only to improve the efficiency of care processes, but also the quality of the overall system.
- Measurement and analysis is key - There needs to be a shift from comparative data to presenting it in time series and using statistical methods in its analysis. This will enable the understanding of where the problems lie and the impact of interventions both internal and external to the organisation.
- South Warwickshire in particular benefited from developing and using new system-level measures in this way. Plotting deaths by date of admission (rather than the traditional way by date of discharge) revealed a relationship between poor flow and clinical outcomes.
- When the emergency flow was poor (as indicated by breaches of the A&E target), the death rate increased. This enabled the team to monitor the impact (intended and unintended) of the changes they made to care processes on these crucial measures of system performance. They also found that what happened in A&E became a 'temperature check' for flow within their whole system.
- The two sites also learned that being open and transparent with data increased staff engagement, while rigorous measurement and analysis enabled people to learn from both success and failure of tests and changes. However, this required the development

of more sophisticated measurement skills for analysing data and using statistical methods.

- Organising healthcare systems into organisational and departmental silos contributes to poor flow. Rather than optimising the utilisation of individual units in the system, there needs to be a focus on optimising the flow of patients through the system. True capacity constraints (ie average capacity not meeting average demand) are rare. The key issue is the mismatch between variations in capacity and the largely predictable variations in demand. Using the principle of 'doing today's work today', we can understand and manage variations in demand, and match capacity to meet it.
- Understanding overall impact on cost - Most accounting systems encourage individual departments and functions to reduce their individual capacity and costs. This unwittingly creates constraints and additional costs to the system as a whole. The cost of managing any subsequent backlog or queue is borne by the departments or organisations upstream of the constraint, instead of by the department causing it. There needs to be a shift in focus from reducing unit costs to improving the productivity of end-to-end processes.
- Changing the paradigm from utilisation of resources to flow between resources also means changing the financial paradigm and how costs are accounted for within the system, from 'economies of scale' to the 'economies of flow'.
- Managing complex change - Many of the key insights and lessons from the Flow Cost Quality programme are not new but contribute to the growing body of knowledge and understanding on managing complex, large-scale change in health and social care. Some of these lessons remain hard to act upon in a heavily performance - managed culture, where there is pressure to provide immediate solutions.
- Both trusts found that focusing on the real experience of patients was a key driver for change. Highlighting the impact of poor quality systems on individuals gave meaning to the work on improving flow, and helped them ensure that the changes they made to services and care processes were centred on the patient rather than on the professionals
- Improving flow requires organisations to build internal capability in problem solving, data analysis and improvement methods.
- For both sites, helping staff to identify and make improvements themselves enhanced ownership of change. This was particularly true for nursing staff who often have a preference for more concrete, pragmatic thinking. Giving them the skills to identify where they thought the problems were and measure them helped engage them in the work.
- Different improvement structures and approaches will suit different contexts and cultures – there is no 'one size fits all'. Organisations need to be honest about their

strengths and weaknesses, and employ an improvement approach that works for them. However, there are a number of key principles that are important whatever the approach:

- Leadership is key, whether from the top or distributed through different levels of the organisation and professional groups.
- Relationships are important. The involvement and participation of multidisciplinary teams and wider stakeholders, including primary care and social services, is essential to both understanding the system and identifying solutions to its problems.
- Service improvement needs an adaptable, participative process with real-time measurement and feedback loops.
- Staff require time and improvement expertise to make successful, sustainable change.
- Achieving impact takes time
- The Flow Cost Quality programme demonstrated the need to recognise that multi-strand system improvement is complex and will take time to achieve results. Despite some initial 'quick wins', the time taken to see real change at a system level was two to three years for both sites and continues. There are no quick fixes. Solutions cannot be 'dropped in' from elsewhere. Each trust had to spend time analysing and really understanding their own system to identify the real problem areas and unlock the bottlenecks.

Sustaining improvements

Findings from a qualitative case study to explore factors that contributed to a sustained reduction in cancellation rates following a redesigned pathway for elective surgery at a Norwegian hospital demonstrated that employees at the hospital developed a revised and deeper understanding of their clinical system and its interdependencies during the course of the improvement project (Hovlid et al, 2012). The new understanding emerged from a dynamic process in which clinicians shared information, reflected on it, and related it to their everyday work situation. The authors concluded that a new understanding of the clinical system and its interdependencies can influence organizational action; *"The improved understanding of the system increased the employees' awareness of the interaction between context and interventions and improved their ability to adapt interventions to specific situations"* (Hovlid et al, 2012).

Changes originating from a new mental model represent double-loop learning. In double-loop learning, deeper system properties are changed, and consequently improvements are more likely to be sustained. A number of useful lessons were highlighted in the Norwegian quality

improvement programme (Hovlid et al, 2012) that may be of use when redesigning patient pathways:

- Cases of patients were used in the inquiry process to emphasize the patient experience in the pathway.
- The middle managers participated in the actual clinical processes that were affected by the interventions, thereby instantly learning about the effects of their decisions. This feedback was considered more valuable than measurements such as cancellation rates because it was direct and without delay. Sometimes this feedback revealed a need to revise previous decisions.
- Implementation was time-consuming and difficult because of resistance in the organization. Consistent follow-up by middle managers over an extended time was necessary to actually implement the decisions that were made.
- The meetings in the project groups were the most important arena for sharing and reflecting on information.
- In these groups, frontline clinicians shared information, reflected on it, and related it to their own work and the clinical pathway as one whole to detect areas for improvement. Through this process, tacit knowledge was made explicit and shared.
- Clinicians' focus shifted from their small, familiar part of the patient flow to how all of the various elements needed to interact to improve overall system performance, and individual clinicians reflected on how their own work contributed to the pathway, and thus realising how dependent they were on each other and how crucial everybody's contribution was for an optimal pathway. Through this reflection, the organization improved its understanding of the clinical system and its interdependencies.
- As staff members became aware of the complexity of their clinical processes and their understanding of the interdependencies of the various elements grew, they discovered new problems and possible solutions.
- Clinicians revised their understanding of the clinical system as they acquired a better understanding of its interdependencies. Clinicians' improved understanding of the interdependencies in the clinical system affected three important stages of the change process: inquiry about what to change, change of organizational routines, and adaptations of interventions to the context.
- The use of multidisciplinary teams of professionals, combined with knowledge about improvement, was an important success factor in our case study. The staff that supported the project groups helped to structure an arena for reflection and sharing information.
- Perseverance from middle managers, who led the implementation process through their clinical work, was a key driver in overcoming resistance and implementing change. Consistent with previous findings, middle managers built and demonstrated knowledge

about the clinical system through their work and leadership, thereby facilitating the spread of the new mental model. By doing so, they maintained double-loop learning at the organizational level.

Patient Pathways

“The traditional NHS approach to cutting costs involves identifying a number of incremental cost improvement programmes typically including ‘skill mix reviews’ (meaning replacing more expensive staff with less expensive staff), culling of non-clinical staff (especially in corporate functions), sharper procurement of consumables and cutting back on the use of bank and agency staff. [...]The alternative approach to achieving large cost reductions involves fundamentally redesigning the way that patients flow into, through and out of hospital – patient pathways. The aim is to bring about major improvements in productivity while also improving the quality of patient care. Measures taken to improve hospital productivity include increasing day case rates, reducing lengths of stay, reducing admission and re-admission rates, reducing outpatient ‘did not attends’ (DNAs), and improving operating theatre productivity.” (Palmer, 2011)

Methods to increase productivity and increase quality of patient care are discussed in the following section, covering:

- Separation of elective and emergency surgery
- The productive operating theatre programme
- Daycase surgery
- Shifting outpatient care to primary/community care
- Diagnostics
- Discharge Planning

Separation of elective and emergency surgery

In the reconfiguration of South East London local surgeons have recommended that emergency and more complex elective surgery should be undertaken separately, with as much non-complex elective activity taking place in elective treatment centres as possible. They have recommended that, ideally, there should be two elective inpatient units [in outer South East London]. The expectation is that consolidating non-complex surgery at fewer, higher-throughput NHS elective treatment centres would improve the patient experience and could result in better clinical outcomes (Palmer, 2011).

‘Separating emergency and elective surgical care: Recommendations for practice’ published by the Royal College of Surgeons of England (2007) endorses the separation of emergency and elective surgery:

“Separating elective care from emergency pressures through the use of dedicated beds, theatres and staff can if well planned, resourced and managed reduce cancellations, achieve a more predictable workflow, provide excellent training opportunities, increase senior supervision of complex/emergency cases, and therefore improve the quality of care delivered to patients”.

