The King's Fund

Ideas that change health care

Digital change in health and social care

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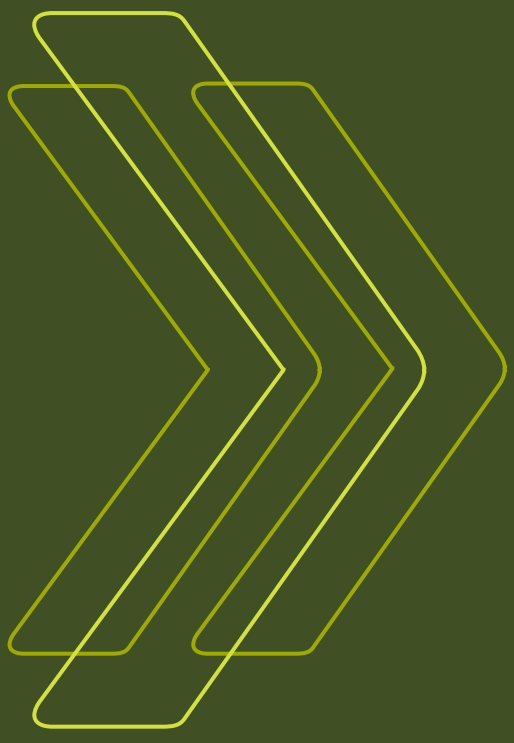

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1 Introduction

The health and social care sector is struggling to come to terms with increasing demand due to demographic and other changes and decreasing growth in funding. The arrival of new technologies offers opportunities to transform services so that they are better able to cope with these pressures. Furthermore, providers and commissioners of care are looking for ways of using digital technology to plan services better, provide more informed care at the point of delivery and keep records more secure.

There is a widely held belief that the health and social care system struggles to manage change involving digital technology. This belief is driven by events such as the National Programme for IT (NPfIT), a £10 billion-plus investment in digitising the records of every patient in the NHS, which ended up achieving a fraction of the original vision; the impact of the WannaCry cyber-attack on NHS services in May 2017; or the age of much of the software or hardware being used across England, for example. The Secretary of State for Health and Social Care, Jeremy Hunt, has emphasised that any ten-year plan will require the NHS to become 'massively more teched up' (Lintern 2018). However, numerous trusts and care providers around the country are already progressing towards more digitised care and record-keeping, both technically advanced organisations that form part of the Global Digital Exemplar (GDE) programme and organisations outside of it.

This report aims to support health and social care organisations that are looking to undertake large-scale digital change, no matter what their current level of technological advancement. It offers a practical understanding of the factors that contribute to successful large-scale digital change by bringing together the experiences of five case study sites that have already made significant progress towards achieving their change aims. Although we frame this report in terms of 'digital change', it is important to note that for many of the people we spoke to for this research, this was a clinical change process, not specifically a digital one.

When we refer to 'large-scale digital change' throughout this report, we mean a change process that involves a large number of staff and that requires them to significantly change how they perform their roles. One example is the

implementation of an electronic patient record (EPR), which enables the way services are delivered to be changed using telemedicine or monitoring technology or introducing mobile working for staff. Our case studies have already completed such changes, and some are now completely digital across all specialties in their hospital or community settings. Smaller, in-team innovations are not covered by this report.

Attempts at large-scale digital change have often faltered for a number of reasons. First, care services are under severe pressure across the country at the moment, and putting into place new, disruptive working processes has introduced a new series of risks and challenges for trusts to deal with. Furthermore, some organisations have struggled to find the resources needed to implement digital technology, given the cost typically involved in buying the necessary hardware or software. Some organisations have found it difficult to make the cultural changes needed as they have struggled to engage their end users, while others have had problems with partner organisations both inside and outside the public sector. Organisational memory can also be an issue: some providers have not undergone large-scale change in such a long time that they no longer have that experience in-house anymore.

We were unable to find any distinct large-scale digital change examples in the social care sector, although some of our case studies do include interviews with social care professionals and we present as much information on the sector as possible throughout the report. We therefore focus more on examples in the NHS.

The case studies we present in this report faced their own unique set of challenges in making digital change happen. But they also developed their own solutions and give hope that large-scale digital change programmes can succeed in the NHS.

Section 2 examines the evidence behind digital technologies as well as lessons for successfully implementing and managing digital change. Section 3 onwards is our contribution to this evidence base, starting with a summary of our methodology and what is happening in each of the case study sites. Section 4 describes the key themes in our findings in relation to factors that can make or break digital change. Section 5 concludes the report.

2 What is the evidence about managing digital change?

How is digital change different from other kinds of change?

There is a wealth of evidence on managing the change process, with many different theories on the best way to deliver successful change in health and care. Our recent report *Transformational change in health and care* tells some insightful and innovative stories about how this can be achieved outside of digital change (Dougall *et al* 2018). This report found that successful transformational change involves an organic approach to change and takes time to engage staff and communities.

Large-scale change management literature often views technology as a technical problem in a wider change management programme (NHS England 2018). Meanwhile, digital change literature emphasises the complex nature of some types of technology. Greenhalgh and colleagues list several complex challenges that technological implementation throws up, including privacy and interoperability issues, resistance from users with a lot of autonomy, and disruption to complex clinical workflows (Greenhalgh *et al* 2017).

What do we know about managing digital change?

The Wachter review of health technology (the Wachter Review), which set the tone for current national NHS digital policy, looked at technological change through this lens. It relied heavily on a theoretical change framework popularised by Ronald Heifetz in fields outside of health care information technology (IT) (Wachter 2016; Heifetz and Laurie 2001). The review urged those undertaking digital projects to view the change process as both 'adaptive' and 'technical'. Adaptive change is change that relies on human behaviour for its success. It cannot be planned out in easy steps and it involves a significant amount of finding one's own way. Technical change, on the other hand, is where change can be planned out and the results of changes are easily predictable. Technology can easily be mistaken for a type of technical change, as technology is technical, but in reality it interacts with people in a multitude of ways and is therefore adaptive.

The Wachter Review's change model can be viewed in the context of the NPfIT – a programme for digitising the NHS that closed in 2011. Although some elements of NPfIT were delivered, major parts of it suffered from critical problems. The review found that the implementation of the programme was hampered by too many technical solutions to problems that were inherently adaptive. Other evaluations of NPfIT back up this assessment, finding that the programme had been over-centralised, with too much focus on contracts and not enough on people (**Campion-Awwad *et al* 2014**).

As already noted, the Wachter Review urged both national and local leaders to view digital technology as both a technical and an adaptive change. National strategy should focus on support and fostering information sharing, through the GDE programme (*see* below). Local organisations should undertake long-term engagement with users on the front line to listen to their concerns and make the necessary changes to the technology.