As well as reduced cancellations the guidance highlights other improvement leading to enhanced patient experience and safety, including:

- earlier investigation,
- definitive treatment and better continuity of care
- reduced hospital-acquired infection risks
- reduced length of stay
- improved supervision of trainees

Lessons learned

The Royal College of Surgeons of England (2007) led a survey of general surgery, and trauma and orthopaedic link surgeons in NHS Trusts regarding the separation of emergency and elective surgery in 2006; 122 Trusts replied, of which 35% had achieved some form of separation of emergency and elective surgical workloads. The results found that there is no universal solution and local circumstances will dictate the best method of service delivery. However, the Royal College of Surgeons of England concluded the following lessons learned:

- A physical separation of services, facilities and rotas works best although a separate unit on the same site is preferable to a completely separate location.
- The presence of senior surgeons for both elective and emergency work will enhance patient safety and the quality of care, and ensure that training opportunities are maximised.
- The separation of emergency and elective surgical care can facilitate protected and concentrated training for junior surgeons providing consultants are available to supervise their work.
- Creating an ‘emergency team’, linked with a ‘surgeon of the week’ is a good method of providing dedicated and supervised training in all aspects of emergency and elective care.
- Separating emergency and elective services can prevent the admission of emergency patients (both medical and surgical) from disrupting planned activity and vice versa, thus minimising patient inconvenience and maximising productivity for the Trust. The success of this will largely depend on having sufficient beds and resources for each service.
- Hospital-acquired infections can be reduced by the provision of protected elective wards and avoiding admissions from the emergency department and transfers from within/outside the hospital.
- The improved use of IT solutions can assist with separating workloads (for example, scheduling systems for appointments and theatres, telemedicine, picture archiving and communication systems, etc), although it is recognised that developments in IT for the NHS are generally behind schedule.
- High-volume specialties are particularly suited to separating the two strands of work. Other specialties can also benefit by having emergencies seen by senior surgeons – this can help to reduce unnecessary admissions, deal with ward emergencies and facilitate rapid discharge.

As well as separating emergency and elective care, units will need to stream elective care into minor, intermediate and complex and will need to consider post-operative arrangements for recovery depending on the 'level' of elective surgery provided (Royal College of Surgeons of England, 2007).

The Royal College of Surgeons of England and Association of Surgeons of Great Britain and Ireland (2013) guidance on 'Emergency General Surgery' commends the collocation of higher risk elective procedures in the same hospital as emergency surgery; "By their nature these procedures have a high rate of complications that require emergency management and it is established that the management of these complications of planned surgery varies considerably between hospitals and can define successful units. Management of complications is a principal determinant of survival after elective surgery and in reconfiguring EGS services within networks there needs to be active consideration of whether detection and treatment of complications of elective surgery will be weakened or strengthened as a consequence".

The Royal College of Surgeons of England (2007) state that a physical separation of services can sometimes help in dealing with cultural change – however, it can produce staffing and resource implications. Trust have demonstrated that separating emergency and elective rotas and theatres can work well if clear protocols are in place to ensure one does not encroach upon the other.

Separating services may require some duplication of resources, perhaps in terms of the supporting staff required to facilitate the two services, for example, non-medically qualified practitioners to support theatre work, allied health professionals to support diagnostics and laboratory work, and administrative staff to facilitate scheduling and patient bookings. It may be possible to exploit economies of scale, especially for 'back office' functions such as administrative support. These should be explored (Royal College of Surgeons of England, 2007).

The Royal College of Surgeons of England, 2007) state that the separation of services needs to be properly planned, resourced and managed. Their survey of general surgery, and trauma and orthopaedic link surgeons in NHS Trusts regarding the separation of emergency and elective surgery in 2006 found that additional resources are likely to be required; respondents of the survey indicated that there had been increased costs initially. These may include:

- expanding the consultant base (surgeons and anaesthetists);
- expanding the number of support staff (nurses, trainees, staff grades, administrative staff, etc);
- setting up SAUs – resources, facilities and equipment;

- gearing up additional theatres so that services can be separated; and
- additional support services (radiology, pathology, etc).

The Royal College of Surgeons of England (2007) suggest that the cost of routine elective care should reduce if services are separated, but the cost of emergency care and complex electives may rise and Trusts should find that scarce resources are used more efficiently. This is due to the payment-by-results mechanism that exists which may not fully recognise the increased costs incurred by Trusts treating emergencies and complex elective cases and this needs to be remedied. Palmer (2011) explains how the reconfiguration of South East London may be affected by this:

“Because with Payment by Results (PbR) money follows patients, the shifts in the pattern of patient care and the redistribution of emergency and elective services across the DGH sites generates financial winners and losers. The increase in activity at Queen Elizabeth, Woolwich, Bromley Hospitals NHS Trust, and University Hospital, Lewisham, provided at low marginal cost, improves their financial position. However, the shift of non-elective care from Queen Mary’s to Bromley Hospitals NHS Trust, and the corresponding transfer of non-complex elective activity in the opposite direction, worsens the financial position of Bromley Hospitals NHS Trust but improves it at Queen Mary’s, Sidcup. This is because Bromley Hospitals NHS Trust loses high-margin elective patients and gains low-margin emergency patients, and vice versa. Therefore, the net financial position across all four DGHs improves significantly but Bromley Hospitals NHS Trust continues to have a significant recurrent deficit”.

Critical Success Factors

To make the separation of elective and emergency care work the Royal College of Surgeons of England (2007) state that surgeons and service planners need to ensure that:

- Patient safety is safeguarded.
- Emergency and elective demands are accurately profiled and understood.
- Clinical involvement and agreement is secured.
- All participants understand the ‘rules of engagement’.
- Proper handover of patients occurs between both emergency and elective teams.
- Training opportunities are maximised.
- Elective bed requirements are well thought out and resourced. Once agreed, they should be strictly ringfenced.
- Supporting facilities can cope with the potential for increased demand (for example critical care beds, nursing staff, imaging, etc).
- Admissions for emergency surgery or to the SAU are made for clinical reasons and not to meet 4-hour wait rules.
- Senior decision-makers are available at key points in the patient pathway to reduce inappropriate admissions, tests, etc.
- IT solutions are explored (for example, telemedicine techniques, PACS, automated booking/scheduling systems).
- There is inherent ability to ‘flex’ emergency and elective resources to meet service pressures at different times in the year.
- Ambulance Trusts, the local authority and the local population are aware of any changes in service delivery.
- The requirement for full public consultation is followed where appropriate – clinicians should take the lead in making the clinical case for service change.

Examples in practice

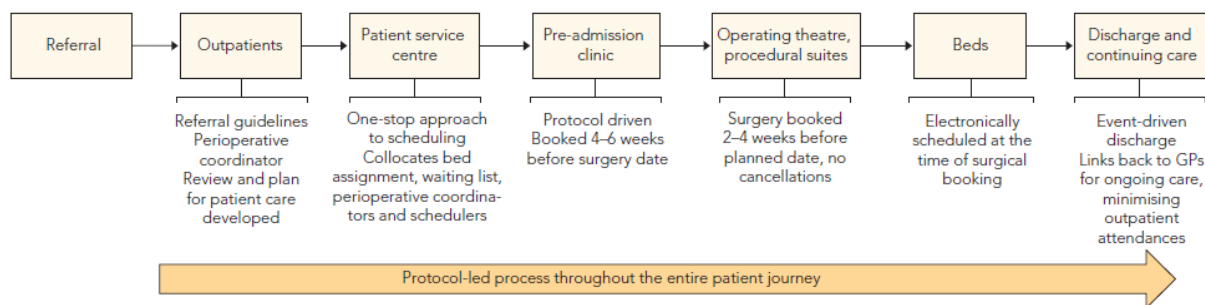


Figure 4 : New streamlined model of care for short-stay surgical patients, Alfred Hospital and Alfred Centre (Lowthian et al,2011)

A before and after retrospective analysis of a major tertiary hospital in Australia that had implemented a process of redesign to streamline clinical pathways for elective surgery (see figure 4), establishing a separate dedicated elective surgery facility (Lowthian et al, 2011), found sustained downwards trends for:

- The number of elective surgery patients waiting longer than national recommended maximum waiting times – comparing data from February 2010 with February 2005, there was a 45% decrease in the numbers of Category 2 (semi – urgent) waiting longer for surgery than the recommended time of < 90 days.

- The number of hospital initiated postponement (HIP) rates for elective surgery – The combined HIP rate for planned elective admissions in the main hospital and elective surgery centre decreased over the period February 2005 to February 2010 from 28% to 6%, furthermore by February 2011 HIP rates at the elective surgery centre and the main hospital were less than 1% and 7% respectively.
- The combined length of stay for the top surgical procedures, as well as the length of stay for the most common surgical procedures – The combined length of stay for the top 10 procedures significantly reduced from a mean of 4.8 days before the redesign to a mean of 2.3 days after the design ($P < 0.001$).

The authors also highlighted further improvements in efficiency:

- Having a dedicated stand alone facility for elective surgery also resulted in a reduction in the median time to time-critical non-elective surgery at the main Hospital.
- There was a rise in the proportion of successful same-day discharges from 83% in February 2005 to 95% in February 2010.

The authors emphasise that it is important to note that the additional capacity of 55 same day (recovery) and 26 overnight surgical beds, in isolation, would not be sufficient enough to improve procedure specific or combined length of stay unless accompanied by a significant redesign of care pathways.

The separation of elective and emergency care is a recommendation of the better service better value programme for South West London as highlighted in the Planned Care Clinical Working Group - Final Clinical Report (2012):

“Planned surgical care must be ring-fenced (theatres, beds and staff) to avoid disruption from non-elective activity and to create an environment in which standardisation of care processes and their systematic audit is promoted [...] The majority of inpatient planned surgical care (including 23-hour stay) can be delivered in an elective centre or elective centres where activity should be consolidated wherever possible in order to drive up quality of outcomes and productivity. Single-specialty elective centres are possible, but multi-specialist centres will allow for a greater provision of infrastructure, for example, intensivists (specialist doctors trained in providing intensive support to patients during a critical phase of their period in hospital) to support patients with co-morbidities”.

Productive operating theatre programme

NHS Institute launched the 'Productive Series' to support NHS teams to redesign and streamline the way they manage and work. The Productive Operating Theatre programme is part of the 'Productive Series'; the NHS Institute (2013) state "evidence suggests that operating theatres could be more efficient and safer for patients". Furthermore, they recognise the need for operating theatres to function at their optimal level; "It is crucial that operating theatres, which serve as a key part of health organisations/hospitals, are functioning at their optimum level. Not only do theatres provide critical patient interventions, but they are also responsible for a substantial proportion of both the total expenditure and income generated at every acute hospital. In addition, the delivery of key strategic organisational objectives involving patient safety, successful clinical outcomes, efficiency and maximised income are dependent upon effective organisation and management of operating theatres."

The Productive Operating Theatre programme evolved through co-production with six NHS trusts in England, working alongside experts from another high risk industry, in this case aviation, and experts in 'Lean' improvement.

The programme contains 13 modules and an associated implementation support package to encourage longer term cultural change for theatre staff (including surgeons, anaesthetists, theatre matrons, preoperative practitioners, managers and operating department practitioners) and offers a systematic approach to improving ways of working. The evaluation of The Productive Operating Theatre programme (NHS Institute, 2013) found that the most commonly mentioned modules include; knowing how we are doing, well organised theatre, scheduling, and team-working. Other modules cover:

- Executive Leader's Guide
- Programme Leader's Guide
- Operational Status at a Glance
- Session Start-up
- Patient Preparation
- Patient Turnaround
- Handover
- Consumables and Equipment
- Recovery Toolkit

Integral to the design of the programme are the four key domains:



Figure 5

The evaluation findings (NHS Institute, 2013) demonstrate that The Productive Operating Theatre brings about clear benefits for the four key domains of the programme. Benefits include:

- increased session utilisation
- improved list management
- reduction in staff sickness
- increase in staff satisfaction
- uptake of the five step model including team brief and debrief
- adherence to VTE and antibiotic guidance
- improved stock management
- reduction in pharmacy costs.

Organisations also reported a range of improvements as a result of implementing the programme, these have been categorised into the following areas:

- data collection and measurement of performance
- organisation and standardisation of theatre equipment and consumables
- team working and communication
- efficiency

Examples from each categories are shown overleaf.

Organisation and standardisation of theatre equipment and consumables

Gateshead Health NHS Foundation Trust: Reduced two theatre drug stores to just one saving over £17,000; with an additional £22,000 saving through reductions in Paracetamol IV and oral Paracetamol by restricting the use of costly anaesthetic gas Sevoflurane.

North Tees and Hartlepool NHS Foundation Trust: Saved £65,000 by returning unwanted stock from five theatre utility rooms.

Data collection and measurement of performance

Information boards such as Operational Status at a Glance board, the Vision board, and Knowing How We are Doing board, have all created a high level of understanding and ownership of both the operational and improvement work in theatres. Ultimately, staff are now able to see the value of the work and time that they have invested in the programme.

Efficiency

Organisations have adopted a range of solutions to improve their processes to increase efficiency such as:

- staggering lunch breaks to ensure the continuity of patient flow through theatres
- designated theatre co-ordinator to manage the theatre list every day and mitigate issues as they arise, provide updates on progress to other teams along the patient pathway
- standardised tools for handovers between teams along the patient pathway
- walking patients to theatre (as opposed to being transported by trolley) to save portering time
- implementing a prospective session planning tool, which tracks session usage, and helps improve scheduling.

Team working and communication

The implementation of team briefing and debriefing has emphasised the importance of having team discussions and opportunities to talk about the processes in departments. Increases have been seen in:

- Staff briefing rates
- Safety attitude scores

Staff wellbeing has also been improved as reflected by staff appraisals and sickness levels.

Improvements in staff engagement have also been seen.

Lessons learned

The evaluation of The Productive Operating Theatre programme (NHS Institute, 2013) found a number of useful lessons learned, including:

- Benefits realisation: At programme initiation, establish a clear understanding of the benefit opportunity open to the organisation. This process will not only provide purpose and direction to the programme, but also provide confidence in the potential return on investment, ensuring the business case is more robust from the outset.
- Organisations identified several issues with their 'traditional' working practices and the culture in which they operate. These have now to varying degrees been addressed and improvements have been made through the implementation of programme. These issues fell into three main categories:
 - co-ordination of processes
 - cultural issues (e.g. communication across different teams/professionals and staff empowerment)
 - accountability.
- Tailor programmes: "One organisation suggested that different professional groups should have different levels of engagement in each of the modules for it to succeed, for example, a surgeon may not need to be involved in changes made to a store room, through the Well Organised Theatre module, but would play a key role in the implementation of briefing and debriefing in the theatre, featured in the Team-working module. "
- Long term quality of care strategy rather than short term financial gains: The evidence demonstrated that successful organisations employed a clear vision achieved with staff, which was communicated and articulated to all staff, and became the driver for change in the organisation.
- The principles underpinning the programme are applicable to all clinical specialities including obstetrics and endoscopy. However, the sequence of the modules needs to be tailored to the individual priorities of the organisation. The pace of implementation across the organisation is based on several criteria:
 - the ability of stakeholders to embrace change
 - the resources available, specifically staff time
 - the ability to measure the changes
 - access to programme management skills
 - improvement skills and capabilities of staff to test and implement change
- Organisations experienced a range of challenges with the set up and implementation of the programme in the following areas:
 - clinical engagement
 - change management

- differing healthcare systems
- financial and human resources.
- Clinicians played a vital role in the programme's success. However this does not necessarily involve additional time commitment. Clinicians used their time creatively being advocates for change, influencing colleagues and being willing to test and develop new ways of working, much of which can be built into the daily work so their additional time commitment can be much less than expected
- The Executive Lead must dedicate sufficient time to lead the steering group, be an advocate for the programme with Board colleagues, and make time to be visible to staff in theatres to actively support the programme.
- Often the initial financial outlay is recouped in the early stages of the programme through implementation of the Well Organised Theatre module. It was recognised that particularly in the current financial climate, when resources are limited, organisations need to demonstrate the impact of the programme on performance. The best way to achieve this is to be clear as an organisation at the start of the programme about the benefit opportunity that the programme is required to deliver. Understanding the benefits prior to launching the programme helped organisations focus their resources more effectively, and helped build a case for additional resources if required.

Critical Success Factors

The Productive Operating Theatre incorporated the six key factors essential to success and sustainability identified during the initial evaluation of London trusts participating in The Productive Ward – 'Releasing Time to Care' programme:

1. Leadership engagement - *the ability to demonstrate visible executive leadership to encourage and empower operational staff to deliver the programme.*
2. Strategic alignment - *establish and cascade a clear link between the strategic objectives of the organisation and the aims of The Productive Operating Theatre programme, encouraging staff at all levels to drive the relevant change that supports and delivers the organisations objectives.*
3. Governance- *clarify the expectations of the board to include taking an active role in the operation of a robust governance mechanism. This will provide clear visibility of the progress and outcomes of the programme and the means to resolve issues where senior intervention is required.*
4. Measurement - *engage staff in collecting and owning appropriate measures and actively analysing and responding to changes in measurements, in order to ensure that processes and metrics continue at a desired pace.*
5. Capability and learning - *develop staff knowledge and skills to change the work processes and coach others; grow a shared knowledge across the organisations and nationally.*

6. Resourcing - *ensure that staff have adequate time to dedicate to The Productive Operating Theatre, with support resource committed to delivering capability and learning.*

In addition to the critical success factors identified by The Productive Ward programme The Productive Operating Theatre recognise the importance of clinical engagement as a necessary seventh component; “primarily, unlike The Productive Ward, which focused on one staff group – nurses, the focus for The Productive Operating Theatre was multi- professional including surgeons, anaesthetists, theatre practitioners, as well as administrative staff and porters. True clinical engagement and multi professional groups working together towards a common goal, was proved to be a necessary component in successful organisations”.