The Global Digital Exemplar programme

The Department of Health and NHS England accepted the Wachter Review's recommendations for how to digitise NHS providers, particularly the goal of supporting them to go paperless (**Department of Health 2016**). They announced that an initial group of acute trusts had been awarded what they called Global Digital Exemplar (GDE) status and would receive matched funding of £10 million each for their digital projects. Each GDE would then be partnered with 'fast follower' trusts, which would also receive funding to participate in the next wave of digitisation.

The GDEs are now receiving their funding. It is expected that they will evaluate and share their learning through a 'blueprinting' process, where they partner with less digitised trusts to help them implement technology following the exemplar's model. The programme has been expanded beyond acute sector organisations to include three ambulance trust GDEs and seven mental health trust GDEs.

In March 2018, local areas were invited to bid for another programme of match-funded Local Health and Care Record Exemplars (known as LHCREs) (**Hoeksma 2018**). At the time of writing, potential sites were submitting bids for the LHCRE money.

Wachter's recommended route to digital change is just one way of enacting change, however. The experience of digitising primary care in England suggests that heavy

financial incentives are another way to instigate change. GPs were given these and general practice in England is now virtually entirely digitised, with GPs having choice over which systems they use. A national initiative, GP Systems of Choice, meant that for most practices there was no cost for digitising (Wachter 2016).

The 'productivity paradox' is a suggested reason for the benefits mentioned in the introduction being largely unrealised. The productivity paradox refers to the phenomenon of an absence of efficiency gains accompanying widespread digitisation, at least as we measure them with traditional indicators (Brynjolfsson and Hitt 1998). Along with other factors, the productivity paradox adds further complexity to digital change projects, and helps to make the case that they should involve adaptive changes built on a set of technical changes.

If we are to view digital change as adaptive as well as technical, there is a question about the best way to share lessons about digital change with others who are looking to begin their own digital change journey. The next subsection examines some of the evidence about how to scale and share implementations of digital change.

What do we know about scaling and sharing digital change?

The NHS finds spreading innovation challenging. A recent report by The King's Fund found that the fragmentation of the English NHS makes it hard to share what works (Collins 2018). Local leadership from providers, with devolved responsibility from commissioners, is seen as a key way of overcoming some of this fragmentation, minimising the competing interests in health care systems.

Research into the diffusion of innovation in the United States (US) found nine essential strategies for effectively spreading a large-scale system transformation (McCannon and McKethan 2013).

- Develop aims that are clear and make the criteria of failure obvious, while also setting expectations from timeframes.
- Introduce a variety of incentives for adopting the new model, which reflect the diversity of interests in the workforce.
- Support staff in the midst of a large-scale change by removing barriers that arise during the scaling.

- Focus on the people who are affected by the change, whether it be patients or staff, and adapt the change accordingly.
- Invest in change management and bring clinicians into the fold of large, complex changes.
- Test innovations while they are being scaled up and make adjustments according to this testing.
- Find ways of collecting data on the impact of the innovation and then use this to improve it, and empower local leaders to understand and react to the data.
- Use formative evaluation to understand how contextual and organisational factors may be affecting the implementation of the innovation. Be comfortable with some levels of uncertainty that contextual issues introduce to an evaluation.
- Invest in understanding new methods for spreading learning and best practice.

These principles for the general diffusion of innovation are well researched. There is a weaker evidence base for what makes for effective sharing specifically in the digital sense. So those involved in the GDE programme, for example, will need to disseminate how they implemented digital change successfully if others are to learn from their experiences.

One review, in a specifically digital context, found that the length of time to realise benefits, the distribution of benefits across a fragmented health care system, a lack of interoperability and the lack of conclusive evidence all hinder diffusion (**Clark and Goodwin 2010**).

Stories and case studies can be a helpful way of conveying positive and negative learning from technological implementations, in a way other evidence does not do adequately. An analysis of EPR case studies has found that they are generally of a high quality (Gill and Borycki 2017).

Linked to learning from real-life examples, rigorous evaluation is also important, McLellan (**Health Service Journal and University of Birmingham 2012**) argues that it is the best way to learn from the success and failure of national programmes. And it is important not only for learning lessons about the internal workings of a particular IT project, but also for externally setting the terms for projects undertaken by others in the future.

Despite a consensus in the literature about staff needing to feel ownership of change, a tension between top-down and bottom-up approaches is always present, one that is not well explored in the literature. Eason and colleagues discuss the benefits of 'middle-out' (as opposed to top-down or bottom-up) approaches to programmes of technology (Eason *et al* 2012). This approach maintains local ownership while setting national standards and frameworks. This is particularly relevant when thinking about the move from a top-down approach in NPfIT to the middle-out approach for the GDE programme.

The next subsection looks at what we can learn from different successes in digital change and how some places have managed the complexity of digital implementations.

What are the lessons from doing digital change?

The literature is in agreement that implementation of large-scale digital change is challenging and frequently fails (Eason *et al* 2012). However, lessons can be drawn from where projects have been successfully implemented.

Successful digital implementation

A Commonwealth Fund study looked at how nine leading hospitals in the US had used EPRs to improve quality and efficiency (Silow-Carroll *et al* 2012). It identified six challenges to the successful implementation of EPRs and the realisation of benefits of the new system, and the solutions to each challenge that the hospitals offered, as shown in Table 1.

Table 1 Challenges to the successful implementation of electronic patient records and solutions to them

Challenge	Solution(s)	Detail
Achieving clinician ownership	Have forceful and realistic leaders Involve clinical staff in design and implementation	Buy-in is a key challenge to avert undesirable clinician behaviours. Leaders should set targets for their staff, but also demonstrate that they understand the challenges. Clinical staff feedback should be actively solicited and taken on board.
Training	Invest in training and make it mandatory	Successful implementation requires IT-focused clinicians to bridge conversations. Training should be prioritised financially and made a necessity for all staff.
Improving performance	Redesign care pathways Embed care standards in EPRs (for example, checklists)	Using the EPR to drive improvements in quality and efficiency is a key challenge. The EPR provides an opportunity to reconsider how practice around the patient record can improve, making the most out of the technology's capabilities. Avoiding variability in how the EPR is used is important for this.
Making the most out of EPRs for reporting performance	Aggregate performance data Actively involve quality improvement teams in developing EPRs	Limitations in the EPR's ability to generate useful reports may be encountered. However, this could be avoided by involving audit and quality improvement teams in the design of the EPR to make sure the right data is collected.
Money and time	Keep to an implementation plan	Strategies are required to rigorously understand the costs and timescales for the EPR. Strict adherence to timelines whilst leaving some flexibility in the schedule are ways to keep to budget. Evaluation is then key to ensure that benefits are being properly recorded.
Having clinicians make the most out of EPRs	Modify the technology to encourage appropriate use	Systems must be made as easy for staff to use as possible, while still providing value. Identifying undesirable shortcuts and then working to modify the technology to adapt to this way of working is challenging, but must be done to realise the full benefits of the EPR.