7. Clinical engagement - *establish positive partnerships between clinician's and managers at all levels within the organisation. Clinical leadership and participation is actively sought to initiate, test and sustain a culture of continuous improvement.*

Daycase surgery

The NHS Institute (2008) Quality and Service Improvement Tool ‘Treat day surgery as the norm for elective surgery’ high impact change states “Switching to day case supports the national imperative of giving patients more choice and reducing waiting times. There are enormous benefits in adopting this approach. There is clear evidence to show that patients who have day surgery have an overall better experience, improved clinical outcomes and less risk of hospital acquired infections.”

In a proposed new model for planned care provision in south west London (Better Service Better Value, 2012) the Planned Care Clinical Working Group agrees that day-surgery should be the default, and admission as the exception. The model shows that the majority of elective surgical care should take place in one of three settings: a day surgery unit, an elective surgery centre and in a major acute or specialist centres, anticipating that the majority of elective spells will occur as day cases in their current location. The remaining care will be broadly split into equal proportions and occur in an elective centre/centres and in major acute/specialist centres.

The report states that “the benefits of consolidating day case surgery from more than one hospital on the elective surgery centre site whilst still providing good local access to day surgery across south west London should be considered as part of the overall development of options for acute services in south west London. This might apply to the more difficult procedures as they are moved from an inpatient to a day-case setting, or where expensive capital equipment is needed” (Better Service Better Value, 2012).

Payment by Results Guidance for 2013/14 includes ‘best practice’ tariffs (BPTs) exist to encourage hospitals to shift from inpatient to day case surgery for six specialties: Urology,

Gynaecology, Breast Surgery, Orthopaedic, General Surgery, and Ear, Nose and Throat. The procedures selected for BPTs come from the third edition of British Association of Day Surgery (BADS) directory of procedures, with some revisions following the update to fourth edition in 2012. They are high volume, and have day case rates that vary significantly between providers and are nationally below the BADS rates.

Shifting Outpatient Care

From the lessons from South East London reconfiguring hospital services state that there is an urgent need to develop new models of out-of-hospital care that aim to keep patients out of hospital for longer, however Palmer (2011) argues that shifting non-admitting hospital services into non-hospital settings should be subject to rigorous review as re-providing services in the same way in non-hospital settings is unlikely to improve quality or reduce costs and suggests an alternative model of care “The proposals to shift care out of hospital are unlikely to improve the quality of outpatient care or bring about the planned sharp reduction in the growth of hospital admissions. Given the projected excess estate in hospitals, it would be more cost-effective and probably result in higher quality care if increased intermediate care bed capacity and outpatient services were located in ‘voids’ within existing hospital sites.”

A scoping review of research into strategies for improving outpatient effectiveness and efficiency (Roland et al, 2006) looked at approaches to reduce waiting times for specialist care using alternatives to outpatient treatment. The review focused on four broad strategies:

- **Transfer:** The substitution of services delivered by hospital clinicians for services delivered by primary care clinicians. This included: minor surgery, diabetes care, GPs with special interests (GPSIs), discharge from outpatient follow-up, and direct access for GPs to hospital tests and services.
- **Relocation:** Shifting the venue of specialist care from outpatient clinics to primary care without changing the people who deliver the service. This included: shifted outpatient clinics, telemedicine (as a ‘virtual’ form of relocation); and attachment of specialists to primary care teams.
- **Liaison:** Joint working between specialists and primary care practitioners to provide care to individual patients. This included shared care and consultation liaison.
- **Professional behaviour change:** Interventions intended to change the referral behaviour of primary care practitioners, including referral guidelines, audit and feedback, education and financial incentives.

The review found that there was a dearth of high-quality research for any one intervention, making it risky to draw firm conclusions; however the authors concluded that findings broadly suggest that transfer and professional behaviour change are generally effective strategies for reducing outpatient demand, whereas relocation and liaison are largely ineffective.

A summary of the interventions reviewed:

	Effective	Promising (merits further Investigation)	Uncertain or low quality
Transfer to primary care	<ul style="list-style-type: none"> Discharge of outpatients to: (i) no follow-up, (ii) patient-initiated follow-up, or (iii) general practice follow-up, as alternatives to routine follow-up in hospital outpatient clinics Direct access for GPs to: (i) hospital-based diagnostic tests and investigations or (ii) hospital-provided treatments, without the prior approval of a specialist in an outpatient clinic 	<ul style="list-style-type: none"> GPSIs acting as substitutes for outpatient specialists Transfer of medical care for common chronic conditions from secondary to primary care 	<ul style="list-style-type: none"> Transfer to primary care: Minor surgery (report decrements to the quality of care)
Professional behaviour change	<ul style="list-style-type: none"> Structured referral sheets that prompt GPs to conduct any necessary pre-referral tests or treatments Educational outreach by specialists 	<ul style="list-style-type: none"> 'In-house' second opinion prior to referral 	<ul style="list-style-type: none"> Passive dissemination of referral guidelines; audit and feedback of referral rates Discussion of referral behaviour with an independent medical advisor
Relocation to primary care settings	<ul style="list-style-type: none"> Attachment of physiotherapists to primary care teams 		<ul style="list-style-type: none"> Shifted outpatient clinic Telemedicine Attachment of mental health and epilepsy to primary care teams
Liaison with primary care			<ul style="list-style-type: none"> Shared care Consultation liaison

An earlier review produced by Central Midlands CSU, 'Diabetes Integrated Models of Care: A rapid review of the literature' (Aldridge S, 2014) explored integrated models of care for diabetes focusing on what type of diabetes care can safely be delivered out of hospital and as close to home as possible. The review found a number of UK integrated models of care for

diabetes including models in Bexley, Derby, Portsmouth and North West London have reported improvements in health and increased patient satisfaction.

The organisation of specialist services is dependent on local demographics, facilities and staff skills (Diabetes UK, 2010). Each CCG will have their own local providers with their own strengths however recently models have started to emerge defining specialist care; the Portsmouth 'Super Six' model defines six clear areas identified locally that need to be under the auspices of an acute trust with all other care in primary care with specialist input providing a comprehensive advisory/support service to primary care. The 'super six' was deciphered locally by identifying which areas of diabetes needed to be under specialist care either owing to the multidisciplinary nature of clinics, such as antenatal diabetes clinics, or in areas where expertise was beyond dispute, such as the use of insulin pumps (Kar, 2012).

Specialists have two distinct roles; the super specialist and the educator as a support mechanism for primary care (Kar, 2012). The Portsmouth 'Super 6' model includes:

1. Inpatient diabetes
2. Antenatal diabetes
3. Diabetic foot care
4. Diabetic nephropathy (individuals on dialysis or with progressive decline or renal function)
5. Insulin pumps
6. Type 1 diabetes (individuals with poor control or young people).

This is a model that has been adopted by CCG's such as Bromley CCG (2013), or adapted such as Leicester CCG (2013) who have proposed a model based on a 'Super Seven' having the same 6 components and the addition of 'complex and rare' patients:

1. Inpatient care
2. Insulin pumps
3. Renal
4. Foot
5. Children/adolescents
6. Pregnancy
7. Complex and rare

A study by Findlay et al (2013) undertaking a service audit of the reasons for type 2 diabetics remaining in secondary care clinics in Addenbrooke's Hospital diabetes service suggested the following reasons to be valid for remaining in the specialist clinic:

- Poor glycaemic control: most recent HbA1c before annual review >64mmol/mol (8%) – taken as the local criterion for poor glycaemic control

- Nephropathy: chronic kidney disease stage 3 or greater but not microalbuminuria alone
- Patients being treated with incretin mimetic
- Other medical problems: where they affected diabetes, such as any requiring steroids, organ transplantation or undergoing chemotherapy
- Lipid problems: where there had been communication with a specialist lipidologist or had a specific diagnosis, e.g. hypertriglyceridaemia
- Hypoglycaemia: if the patient had suffered with hypoglycaemia needing rescue or frequent hypoglycaemic episodes
- Active treatment ongoing: where a drug was added or removed during the last 2 consultations or the dose of a drug was changed at the annual review
- Obesity: where it was identified by the doctor writing the letter as a significant problem needing specialist management
- Blood pressure: where the doctor writing the letter specifically highlighted it as a problem needing specialist management
- Foot problems: where foot lesions or amputations were mentioned or the patient was identified as having 'at risk feet'
- Patient choice: where it is recorded that the patient wishes to continue to come to the clinic
- Patients with type 2 diabetes who were planning pregnancy generally remain in the service if one of the above criteria are in place – to date, few others have been referred to the service.