Source: Adapted from Silow-Carroll *et al* 2012

The study found that following these guidelines and after successful implementation, the hospitals experienced improved quality, reduced length of stays and better returns on investment. The researchers note that EPRs should build on an existing culture of quality improvement, involving performance monitoring, goal setting and accountability chains.

Work by Greenhalgh and colleagues has found that 'bridge' professionals (people who hold boundary-spanning roles) can act as translators between different professional 'worlds' – for example, the clinical and the technical – and can make implementation more likely to be successful (**Greenhalgh *et al* 2008**).

A study in 2010 looked at the successful application of technologies in six countries of the Organisation for Economic Co-operation and Development (not including Britain) and found that when implemented well, the technologies improved quality and efficiency and supported new models of care (**Organisation for Economic Co-operation and Development 2010**).

Recent evidence from outside the academic literature comes from the NHS. Five 'vanguard' sites shared the following lessons with NHS Providers about successful change involving technology (**NHS Providers 2017**).

- Focus on user engagement built on user-centred design principles.
- Conceptualise technologies as tools that complement rather than replace staff.
- Embrace large-scale change over pilots despite the challenges that scale brings.

International evidence on technologies beyond electronic records helps here too. The US Veterans Health Administration succeeded in deploying telehealth at an unprecedented scale because it committed to a new model of care supported by the technology, but this took time and investment, and fundamental process redesign throughout the organisation (**Cruickshank 2012**). An international systematic review of m-health (mobile health, such as text message contact with professionals) found that the technology had to be seen as useful and easy for staff to use, and staff had to be given extra support to use it (Gagnon *et al* 2016).

Barriers to successful digital change

While the successes written up in the literature are mainly – although not exclusively – to be found outside England, there are many lessons about doing implementation better that can be drawn from the struggles that the NHS has had in the past.

Barriers to the successful implementation of health technology identified in the literature include a lack of interoperability in a concentrated market, resistance towards digital adoption, and perceived usability and support among patients (Bunn and Crane 2016). Another review found a lack of implementation experience and accountability (Llewellyn *et al* 2014).

Greenhalgh and colleagues have found that technology projects tend to assume that issues are **complicated,** rather than **complex** (Greenhalgh *et al* 2017). A complicated issue is one that may be difficult, but is essentially predictable, while a complex issue is one that is dynamic and emergent. This distinction (originally from the change literature) is helpful for understanding where adoption fails. A project team may understand the scale of the task, but perhaps not the complexity of it.

Understanding studies of the effectiveness of digital technologies

This subsection looks at the evidence on the proposed benefits of digital technology. Finding conclusive evidence of the benefits is difficult. Things are complicated by the fact that some studies may be evaluating an imperfect implementation, while others may be highlighting a problem with the technology itself. Technology is also being adapted and changed constantly and so the solution and its use within an organisation at the start of an evaluation can potentially be very different at the end of it.

Evidence on electronic patient records

What are electronic patient records?

Electronic patient records (EPRs) in the NHS refer to electronic systems for bringing together clinical and administrative data about hospital patients in a single place. In this way, EPRs partly support the national goal for organisations to go paperless.

The benefits of EPRs are about more than just getting rid of paper, however. They hold data about patients in a more useable, digital format, making it easier to be shared instantly. The NHS England test bed in Greater Manchester, for example, is using information held in a digital format to create risk stratification tools to monitor, plan and provide services for patients with long-term conditions (Galea *et al* 2017).

Staff at University Hospitals Bristol NHS Foundation Trust are able to record monitoring information entirely on mobile devices, eliminating the need to note the information on paper in most departments (Ford 2018). Clinicians use the software to monitor whether important checks have been performed in a timely manner and remind staff if not. So reminders and alerts can be built into EPRs to support the work of clinicians.

There are few high-quality studies that have looked to quantitatively define the effectiveness and efficiency of EPRs. One major review of systematic reviews commissioned to support the evaluation of NPfIT looked at several different types of technologies, one of which was EPRs (Black *et al* 2011). Most of the studies found weak to moderate evidence of EPRs improving efficiency. Other metrics linked with safety, such as accessibility and legibility, also showed weak to moderate evidence of benefits. The review also found that technology policy in health care tended to focus on benefits without acknowledging risks and downsides. In terms of downsides, there was weak evidence that EPRs increased time and costs, and that patients felt disengaged while an EPR is used. However, the review noted that evidence on both the benefits and risks was largely 'anecdotal'.

A European Commission-funded research project found that benefits outweighed costs in every case study of EPR implementation. However, getting to the break-even point took a very long time and varied by site. It took the quickest four years, but the slowest nine (European Commission, Information Society and Media 2009). This

finding reflects the theme in the digital change and implementation literature about the lengthy timescales needed for the realisation of benefits.

Evidence on shared care records

What is a shared care record?

Shared care records are being developed in some areas of England to enable clinicians to share patient records across care settings. Sharing information in digital records can sometimes be constrained by the ability of organisations' computer programs to 'talk' effectively to one another – a characteristic known as 'interoperability'. A shared care record, sometimes called a 'health information exchange', sits on top of the systems to act as a translator between different proprietary records.

One example of such technology is the Hampshire Care and Health Information Exchange (CHIE), a shared care record containing key information from hospital, primary care, community health and social care records (**CHIE undated**). The shared record is available across all participating organisations at any time to anyone given access to both the record itself and the relevant fields within it. Staff can find out what services the individual they are seeing uses, as well as the staff involved in their care.

Another example is the national summary care record, which is an electronic record of important basic information from the patient's GP record that is available to authorised staff in other health and care settings (**NHS Digital undated**).

More local shared care records, with more detail than the summary care record, are likely to emerge over the next few months and years. NHS England and NHS Digital are supporting such systems through the Local Health and Care Record Exemplar programme (**Hoeksma 2018**).

As electronic records were historically developed and adopted in separate health organisations in England, there has been a growing focus on how sharing data across settings can realise additional benefits, such as supporting integrated care. Very little evidence currently exists on the new generation of shared care records that many areas in England are now developing. There is, however, some evidence on other kinds of record-sharing schemes.

The summary care record is a national information-sharing project that, as already noted, pulls limited information from the patient's GP records into other settings such as acute care. It has taken many years to become widely operational and somewhat used. An early evaluation of the summary care record found that it was rarely used and its impact on safety and improved co-ordination of care remained unknown, but that there were opportunities to improve consultation quality (**Greenhalgh *et al* 2008**).