However the authors recognise that the role of secondary care could be considered to deal with diabetes emergencies and provide outpatient intensive interventions for patients with suboptimal control only and note the following limitations of the suggested criteria:

- Patients with chronic kidney disease stage 3 alone, obese patients, patients on an injectable incretin without (or even with) insulin and those who only have poorly controlled hypertension could well be appropriate for discharge
- Patients with an elevated HbA1c which is not improving under specialist care might also be appropriate for discharge, or at least discussion with the patient and general practice team.

Many patients with insulin-treated type 2 diabetes have an HbA1c that is inadequate and has not changed for many years despite attempts at interventions by specialist teams. They often attend hospital clinics only once or twice a year, so any effective interventions at these visits is unlikely.

Diagnosics

Diagnostic services, in particular blood sciences and imaging, are key to timely diagnosis and monitoring of treatment. Diagnostics are often highlighted as a bottleneck in the patient pathways as speed of clinical investigation and clinical decision making depends upon diagnostic services and thus poor availability of these services can lead delays elsewhere in the system. Diagnostic services rely on a number of staff to deliver timely services; any changes to diagnostic services require coordination of a number of staff, including phlebotomists, porters, and laboratory technician staff, which requires an understanding of the role each person plays in achieving patient flow improvements. The Health Foundation report, *Improving Patient Flow* (2013), cites how co-ordinated changes in working patterns for phlebotomist, porters, and laboratory technician staff at South Warwickshire Foundation NHS Trust increased the number of same-day blood test results available on ward rounds from less than 15% to over 80%; phlebotomist working hours changed to coincide with end of the nursing handover. Changes to the portering routine enabled two porters to 'shuttle' between the phlebotomist and the laboratory, delivering small quantities of blood samples in real time. One laboratory technician changed their working day to start at 8.00am and finish earlier in the afternoon laboratory enabling staff to process blood samples as they came in.

The *Atlas of Variation in Diagnostic Services* (NHS Right Care, 2013) highlights variations in diagnostics services and is a useful tool for clinicians and commissioners as it aims to encourage questions to understand if the variations are unwarranted. The report acknowledges that it is difficult to establish the 'right' rate of testing, as tests can be performed for more than one reason, such as making a diagnosis and excluding a diagnosis. However it is important to consider whether variation rates reflect over or under use of resource as both can have negative consequences for the patient. The under-use of diagnostic tests may result in a delay in treatment, the establishment of inappropriate treatment, or the limitation of treatment to options for behaviour change only. However over-resourcing can increase the risk of harm.

'Digital First: Clinical Transformation through Pathology Innovation' is a newly published report by NHS England (2014). The report recognises that complete care pathways need to be understood in order for improvements to be made; "Delivering real improvements for patients means that clinicians, service managers and commissioners must identify the opportunities for improvement in care pathways. Key to this is understanding the roles and interplay between different clinical specialties and services, and how to maximise the value of those elements to the whole and remove or redesign parts of the system that do not add value". The report goes on to highlight that pathology services have a key role in the care pathway; Pathology's relevance to delivering better outcomes is due to its role throughout pathways, and not just at the point of diagnosis – 95% of clinical pathways rely on patients having access to efficient, timely and cost- effective pathology services".

The 'Digital First' report showcases innovation in the use of digital systems and processes used in pathology across the country to improve service delivery, patient safety and communication, among other things. Examples include:

- Transformative infrastructure – e.g. The National Pathology Exchange (NPEx), Virtual pathology, and Integrated management of test results
- Sharing information to improve patient care- e.g. Electronic referrals and sharing of electronic health records
- Supporting patient self-management – e.g. Renal PatientView project
- Business intelligence in pathology – e.g. Using information to improve services and outcomes
- Safer sample management – e.g. Managing samples from end-to-end with automatic identification, and RFID supports HTA compliance.

Benefits delivered from these service enhancements include:

- People feeling more in control of their health through better access to test results
- Multi-disciplinary teams having timely information and specialist advice to enable better treatment planning
- Better workflows between wards and labs to improve turnaround times and improve patient care
- Better identification and management of samples to enhance patient convenience and safety and reduce the cost impact of re-testing

NHS England (2014) state that the use of digital technologies enables opportunities to create patient-centred pathways; [“Once data is available digitally, it opens up huge opportunities to redesign process-driven services to create patient-centric care systems. Digitally enabled laboratory medicine services have the potential to bring pathologists closer to patients and so to speed up and improve the patient experience”](#).

NHS England (2014) suggest a future model that could assist in creating patient-centred pathways. By making appropriate test results reports available to the patient electronically (by email or text), at the same time as their GPs unnecessary loops in the patient's care pathway could be removed. Furthermore, the test report process could trigger further action within a pathway, where a diagnostic rule could show that this was appropriate, without the GP having to initiate it. Examples include:

- positive cervical smear generating a colposcopy appointment
- positive BNP result generating an ECHO cardiogram appointment
- positive calprotectin result generating a colonoscopy appointment
- positive Chlamydia or pre-op MRSA test triggering a prescription for an appropriate antibiotic

Communication with GPs would be triggered at the same time, whether they need to be involved with the next step in diagnosis or treatment, but it would cut down on delays and costs in the pathway caused by the need for every action to go back through the GP before further action could be taken.

The report (NHS England, 2014) points out that consideration would have to be given to the type of test being reported, and to making the commentary more understandable for non-experts, and there will have to be safeguards in terms of how information was presented to the patient e.g. in the case of a positive screening for serious conditions such as cancer, for example, the patient should still be informed by the GP, but with an appointment for further investigation already offered.

A series of case studies to support the delivery of high quality and effective diagnostic services is available in the NHS Improvement – Diagnostics archives (<http://webarchive.nationalarchives.gov.uk/20130221101407/http://improvement.nhs.uk/diagnostics/>). These case studies are referenced in NHS England's 'Digital First' report (2014): "In its recent review of blood sciences, NHS Innovation cited a number of case studies where simple process improvements around the collection, processing and reporting of blood samples in a hospital setting made a significant impact on other areas, such as patient safety in the operating theatre (by improving the availability of Group and Screen results prior to surgery) and to length of stay. Conversely, in one "before" case the misaligned timing of sample collection and analysis in relation to ward rounds had turned what should have been a 38 hour stay in hospital into an eight-day stay for one patient".

Discharge Planning

The evidence base is supportive of the impact of discharge planning on avoiding admissions but there is the risk of readmissions when associated with hospital at home care. There are a number of reviews of discharge planning, including several focused on specific patient populations.

The Future Hospitals report (Future Hospitals Commission, 2013) recommends increased collaboration to facilitate discharge with planning starting at the first consultant review. This should result in a provisional transfer of care plan communicated to patients and carers within 24 hours of admission, with discharge pathways functioning 7 days of the week. This should include a provisional discharge date as well as outlining how clinical and support needs are to be met and how deterioration is to be managed. This would require transition planning to be incorporated into daily ward rounds and reviews. Integration is needed to ensure support services are in place as soon as the acute bed is no longer required; hospital-delivered specialist care should continue in the community particularly for patients experiencing exacerbations of

long term conditions or frail elderly patients. Inadequate integration and collaboration leads to avoidable admissions.

The vision outlined in the Future Hospitals report would envisage admission as only one step in a “smooth and efficient” pathway starting and ending at the patient’s usual place of residence. Home-based care, for example, intravenous antibiotics, subcutaneous therapy and nebulised treatments, should be offered. The report outlines an ambulatory emergency care facility which could handle further diagnostic and medical needs, on a day case or hospital-at-home model. Functional ability would be monitored by physiotherapists and occupational therapists in the patient’s usual place of residence, to give a truer picture of ability to cope.

What has been shown from the evidence base

Purdy (2010) reports a positive association between structured discharge planning and unplanned hospital admissions, in particular the use of individualised discharge plans, quoting a Cochrane review from 2010 which found re-admissions to hospital were significantly reduced by around 15 per cent for patients allocated to structured individualised discharge planning.

This Cochrane Review has since been updated (Shepperd et al, 2013) and concludes: "[The evidence suggests that a discharge plan tailored to the individual patient probably brings about reductions in hospital length of stay and readmission rates for older people admitted to hospital with a medical condition.](#)"

The Department of Health (2010) provides guidance on discharge and transfer planning, outlining 10 steps, operating principles and organisational enablers. The guidance suggests organisations should consider:

- Monitoring patient flow including causes, length and types of delays
- Reviewing the reimbursement notification procedure
- Reviewing discharge policies and protocols
- Providing patient information
- Scheduling ward rounds to enable daily senior clinical review
- Providing tests and treatments seven days a week
- Enabling nurses and allied health professionals to take on more responsibility for the discharge process
- Assessing the needs and preferences of those who are approaching the end of their life and do not wish to die in hospital.
- Developing a corporate approach to discharge practice training

A meta review of systematic reviews (Mistiaen, 2007) of discharge interventions for adult populations found that discharge planning worked most effectively as part of a package of care and when discharge planning and discharge support are combined; the reviewers concluded

that evidence seems to support a reduction in readmissions but is limited as to effect on length of stay and health care use after discharge.