Another area of focus here is sharing with social care. The Local Government Association highlights several areas where health records are being linked with social care (**Local Government Association and Institute of Public Care 2016**). While many of these data-sharing projects are in their early stages, anticipated benefits include:

- effective risk management for children in care
- reduced separate visits to recipients of social care from health and care professionals
- efficiency cost savings.

Historic underinvestment in the evaluation of NHS IT contributes to the lack of high-quality evidence about new and emerging record-sharing technologies. However, a report by The King's Fund found that poor information sharing was part of the problem in realising the benefits of accountable care organisations in the US (**Smithson *et al* 2014**).

As we start to move towards place-based care through the creation of integrated care systems, organisations will need access to information from multiple service areas in a single source, to generate relevant data for planning and research purposes (**Evans 2017**). Further investment and work is needed to make sure that the data is fit for these purposes.

Evidence on communication technologies

What are communication technologies?

Communication technologies allow patients to interact with the health service remotely. Videoconsulting technology, such as Skype, is one example and another is patients being monitored through smartphones combined with portable diagnostic equipment or sensors.

At Airedale NHS Foundation Trust, patients are able to benefit from a Digital Care Hub service, which provides e-consultations across a large, mostly rural region (**Airedale NHS Foundation Trust undated**). This could be anything from monitoring a patient's condition to the provision of mental health counselling services or a GP appointment via video link.

Milton Keynes University Hospital NHS Foundation Trust (**Milton Keynes University Hospital NHS Foundation Trust 2018**) has just launched a new smartphone-based appointment management service, whereby patients are able to reschedule or cancel appointments with the trust's dermatology service on their phone and in the future will be able to book earlier slots vacated by other patients.

As well as being convenient for patients, proponents of these technologies hope that they will allow for a more efficient use of clinicians' time and resources. This might be through effectively triaging patients who would otherwise come in for an appointment or by making the appointment booking system more streamlined, reducing the number of empty appointment slots.

Communication technologies cover a wide range of different points of patient interaction with the health service. Some of these, such as appointment booking systems for hospitals, are relatively new and lack evidence. Conversely, telehealth, telemedicine and digital triage services are among the most evidence-rich areas of digital technology.

The Whole System Demonstrator (WSD) was the largest randomised controlled trial of telehealth in the world, commissioned by the Department of Health. The telehealth technologies that were used were picked by each site included in the trial, and not standardised. Researchers found that the WSD intervention was associated with lower mortality and small reductions in emergency admissions (Steventon *et al* 2012). However, small positive differences in the intervention

were very expensive, with a cost-effectiveness study finding that each additional quality-adjusted life year (QALY) gained cost £92,000.

The WSD programme again illustrates the potential tensions between digital implementation and effectiveness research. A qualitative study highlighted that the need for evolution and adaptation in a complex intervention like the WSD is often at odds with the need for robust evidence on benefits (Hendy *et al* 2012). In other words, if users of a technology are to evolve and find their own way of making use of the technology, this can disrupt efforts to fully and quickly measure and realise benefits.

A more recent trial of telephone triage in primary care found no evidence to demonstrate that it led to cost savings or reduced admissions in secondary care (Newbould *et al* 2017). Patient experience of the service was found to be mixed: it improved for some measures, such as time to be seen, but it slightly reduced in other areas. However, the research found that, across the 107 GP practices involved in the study, the telehealth solution had been implemented in very different ways and that patients seemed to respond differently depending on the practice. The technology allowed some practices to much more effectively cope with demand, while other practices became overwhelmed by the increased patient activity. This nuance highlights the complexity of technological change, and how it is not possible to implement a one-size-fits-all solution.

'Telephone-first' consultations have given way to newer and more up-to-date technologies, utilising e-consultations and digital triage systems. Many of these communication technologies are too new to have been evaluated. But an early trial of one implementation of e-consultations across 36 practices found low uptake, particularly at the weekend (Edwards *et al* 2017). It also found a small likelihood that e-consultation would lead to increased costs and workload in primary care.

As the telehealth trials indicate, a rapid assessment of these technologies has proved challenging. Technology advances more quickly than research trials, and often more quickly than smaller evaluations. This brings various challenges in maintaining an up-to-date evidence base that reflects the technology that is actually being used. A specific challenge that we highlighted earlier is the tension between adapting a digital change to a specific context and robustly researching the change in a generalisable way.

What do effectiveness studies tell us about managing digital change?

Studies in telehealth make for particularly challenging reading for innovators looking to use technology to improve the quality, efficiency and experience of care. However, effectiveness studies present a challenge in each of the major large-scale digital technologies in this section.

The evidence about large-scale digital change projects demonstrates that getting the implementation right is subject to complex, long-term challenges that are not resolved easily. This means that it is difficult to prove the effectiveness of technology, as studies may be testing the implementation of technology, rather than the technology itself. If we view digital change as inherently adaptive, it means that there will rarely be a perfect, static state for trials to test – the practice that surrounds the technology will be evolving and changing in response.

This report does not attempt to look at the effectiveness of technology. Instead, it chronicles the complexity of digital change, and how organisations have adapted and found their own way to implement it that works for them.

3 The case study sites

This section describes the background and characteristics of our case study sites. Initially, we created a shortlist of potential trusts based on the Digital Maturity Assessment, a self-assessment of digital ability that all English providers have completed (NHS England undated). We used this as a starting point for identifying organisations and areas that might have a journey for others to learn from.

From this shortlist, we selected case study sites to represent a spectrum of digital change journeys and based on several criteria. They had to represent:

- a mix of provider types: acute, mental health and place-based providers, including primary, community and social care
- a spread of geography and urbanity
- a mix of organisation sizes: ranging from a small university hospital to providers and commissioners across an area or city.

More important was the large-scale change experience that the areas chosen had gone through, and what had been learnt. In addition, we were keen to interview some GDEs and also other areas that had implemented successful digital change projects. GDEs have received additional funding and support from national bodies, and we wanted to make sure that our report is relevant to any organisation interested in undertaking digital change.

Table 2 gives a summary of the case study sites.

Table 2 Summary of the case study sites

Case study	Type of provider	Examples of large-scale digital change
Liverpool health and social care economy	Place-based	Several paper-free and interoperability programmes GP and community record-sharing and telehealth projects
Essex Partnership University NHS Foundation Trust	Mental health and community trust	EPRs Remote access to therapy Mobile working technology
Cambridge University Hospitals NHS Foundation Trust	Specialist, district general and acute care	EPRs Mobile device record access Medical device integration Barcoding
Berkshire and Frimley	Place-based	Shared care record across health and social care
Homerton University Hospital	District general hospital	EPRs Health information exchange between GPs and the hospital

We held semi-structured interviews between November 2017 and March 2018. We requested interviews with different types of professional in each case study site. Depending on the type of organisation, we interviewed chief executives, chief clinical information officers, chief information officers, commissioners, change managers (people with programme management responsibilities) and frontline staff. We also spoke to a variety of national policy-makers and thought leaders as part of the scoping of the project. Quotes in this report are anonymised and attributed with a broad, non-disclosive category for the interviewee's role.