This is supported by Scott (2010) who reviewed 7 systematic reviews of a range of discharge interventions: "With the exception of intense self-management and transition coaching of high-risk patients, and nurse home visits and telephonic support for patients with heart failure, single-component interventions were ineffective in reducing readmissions. Multicomponent interventions demonstrated evidence of benefit in reducing readmissions by as much as 28%, with best results achieved in populations of older patients and those with heart failure".

Rennke et al (2013) concluded that there is some evidence to suggest that "bridging interventions" (which combine pre and post discharge interventions) could be effective in reducing readmissions.

Hall et al (2012) report a case study from Australia. They conclude: "Assuming the best case scenario, the Transition Care Programme is still unlikely to be cost saving to a healthcare system. Hence for this service to be justified, additional health benefits such as quality of life improvements need to be taken into account. If it can be demonstrated that this service also conveys additional quality of life improvements, community-based programmes such as Transition Care could be considered to be cost effective when compared with other healthcare programmes."

Winkel et al (2008) conducted a systematic review of 8 randomised controlled trials on early discharge and home rehabilitation for stroke patients. The authors concluded that early discharge and home rehabilitation can reduce length of stay and potentially improve activities of daily living but the analysis did not support a reduction in readmissions or subsequent service use.

Ali and Rasmussen (2004) conducted a review of the evidence (39 papers representing 25 studies) on the interface between hospitals and community services. They found the evidence at that time to be mixed, with some studies reporting benefits and others reporting poorer outcomes. They concluded that the most effective interventions were: programmes to reduce falls; discharge planning to reduce readmissions; case management models. The review found Hospital at Home to have similar outcomes to standard inpatient care. The evidence regarding nurse-led units and disease management was ambiguous.

Hyde et al (2000) conducted a systematic review of 9 controlled studies to analyse the effectiveness of supported discharge for older people with undifferentiated clinical problems after an acute admission. Outcome measures included: mortality, functional status, satisfaction, institutionalisation and hospitalisation. There were mixed findings in relation to hospitalisation, with some showing positive effects and others negative effects. More patients receiving supported discharge remained at home at followup and there were no significant differences in

mortality. There were high losses in followup which invalidated findings relating to functional status; patient and carer satisfaction were measured but considered invalid due to lack of validation.

Variations in practice

Greene et al (2008) describe the use of information leaflets for patients describing how supported discharge will work covering practicalities such as time of discharge. The authors also describe a central office base to manage patient flow, which has also piloted an electronic referrals system. Three bed pressure meetings are held each day with a clear process in place to alert community teams should a patient's discharge be delayed.

A number of studies point to the following variations:

- Timing and duration of follow up of patients.
- Intensity and frequency of patient contacts.
- Differences in local services and running costs impacts on potential savings.
- Availability of hospital at home services - not all are 24-hour.
- Eligibility criteria used to select patients for early discharge and hospital at home.
- Link up of assisted discharge with pulmonary rehabilitation programmes and patient education.
- Different combinations within multi-component interventions.
- Facilitator of discharge and transitional interventions.

Key lessons

- Individualised discharge planning is more effective than routine discharge care (Shepperd et al, 2013).
- Discharge planning works more effectively within a package of care and when combined with discharge support (Mistiaen, 2007).
- Multi-component interventions have been found to reduce readmissions by up to 28% (Scott, 2010).
- Ali and Rasmussen (2004) suggest focus could shift towards more screening and prevention.
- Clear strategies are needed for managing follow up and post discharge in high risk patients.
- Communication between clinicians and across settings of care is critical.

Critical success factors

Scott (2010) points to the following key critical success factors:

- early assessment of discharge needs
- enhanced patient (and care-giver) education and counselling with a view to self management

- robust and timely communication between clinicians and across settings
- early follow-up and post-discharge phone calls/home visits for high-risk patients
- appropriate referral for home care and community support services when needed

Ali and Rasmussen (2004) suggest collaborative, interdisciplinary and multidisciplinary working and comprehensive geriatric assessment are critical to improving patient outcomes.

Limitations and comments on the quality of evidence

- "The impact of discharge planning on mortality, health outcomes and cost remains uncertain" (Shepperd et al, 2013).
- There is limited evidence on length of stay and health service use post discharge (Mistiaen, 2007).
- There is limited data on the effectiveness of discharge planning in elderly populations.
- There is limited evidence on the impact of discharge planning for adult mental health patients.
- Inadequate sample sizes and underpowered trials make it hard to draw robust conclusions from many studies.
- There is considerable variation in definitions of what constitutes discharge planning or transitional care.

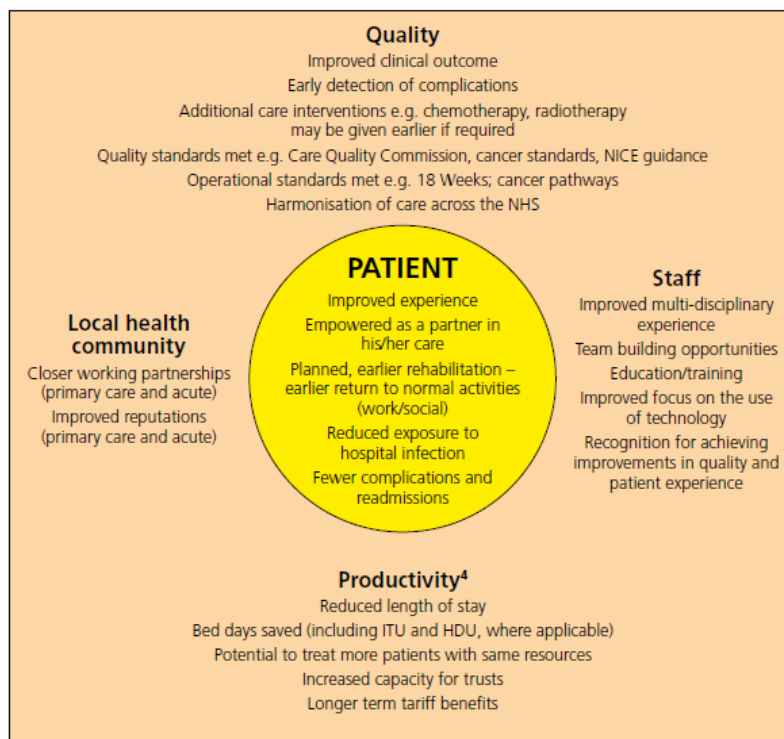
Enhanced recovery

Enhanced recovery has been promoted widely within the NHS, with a national programme from 2009-2011 (Enhanced Recovery Partnership Programme) and a signed consensus statement in 2013 from various professional bodies. There are now numerous studies and reviews on enhanced recovery and increasing examples of implementation but the evidence base remains patchy. The concept of enhanced recovery originates from colorectal surgery in Denmark (Kehlet and Wilmore, 2008) and many of the studies focus on this speciality.

An evidence review (Almoudaris et al, 2010) from the Enhanced Recovery Partnership Programme (ERPP) suggests a range of benefits can be realized, including:

- Improved multidisciplinary working
- Reduced nursing workload
- Use of new technologies
- Improved patient satisfaction
- Early mobilization
- Reduction of “surgical stress”

This is expanded further in guidance issued during the programme (ERPP, 2010):



There are a number of studies, synthesized most recently in an NIHR-funded review (Paton et al, 2014a, 2014b). Much of the evidence stems from colorectal surgery, understandable given

its origin, suggesting a reduction in length of stay by 0.5 days compared to conventional care, with no significant difference in readmissions or mortality. The findings in relation to patient experience and quality of life are less clear, due to limitations explained below. The ERPP programme focused on four surgical specialties; colorectal, gynaecology, musculoskeletal and urology. A recent report from NHS IQ (2013) notes that enhanced recovery initiatives are now being seen in maternity and acute care.

The role of the patient is key to the implementation of enhanced recovery. The ERPP (2010) programme emphasise the involvement and empowerment of patients, through education and shared decision making, thus forming a “contract of care”. This is echoed in the Future Hospitals report (Future Hospitals Commission, 2013): "[Where possible patients must take an active role and take responsibility for enhancing their recovery, which includes paying attention to nutrition, hydration and mobility from the start of an inpatient journey.](#)" The responsibilities of patients should be clarified at all stages: pre admission (e.g. stopping smoking); during admission; and post discharge. Roberts and Fenech (2010) suggest this can increase patient confidence. NHS IQ (2013) also note the alignment with NICE Quality Standards on patient experience.

NHS IQ (2013) suggest pathways should follow the 5 Ps:

- Primary care “fitness for referral” to manage risks
- Patient involvement to encourage shared decision making
- Prehabilitation, assessment and care planning
- Pain relief, fluid management and anaesthetics
- Preparation for discharge

The pathway featured in the ERPP programme incorporates:

- **Referral from primary care.** Roberts and Fenech (2010) discuss the role of the GP in identifying risks (e.g. anaemia, obesity, smoking, diabetic control) and referring patients to relevant programmes (e.g. smoking cessation, weight loss). ERPP (2010) also notes the importance of self management (our recent evidence briefing on self management is available) and the use of risk tools such as the Risk Assessment and Prediction Tool (RAPT).
- **Pre-operative assessment and preparation.** Roberts and Fenech (2010) describe the need for resource management in ensuring appropriate staff (e.g. nurse, consultant anaesthesiologist, diagnostic services) are available at the appropriate points of assessment, investigation, review and care planning. ERPP (2010) recommends traffic light triage systems to confirm risk criteria; the level of risk determines who should lead the assessment. For example, a low risk patient may be assessed by a nurse; higher risk patients would require involvement of anaesthetists. The Association of Surgeons of

Great Britain and Ireland (2009) note the importance of both written and verbal information for patients which should promote an understanding of enhanced recovery, what it means for them individually, what they can expect and instructions/targets regarding mobilisation, diet and stoma care, where appropriate.

- **Admission.** The ERPP (2010) guidance recognises the increase in day of surgery admission in recent years. Other important factors include appropriate nutrition and hydration. The ERPP guidance also highlights the need for bed management, to avoid delays and cancellations. A case study from Colchester discusses the establishment of an elective care centre; patients are admitted directly to the elective centre early in the day.
- **Intra-operative management.**
- **Post-operative management.** The Association of Surgeons of Great Britain and Ireland (2009) recommend that patients are helped to mobilise on the evening of the surgery and that continuous education is provided to ensure the benefits of early mobilisation are clearly understood. The guidance also notes some evidence to suggest avoidance of bedside entertainment systems can encourage mobilisation. ERPP (2010) suggests the use of eating areas to encourage patients to return to normal diet quickly. Roberts and Fenech (2010) stress that discharge planning should start early in the process and the expected length of stay identified before admission.
- **Follow-up.** The Association of Surgeons of Great Britain and Ireland (2009) suggest more intensive follow up may be required for elderly patients or those with multiple comorbidities. This may take the form of telephone calls or home visits. This supports the need for early discharge planning to ensure connection with primary and social care and to ensure timely support. ERPP (2010) notes the need for clear discharge criteria.

In their forthcoming review, Paton et al (2014b) include a summary and appraisal of 10 economic evaluations of enhanced recovery. The evaluations suggest that programmes achieving lower lengths of stay are cost saving and do not impact negatively on complications, readmissions or quality of life; however, the authors caution that the evaluations are based on relatively low quality research. Paton et al (2014a) sum up the implications for the implementation of enhanced recovery:

"The extent to which managers and clinicians considering implementing enhanced recovery programmes can realise reductions and cost savings will therefore depend on length of stays achieved under their existing care pathway. [...] Consideration of potential benefit also needs to take account of the costs of service redesign, the resource use associated with programmes of this nature, the potential for improvement in patient outcomes and the impact on equity of access".

Variations in practice

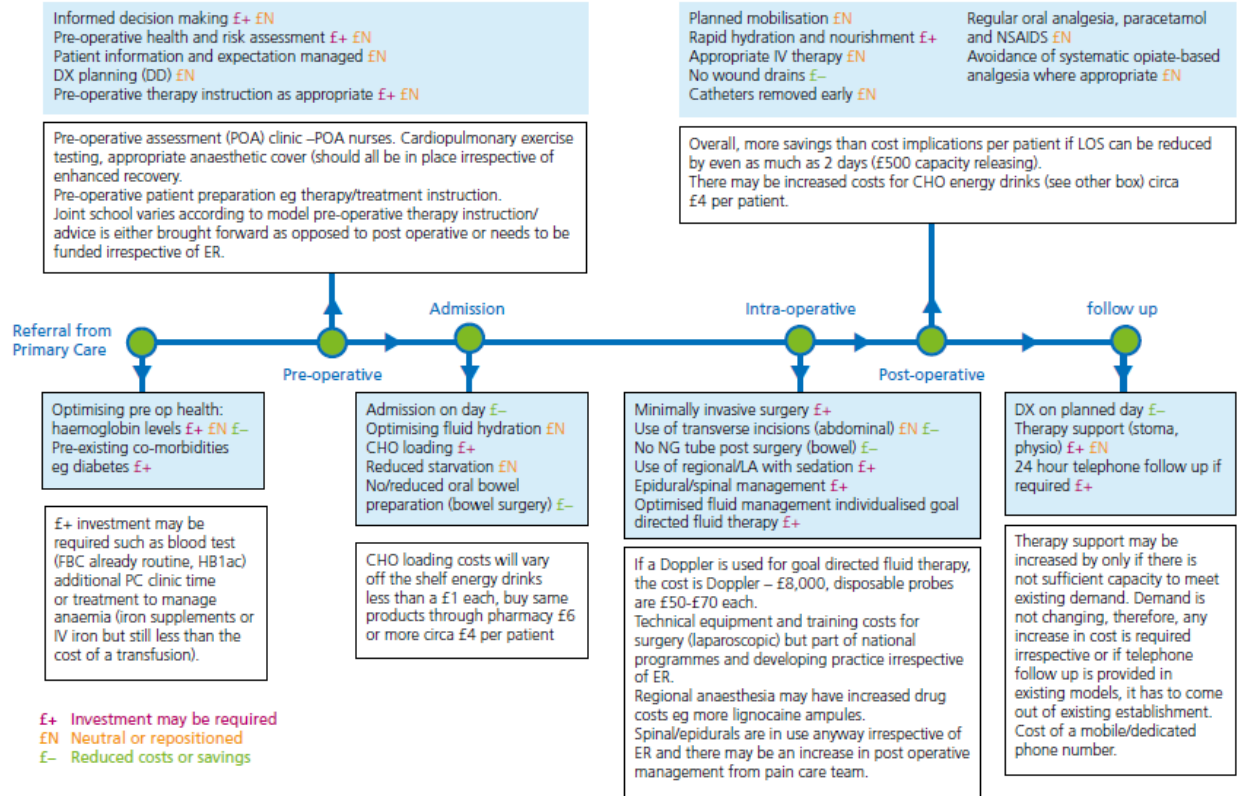
- 14 innovation sites were set up as part of the ERPP; each site set up programmes in one or more of these specialties. 10 of the innovation sites report a reduction in length of stay; however, not all provide evidence and there is no indication if this change was sustained over time (Paton et al, 2014b).
- Paton et al (2014a, 2014b) note that the content and implementation of enhanced recovery programmes varies considerably between and within specialties; the systematic reviews evaluated show variation in the number of elements comprising enhanced recovery programmes, varying between 4 and 14 elements. The elements most typically present in programmes were pre-operative patient information and early postoperative nutrition/mobilisation.
- Paton et al (2014b) point to the differences in surgical techniques used in the various trials reported, some focusing on open surgery, some on laparoscopic and some covering both. This is consistent with the findings of the ASERNIP-S review in 2009.
- Paton et al (2014b) comment on the variations in discharge criteria and protocols in use across the various trials and implementations reported in the literature. All patients were required to be mobile before discharge; however, other criteria varied including: ability to take oral fluids, ability to eat, free of analgesia.
- Paton et al (2014a, 2014b) note the differences in the definitions and reporting of outcome measures in the various trials and studies; for example, definitions of mobility included “safe ambulation” and “time to complete mobilization”, making it difficult to compare study findings and generalize conclusions. There was similar variation in the definition of morbidity.