The Liverpool health and social care economy

The Liverpool health and social care economy has more GDEs in it than most regions in the country have in total, with three trusts having been awarded GDE status. Organisations across the area are coming together to integrate data and better inform practice and patients. Relationships in Liverpool were initially fraught, with competition between different NHS organisations in the city providing

a barrier to those organisations considering their mutual objectives. These relationships have since been turned into co-operative partnerships, working across multiple settings, and have achieved significant strides in digitisation across several local organisations.

Some of the technologies in place within the Liverpool area include its Paper Electronic Notes System (PENS), developed in-house for use by Royal Liverpool and Broadgreen University Hospitals NHS Trust. A single EPR is to be launched across three trusts once the new Royal Liverpool building is complete. The new EPR will extend across Aintree University Hospital NHS Foundation Trust and Liverpool Women's NHS Foundation Trust.

Other digital projects include the following.

- Patients are better monitored both inside and outside hospital settings.
- Sensors and digital whiteboards help keep staff up to date with their patients' status.
- Telehealth schemes are being trialled.
- In-house analytics are helping to improve practice across several settings.

Liverpool's digital journey has progressed significantly through Healthy Liverpool, a wider programme led by the Liverpool Clinical Commissioning Group, which is attempting to improve the health of Liverpool's population by reducing variation and inequalities in health care and creating a sustainable long-term health economy (**Liverpool Clinical Commissioning Group 2015**). The programme has several strategic areas, but after its inception it quickly became a focal point for conversations about how digital technology could improve care across the city.

Different groups were set up to encourage conversation between Liverpool health and social care organisations, including a clinically led advisory group – the Clinical Informatics Advisory Group (CIAG). This group met regularly and the local clinical commissioning group (CCG) attached a Commissioning for Quality and Innovation (CQUIN) payment to encourage attendance. Relationships were frayed initially but the group soon began to lead action on developing technological solutions to the problems that each organisation was having.

One of the first successes of the group was the development of the iLINKS Information Sharing Framework (**iLINKS 2017**), which sets the terms of sharing information, based on the role of the professional. It has created a clear, consistent framework that can be built on as records are shared more widely between organisations in the future.

Some change in Liverpool was top-down and led by senior leaders, but many of its projects have been driven by interested and passionate clinicians, working with colleagues in IT and transformation teams. They have created a more co-operative health economy from a series of strained or difficult relationships, led with flexibility and vision, but this follows years of careful work around a consistent set of values and principles.

Examples of digital technology in use in the Liverpool health and social care economy

- The Royal Liverpool's PENS system is an interim step to the Intersystems EPR. The Royal Liverpool will transfer over to a new EPR when it moves to its new building.
- The Royal Liverpool has several other technologies that have been developed in-house. For example, there are digital whiteboards across the hospital, providing a user-friendly portal for the Patient Administration System and allowing clinical staff to monitor the status of patients in each ward/department in real time and locate patients whose condition may be deteriorating.
- All of the GP practices in the area are running a single system for their records, providing a unified platform from which to draw information for out-of-hospital and local authority services.
- Alder Hey Children's NHS Foundation Trust is leading on a project to enable local EPRs to be fully interoperable, as some providers are on different systems.
- The CCG has piloted telehealth in its GP practices, which has been positively evaluated. It is now extending this further, providing devices to patients in the community to help with remote consultations, alongside the mobile working technology available to community staff. To support this, GPs and community health organisations share records.

Essex Partnership University NHS Foundation Trust

Essex Partnership University NHS Foundation Trust (EPUT) is a community and mental health trust that operates across the whole Essex region following a merger between South Essex Partnership University NHS Foundation Trust and North Essex Partnership University NHS Foundation Trust.

Digital projects are well embedded in the organisation, with electronic records, mobile working and remote access to treatment having been in place for several years in the south-eastern region. The focus of the organisation has been on improving information and safety through technology, and management both at board level and below has been open to change that moves the organisation towards those goals.

EPUT has viewed digital technology as enabling it to move beyond providing services in the same way it has in the past in order to meet potentially difficult national targets, to reduce the burden of administration on clinical staff and to improve the way it plans its services. Many schemes are clinically led by people allowed to develop beyond their traditional role, through support from both the senior management of the trust and their IT department. Staff are encouraged to contribute ideas through the EPUT Lab, a brainstorming and support group for clinicians in the region, with senior trust management attendance, as well as lead on projects based on their passion, drive and clinical ability. The trust has already begun to adjust to the changes brought by the merger, with clinicians from the north Essex region taking on leading roles in the continuing efforts of the new organisation.

The trust has made clear efforts to improve the way it implements technology based on mistakes and issues it has had in the past. It has managed to achieve all of this without GDE funding.

Examples of digital technology in use in the Essex Partnership University NHS Foundation Trust

- The trust is using an online psychological therapies portal to provide remote access to therapy in a more flexible and convenient way to its patients, significantly improving its performance against the national targets for early access to psychological therapy and giving people who may not have otherwise accessed the service a new route towards care.

- The trust has implemented an EPR that is integrated with GP records in the region, creating a much more complete and connected record of each patient's history. This has changed the level of information available not just to clinicians, but to also analysts and service planners. Further features are being added by an in-house development team also responsible for maintaining the system.
- The trust has a health information exchange in place to allow information to flow between the trust, primary care and local authority services, as well as a summary care record allowing information to be brought together from both the northern and southern regions, reducing variation in care and improving access to information.
- Staff have access to mobile working technology, allowing access to records and meetings taking place across the whole region at any time, despite the rurality of much of the area and the geographical spread of the trust.
- The trust is using dictation software to allow clinicians to more easily input data into their patients' records, available in all care settings. This means that less digitally capable staff are to still able to input information quickly and it is stored in a legible format usable by all.

Cambridge University Hospitals NHS Foundation Trust (Addenbrooke's and Rosie Hospital)

Addenbrooke's is a large teaching hospital and leading national centre for specialist treatment. Rosie Hospital is a women's and maternity hospital. Both are part of Cambridge University Hospitals NHS Foundation Trust, a GDE. Before 2014, there had been very little investment in IT. Hardware was out of date and software was disjointed and approaching licence and support expiry. The costs of maintaining an ageing IT infrastructure were not much less than it would cost to update it.