Lessons learned

- Knott et al (2012) comment that enhanced recovery offers improved outcomes in length of stay, morbidity in the elderly, earlier mobilization and reduced pain scores.
- The ERPP programme (2010) reports on results from innovation sites, including Hillingdon Hospitals NHS Trust which saved 638 bed days (the case study does not state over what period of time) and secured £223,300 financial savings, through its programme for hip and knee replacements. Components of the programme included: education, pain management, pre-admission discharge planning and avoidance of surgical drains.
- Barriers to the successful implementation of enhanced recovery include (Paton et al, 2014b):
 - Resistance to change from staff and patients
 - Financial pressures/lack of funding
 - Lack of support
 - Staff turnover

- Poor standardization and documentation
 - Lack of space for training and team meetings
- ASERNIP-S (2009) comment on views expressed in the literature and local surgeons on the “considerable learning curve when implementing a fast-track program” and suggest an association between surgeon experience and patient outcomes.
- Paton et al (2014b) suggest that “[integration with social care will also impact on overall gains](#)”.
- Knott et al (2012) report on a Delphi study to achieve consensus on emerging technologies in enhanced recovery; participants agreed the following technologies would likely have greatest impact: recent developments in regional analgesia, increased use of intraoperative monitoring for fluid management and cardiopulmonary exercise testing.
- Identification of risk (and associated systems and processes) is an important theme emerging from the literature. NHS Improving Quality (2013) emphasizes the need for systems for GPs to assess fitness for referral and for pre-hospital risk stratification, and linked to this the need to clearly communicate risks to patients. Paton et al (2014b) highlights the need for clear criteria to identify patients who can benefit from enhanced recovery and who may be at risk of delayed discharge.
- Follow up procedures at 6 of the ERPP innovation sites included telephone advice for patients, it is suggested this may help reduce impact on GPs and could potentially help to limit readmissions (Paton et al, 2014b).
- From a patient perspective, the evidence is relatively limited (and of low quality); however, it appears patients value the ability to recover at home, preoperative preparation and postoperative support. Negative comments included: getting advice following discharge, feeling vulnerable in the event of post-discharge complications and added pressure on carers (Paton et al, 2014b). The review also comments on the potential impact on equity/parity of access should programmes focus on patients who are independent and without comorbidity.
- Realisation of benefits may take time to allow for learning to be applied and embedded (Department of Health, 2011)
- ERPP (2010) share the following learning in terms of investment and savings:

Enhanced recovery pathway illustrating which elements may/may not require investment and examples of potential investment and savings



Critical success factors

- Understanding the current service (ERPP, 2010)
- Clinical champions (Knott et al, 2012; Paton et al, 2014b; Department of Health, 2011; Association of Surgeons of Great Britain and Ireland, 2009)
- Dedicated project lead/nurse/facilitator (Knott et al, 2012; Paton, 2014a)
- Multidisciplinary approach (Department of Health, 2011; Paton et al, 2014a; Association of Surgeons of Great Britain and Ireland, 2009)
- Identifying clearly who is involved in the whole pathway (ERPP, 2010)
- Continuing education for staff and patients (Paton et al, 2014a; Association of Surgeons of Great Britain and Ireland, 2009)
- Involving patients (Department of Health, 2011)
- Stakeholder engagement (ERPP, 2010)
- Specialised wards or units (Association of Surgeons of Great Britain and Ireland, 2009)
- Front loading the week in the absence of 24/7 elective surgery (NHS IQ, 2013; Paton et al, 2014a)
- Perioperative information for patients (Paton et al, 2014b)

- Standardized procedures (Paton et al, 2014b)
- Safety and quality are seen as organizational priorities (Department of Health, 2011)
- Commitment to change (Paton et al, 2014b)
- Effective use of incentives e.g CQUIN, best practice tariff with a plan for sustaining beyond the incentive (Department of Health, 2011)
- Measurement of process and outcome (Department of Health, 2011)
- Audit and research (Association of Surgeons of Great Britain and Ireland, 2009)

Limitations and comments on the quality of evidence

- Paton et al (2014a) comment that some of the components of early enhanced recovery programmes could now be considered standard good practice therefore making it difficult to synthesise and apply evidence over time. They also note that the research to date does not make it clear which components of enhanced recovery offer the most benefit.
- Paton et al (2014a) found that much of the evidence base relates to colorectal surgery and there seems to be wider variation in length of stay for other specialties. This suggests greater uncertainty as to the impact; however, it is acknowledged that the evidence is very limited. This is consistent with the findings in the 2009 ASERNIP-S review. It is unclear how much of what has been learned in colorectal surgery is transferrable to other specialties. There is variation as to the outcomes reported – readmissions is reported in most studies; however, there is a lack of evidence on pain management, use of resources and reintervention rates. There is also inconsistency as to how length of stay is defined, with some studies failing to differentiate between primary and total length of stay (thus unclear if readmission is included) which may have skewed some results. The authors also note that the impact of surgical experience and volumes has not been explored sufficiently in the literature. Patient experience is reported but is based on poor quality research (the authors recommend the use of validated tools).
- Paton et al (2014a) note some caution on the quality of existing trials - most are relatively small (mostly less than 100 participants), based in a single centre and exclude patients with complexities or comorbidities which may affect their length of stay. Paton et al (2014b) note that most trials selected patients with “independent daily lifestyles”. The review also found that where discharges are delayed, there is very limited information as to reasons why: e.g. postoperative complications; operational factors (e.g. working hours); access to social care; patient confidence.
- Paton et al (2014b) question the impact of enhanced recovery if length of stay for elective surgery is already reducing – the key message for planners is to understand their starting point and model potential benefits.
- ASERNIP-S (2009) questions if the risk of transferring costs to primary care and social care have been addressed sufficiently in existing studies. Much of the research does report on

readmissions but there is a lack of evidence on involvement of or impact on GPs, social workers etc.

- Many of the studies included in the reviews we found typically follow up within 30 days, to identify complications and readmissions. For outcomes such as mobilization and quality of life, it could be argued that a further follow up at a later interval could offer valuable insight.
- ASERNIP-S (2009) notes that the reported reductions in length of stay could be attributable to how care is organized rather than a shorter recovery and questions if postoperative benefits may be due to positive goals agreed at the outset with patients.
- There is a lack of evidence relating to compliance and fidelity with enhanced recovery programmes (Paton et al, 2014a).

Information and technology

The Future Hospital report (Future Health Commission, 2013) proposes that hospitals start offering the same technology that patients now expect from other aspects of their healthcare or lives - for example, the ability to view their summary records, book appointments, receive reminders, report monitoring results and check test results. Use of text and email, and in particular recognising the increasing use of mobile devices (including apps), is recommended. It is acknowledged that use of technology (e.g. remote monitoring) and dissemination of information to provide support in the community could help to avoid admissions or attendances in hospital. The report mentions virtual clinics and ward rounds, using technology such as Skype.

The report emphasises the importance of information, as near to real-time as possible, to deliver improved models of care for patients, noting that "absence of information on the patient's usual health status and level of dependency can lead to a decision to admit when alternatives to admission (such as rehabilitation in the community or enhanced social support) would have met the patient's requirements more effectively and safely". Clinical data systems are seen as critical to effectiveness and efficiency, contributing to improved performance, audit, improved outcomes and improved quality and safety. Real time information on bed and clinical capacity is highlighted as important. The report acknowledges the role of Chief Clinical Information Officer who will help to link IT projects, clinical requirements and patient care, acting as the hospital's "information champion". The report notes the importance of service line management and reporting, reliant on robust information, but dependent on alignment of resources between elective and non-elective services. Improved access to information is needed not just for clinical care and service delivery - it is also critical for patients to support shared decision making.

The report proposes a model including a Clinical Coordination Centre:

"The Clinical Coordination Centre (CCC) will be the physical area from which all hospital and associated community care is coordinated for all patients with active clinical needs that fall within the remit of the organisation. The Clinical Coordination Centre should be part of a suite of rooms in the Acute Care Hub – including a room of sufficient size to accommodate the medical and other clinical staff attending transfer of care meetings twice a day, 7 days a week.

The Clinical Coordination Centre will have monitors available to access electronic patient records, standard clinical referral, diagnostic and management protocols for all commonly encountered patient groups, on integrated care pathways. Access to this information should also be available in clinical areas throughout the hospital.

The Clinical Coordination Centre will have display facilities, upon which the electronic health record of all patients may be accessed and displayed during multidisciplinary team meetings. Other data systems will include those showing the location of all patients in the hospital, details of their admission and transfers of care in real time. Electronic access to the AEC centre and rapid access clinic booking systems, and those of relevant diagnostics, specialty and generalist (acute medicine, (general) internal medicine) clinics should be accessible within the Clinical Coordination Centre.

For inpatients, measurement devices linked to a central clinical control system will be in place, enabling the remote monitoring of the patient location and their status (eg National Early Warning System), on a 24/7 basis, with immediate response by staff to predefined clinical triggers. The information collected will also support more efficient and complete monitoring of adherence to bundles of care, serious untoward incidents and near misses, enabling trends to be identified early. Quality and safety will be monitored in real time and combined with information from serious untoward incidents, near misses and patient feedback. Although not the primary purpose, an additional benefit of such a system of monitoring would be to alert staff to the presence of a patient who may qualify for inclusion in a clinical trial.

Data for community services (intermediate care, rehabilitation etc) and social/domiciliary care will be displayed, as will interim or care home bed capacity. Within the Clinical Coordination Centre, telemonitoring, telephone and email helplines for patients and professionals will be staffed 7 days a week and linked where appropriate with primary care, providing support and advice for both patients and professionals. Responsibility for care will thus be shared between patients and practitioners in hospital and primary care, and continuously supported by a virtual dialogue.

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