A bid was put together to address both software and hardware issues. New software, primarily Epic's EPR, was procured, which became the first fully integrated EPR in the UK. It incorporates major clinic pathways supporting local, professional and national guidelines, and is compatible with national systems, such as the Spine – the NHS's central information exchange – and the NHS e-Referral Service.

At the same time, the trust's entire IT hardware estate and network was refreshed, which included the replacement of old computers with new ones, the introduction of

mobile and handheld devices such as iPod touches, which were integrated with the trust's Epic system to enable real-time documentation of care at the bedside, and the connection of medical devices in theatres and high dependency and critical care beds.

In total, this 'eHospital' programme was budgeted at £200 million over 10 years.

The partnership between the trust and Epic initially came under media scrutiny due to perceived failures in the 'big bang' approach taken – the system was deployed across all departments in the trust on the same morning. This perception was later exacerbated after the Care Quality Commission (CQC) gave the trust a rating of 'inadequate', which drew attention to the Epic rollout and confusion among staff (Stevens 2017).

In time, initial issues were overcome and the trust was awarded GDE status. The Epic system has now been in place for over three years and clinicians are able to make ongoing changes to the system by logging change requests with the eHospital team. These are then reviewed by clinical and operational teams for each specialty and evaluated by the design authorities to set the priority level.

Examples of digital technology in use across Cambridge University Hospitals NHS Foundation Trust

- Epic is implemented in all specialties across both Addenbrooke's and Rosie Hospital, with fully digitised records in all areas resulting in a 99% reduction in the use of paper patient records. Various elements are integrated with the system, such as the physiological monitors, ventilators and point-of-care testing devices in 40 theatres. A significant number of high dependency and critical care beds are also connected to automatically collect data from these patients and record it in their EPR.
- The trust has set up a care information exchange with West Suffolk NHS Foundation Trust, which uses a different EPR supplier. This allows patient records to be shared digitally between the hospitals when needed.
- The trust's clinicians working in the community or remotely have access to the system through Epic applications compatible with smartphone and tablet devices.

- With GDE funding, the trust is rolling out its MyChart patient portal, which is integrated with the Epic system, giving patients access to their records. It is also piloting a read-only view of its Epic system for GPs through a secure web-based portal to enable integrated primary and secondary health care.
- Nurses have access to a Rover – an iPod touch with Epic installed – as well as more traditional workstations-on-wheels for documenting patient information in the EPR in real time.
- The Rover is also equipped with a barcode-scanning function to scan electronic wristbands to track patients through the hospital, as well as enabling safer prescribing with closed-loop barcode medication administration.

Berkshire and Frimley

Berkshire and Frimley's Connected Care programme operates for around 1.3 million people in the area and was built to enable information sharing across primary, acute, mental health, community and social care services. It involves 18 different health and social care organisations in the area and 135 GP practices, across multiple different systems and records, being brought together into one shared record. The IT system commissioned – CareCentric, supplied by Graphnet – is designed so that the patient's information is accessible from the various different IT systems used across the different organisations and sectors. It affords the professional the ability to see information about the person they are helping that was collected and stored by an organisation elsewhere in the system. The information seen is tailored to each setting and linked to the role of the individual accessing the record, so only relevant information is available to the professional.

The programme to commission the technology solution for sharing care was started by a gathering of CCGs within the area who wanted to start sharing information across their organisational boundaries, with programme boards led mostly by IT professionals/chief information officers from member organisations. The programme is supported by a budget of £10.8 million over five years for the whole of Berkshire West and Frimley ICS areas. The funding comes from various sources, including £600,000 from the Better Care Fund.

For the public, there is an information campaign that goes under the moniker of Share Your Care Berkshire. This has a website and there are materials in

the different settings where the shared care record is live, which explain what information is shared and the organisations involved, how it affects their care and how they can express their preferences about sharing.

At the time we visited the area, the default approach was for professionals to ask patients' permission to look up information about them on the connected care system as they access it in their presence. There is an option for the professional to obtain implied consent to access a patient's record if the patient is not present but the data will be used for the purpose of providing their care, or if the patient is present but is unable to provide consent due to a lack of capacity. The system monitors instances where professionals have done this so it can be audited, to ensure that there is no improper use.

The programme board has a collection of examples where the programme has improved care as the service is rolled out to more and more sets of users in the participant organisations.

Examples of digital technology in use in Berkshire and Frimley

- The CareCentric software is intended to provide interoperability between the various different systems in use across the area by recording a 'snapshot of information', sharing information in near real time (up to 24 hours after a given organisation records it). Previously, tracking down information from other sources would have taken a lot of time on the part of the professional and could have omitted useful information about interactions with the patient elsewhere in the system.
- Information about an individual from these disparate sources is assembled into a profile that can be accessed through a portal on a professional's computer. The method of access can vary depending on the systems in use at the different organisations.
- One plank of the next phase of the programme is to open up patients' information to patients themselves through a patient portal. It is hoped that this will encourage patients to use it as a one-stop shop for their information and enable engagement with patients.

- The other plank is to develop the shared care record with population health analytics capability. This will allow commissioners and others improving services to access the data to develop preventive and proactive services, or redesign care pathways. It will also mean that it will be possible to visualise and analyse one patient's journey through the health system, with all contacts recorded centrally in the data store, so that providers can be prompted to take action on an individual patient or look at population-level flows in more detail.

Homerton University Hospital

Homerton is a teaching hospital in east London with around 500 beds, making it a relatively small general hospital. The Homerton University Hospital Foundation Trust delivers acute and community services to patients across the London Borough of Hackney and the City of London. Although it is not a GDE, the trust has embarked on an extensive programme of work over the past few years, having launched an EPR, implemented voice recognition technology, agreed a plan to launch a health information exchange with access to GP and community records for all parties and integrated records with a local hospice as a first step towards working more closely with its voluntary sector partners.

Although most of the change achieved so far has been focused on acute hospital care, the trust's work with external partners – particularly the ongoing work on the health information exchange and work around the Discovery project (*see* below) – is part of the East London Sustainability and Transformation Partnership (STP). A transformation board brings together leaders from the dozens of organisations involved across the area, particularly important given the mismatch between the STP region, the local digital roadmap and the local authority boundaries. More locally, a Hackney transformation board is supported by an IT enabler board intended to put in place the technical infrastructure to facilitate broader changes in the way services are delivered.

The ambitious Discovery project aims to provide an infrastructure that will permit data exchange across settings. At the moment, datasets tend to be stored in proprietary systems and formats across many different kinds of services. The proposal for this project involves providing a service that can extract and link datasets across varied health and care organisations, with the intention of using the linked data to develop population models that can be applied to planning services

better and making predictions about each individual's health needs. The project is still at the planning stage, but will benefit from what the team at Homerton have already learnt from past experience.

Examples of digital technology in use in Homerton

- A health information exchange has been developed and implemented with partners across local GP practices, acute hospitals, community services, local authorities and voluntary sector providers.
- The EPR in the acute hospital has been upgraded, with an extension of the system to cover many records previously stored on paper, digital bed management and vital signs recording, and an e-prescribing system.
- The phased rollout of digital outpatient communication practices in Homerton Hospital is ongoing, which is focusing in particular on the use of voice recognition technology to enable clinicians to dictate letters to patients, reducing transcription costs and time.

4 Key themes in successful digital change management

This section outlines the five main themes in successful digital change management that emerged from our research: leadership and management, user engagement, information governance, partnerships, and resourcing and skill. For each theme, after we note what it is and why it is so important, we examine the barriers to success that the case study sites encountered, how they overcame them, and how they adapted to the issues and evolved. We give practical examples of the adaptations and present key lessons for others embarking on the same sort of change.

Leadership and management

What is it and why is it important?

We use 'leadership and management' as a grouping term to refer to the actions and principles that senior leaders in the organisations we spoke to used to improve the design and uptake of large-scale digital change in their areas. This includes any intervention made by or requiring the specific involvement of board-level or senior management within an organisation or area, such as project design, programme boards, accountability or the incentivisation of staff, as well as the key values and challenges these people faced in making change happen.

Senior involvement in a programme generates interest and support among key decision-makers inside organisations, and it also sends a message to other staff about the importance the programme holds within the organisation.

The barriers to success

As with any transformational change, one of the biggest obstacles to large-scale digital change is the culture within the organisations involved (Dougall *et al* 2018). All of our case study sites explicitly mentioned several aspects of their culture and ways of working when talking about making change happen.

Different organisations faced different cultural issues. The failure of NPfIT still cast a shadow for a few board members who were suspicious of 'IT projects'. Others had difficulty bringing together multiple organisations into a single project or programme, while still others had a history of competition or mistrust between organisations.

One trust chief executive summed up the anxiety about the NHS's previous attempts at digitisation, specifically NPfIT, and wondered whether resources should be risked – at a time of limited budgets – on projects that they felt could disrupt clinical work.

> *The history for the NHS in developing IT solutions is not great. Look at the NHS programme for IT. I think the worry comes down to: Will we spend a lot of money and not see the benefit we should for that expenditure? And that's a legitimate concern.*
> (Trust chief executive)

Furthermore, even for trusts willing to accept the risks involved with significantly altering the way their organisations worked, it could often be difficult to justify investment purely on the basis of the expected return on those resources, especially when putting together a business case for an EPR, for example.

> *I think it's unrealistic to expect there to be a meaningful return on investment that's purely cash releasing based upon going into an electronic environment within a hospital setting, particularly if that set of return investment calculations doesn't in any way respect or take into account 20 years of no investment whatsoever.*
> (Digital leader)

Senior leaders sometimes felt confused by the language around digital projects, although they often felt that, with time, they could adjust.

> *I think the principles of change are probably the same, I think the management principles of change are probably the same. We have our own language in the NHS and I think the digital language is one of its own… this is a language that's very new to a lot of us… it's about not overwhelming people with a lot of digital speak.*
> (Community mental health service manager)

There are also advantages and disadvantages to the broad range of responsibilities that most directors work with. Often it means that there is a system or organisation-wide perspective on project boards, but there can be confusion and duplication of

effort between projects. In one case study area, the confusion came from some of the internal politics existing within the care system in that area – each organisation felt that they needed to have an individual programme board, rather than a region-wide body controlling decision-making. This created duplication of effort, but also needed separate, private discussion to take place when agreement could not be reached.

> *I have never worked on a project with two project boards... when they went out to procurement it was done through the CSU [Commissioning Support Unit] as a procurement managed properly. But then, in implementation it is implemented as one system, but both areas wanted their own project boards. Within three days we repeat ourselves to both boards. And we have to try and get them to agree. On the rare occasions they have different opinions then we have to deal with it outside the project by getting the chairs of the groups to deal with it outside the meetings.*
> (Information governance lead)

Separate to this, other interorganisational issues can arise from systemic issues. Interviewees mentioned concurrent change programmes that needed to be managed. Examples of this included mergers between organisations, changes in responsibility for services and confusion around STP boundaries and responsibilities.

One example was in Essex Partnership University NHS Foundation Trust (EPUT). EPUT had recently merged with a neighbour, which had attempted to put a digital record in place but had struggled to achieve its initial vision. When the management of the new, merged trust took responsibility for the newly created organisation, it had to redraw its digital plans by bringing together the different systems and project purposes. It chose not to take a path of completely resetting the systems in place and bringing in its own. Instead it is iteratively changing the programmes in use and creating projects that will bring information from across the region together, rather than it being left in separate systems. It also looked for clinicians or staff in the old northern region to take leading positions in project or programme boards.

For others, issues around leadership and responsibility as well as information governance arose when attempting to work at STP level, with the boundary of the STP not matching the local authorities in the region. It is hard to share information when the organisations involved are on different systems, use different clinical models and have different priorities.

Interviewees were broadly pleased that the GDE programme was not another top-down technology project, but equally struggled to understand what level of support or control the centre would be providing. Some were pleased to be left to get on with things, while others mentioned a lack of support, for instance over 'vendor lock-in' and information governance.

> *In fact the whole country's in this position, because EPRs are bubbling up all over the place and what's missing is a bit of top-down instruction from NHSD [NHS Digital] and NHSE [NHS England] saying you need to design your systems like this and if you do it like this it will work. We've tried the top-down control with the [NPfIT] but it feels like there's very little overarching control with how EPRs are being designed.*
>
> (Chief clinical information officer)

How case studies overcame the barriers

These may seem like significant issues, but each site was able to identify and, in most cases, move past each of them.

Use the right leadership and manage relationships carefully

Interviewees talked about their principles of good leadership being dependent on good relationships. This leadership should not be the reserve of any single type of professional. Case study sites spoke about finding the right person to lead each part of the work, even if this meant going outside the organisation for that expertise. Where relationships needed further work before change could take place, some sites set up specific working groups and meetings to keep momentum going. Face-to-face meetings are important in encouraging joint responsibility and keeping relationships healthy.

> *They kept telling us not to put all the clinicians in the room. Every time people said don't do it and we did it. And after the first couple of weeks, by the time you got to the third meeting it was like 'oh okay, these guys are serious, we're going to do things differently'.*
>
> (Commissioner)

Sites also mentioned the importance of technology being given a focal point in wider organisational strategies. Sometimes this was the local digital roadmap or STP. But more important than where digital strategy appeared was how the role of technology was communicated in that strategy.

Healthy Liverpool and the Clinical Informatics Advisory Group

In 2013, local NHS and care organisations set up Healthy Liverpool, which aimed to set out a vision for integrated health and social care in Liverpool, which would attempt to improve some of the outcomes experienced by parts of the population.

The Healthy Liverpool strategy made digital care and innovation a core workstream in its blueprint to 'deliver transformational change' (**Liverpool Clinical Commissioning Group 2015**). This provided digital leaders and innovators in the city with the clout to secure investment for digital change.

The digital strategy did not secure the hearts and minds of everybody though. As noted earlier, the commissioners in Liverpool set up a group to advise on digital and innovation in the city – the Clinical Informatics Advisory Group (CIAG). Relationships were not always positive and it took several meetings before people began to have constructive conversations. The CCG attached a Commissioning for Quality and Innovation (CQUIN) payment to attendance at the CIAG meeting, to give people an incentive to go and ensure that each organisation sent a manager and a clinician along to discussions.

Getting people across the city in a room to discuss the challenges they were facing proved beneficial in the long run. The ethos for these meetings became that attendees' roles should be left at the door – clinicians and managers, no matter what their seniority or number of job titles, should have equal voice. This allowed city-wide problems to be discussed and city-wide, digital solutions to be identified. The CIAG also facilitated a fairer division of labour and a sharing of key lessons learnt. Liverpool Heart and Chest NHS Foundation Trust, for example, was one of the first trusts to go paperless in the country, and it shared at the CIAG what it had learnt when the time came for other organisations to digitise.

Be motivated by the right things and don't expect an immediate cost saving

The motivation of many of the case study sites played a key role in moving past concerns around the potential return on investment of implementing large-scale change: although they knew that there wasn't likely to be a short-term reduction in costs, the potential benefits brought by improved information were too big to ignore. Most of the people we spoke to saw it as part of their job to help their clinicians get better information and to leverage the improved ability to recall patient records they would see from remote working and EPRs to improve patient care.

> *It's primarily aimed at primary care providers, GPs and nurses that work in the community. The idea is that they'll have access to the patient's medical records. The idea is that they'll be able to make more effective decisions about the patient's care. They'll have all of the notes that all of the inpatient doctors have written against the patient when they've been admitted; they'll have a summary of clinic visits. As opposed to asking a poor frail elderly gentleman who doesn't know what drugs he's taking, they can actually go on to the system and see what was prescribed at his last clinic visit. There's a lot of benefits.*
>
> (IT analyst)

> *So, for instance, the investment in the digital dictation, from an end user's point of view, they're able to tape digitally, that's great, that gives them a little bit more time. But actually, that doesn't release any money, it doesn't mean I need less consultants. And yes, they can see more patients, but I don't get paid any more for that.*
>
> (Trust chief executive)

In some areas, the difficulties faced, as the lead party in a programme, around managing the relationships between and with other organisations were among the hardest to overcome. For other areas, though, once the benefits of co-operation and information sharing were clear, participation was much easier to find.

> *There's 12,000 diabetes patients with one other long-term condition. It's GP plus national datasets. What we're demonstrating [is] the art of linking – we've got live ADT [Admission, Discharge, Transfer] data flowing, we've got live primary care data flowing. The chief execs across [the area] are asking me to work with them because this is data they've not seen. That cohort of 12,000 patients are seen in primary care 20 times a year, 20 contacts a year.*
>
> (Digital transformation project lead)

Homerton and partners' IT Enabler board

To support better co-ordinated commissioning between NHS organisations and local authorities across a local geography, there are local integrated commissioning boards. In Homerton's area, these meet together for Hackney and the City of London and are currently supporting large-scale transformation and integration programmes. An IT Enabler board sits below these boards. It meets to discuss the technological measures that need to be put in place to support the new ways of integrated working agreed on by the joint commissioning arrangements.

We heard that the board has a critical role in supporting the interorganisational sharing projects that the hospital trust is involved with. It supports the local health information exchange, which has grown from a partnership between the Barts Health NHS Trust and local GPs, through adding Homerton to the exchange, and now adding voluntary services at St Joseph's Hospice – the first link of its kind. It also supports the longer-term ambition to set up the Discovery programme, linking health and social care and other sources of information together in a secure 'data lake' to enable population health analytics to be carried out on depersonalised data.

The IT Enabler board convenes technology experts (for example, chief information officers and their team members) and service leads from the organisations participating in the overarching transformation programmes. It provides technical support and funnels funding from the transformation programme's budget to change going on around the system. A set of minutes from March 2018 gives a flavour of its agenda, including it hearing a bid for support and funding applications for a planned care change programme going on in the local area, as well as approving a bid to the integrated commissioning board for funding to scope out options for social prescribing platforms for the local area.

For others, getting more hesitant people within the decision-making process to agree to change taking place was out of necessity once the costs of continuing without renewing legacy systems had become clear.

> *So not only had you had a set of applications that were going to run out of licence or support or hardware that's going to topple over and not be replaceable inside of a few months, but if we didn't go live [when we did] we couldn't then have gone*

> *live, frankly, for another six months at least, if not longer, because you can't have an entire hospital disrupted in the dead of winter when it's already disrupted and then new software on top of it.*
> (Chief clinical information officer)

Change your culture where necessary and keep the board involved

All of our case study sites had the following in common: they changed the culture and relationships that were relevant to a project by starting with board-level buy-in from the directors, who could then oversee the direction and resourcing of the project as well as create and demonstrate the values that other staff would be expected to take forwards.

> *We have an electronic project group, which is chaired by our medical director and our director of operations, our executive directors [EDs]. [The chief executive] is very clear that it's driven from the top, so the executive directors drive it. It's well attended because it's ED driven... so you'll get each of the disciplines, you'll get the nurses, the medics, the OTs [occupational therapists], the psychologists, they all turn up, because they can't be seen not to be doing what the EDs want... No changes can be made without that board signing it off, so there's no click-your-finger changes.*
> (Chief information officer)

Having that senior involvement allows key decision-makers to be kept up to date about developments and delays and keeps them involved in decision-making, something that may be particularly important where directors feel less confident about digital technology. Just as the EPR being implemented is designed to provide better information for those who use it, the process of putting it in place should provide useful, reassuring information to those overseeing it.

In many of the organisations we spoke to, however, a key characteristic of many of the senior managers involved was their attitude towards technology and risk. Some trusts described their chief executives and medical directors as 'digital evangelists', selling the benefits of technology to staff who were less readily convinced, while others attributed the quality of the final product they had implemented to their management's acceptance of risk – and also failure.

> *It's OK to fail. With innovation, you should expect to fail. The question is how quickly can you get to the point where you find out it's the wrong thing to do and move on to find the right thing to do?*
> (Digital research and innovation lead)

Adapt your approach to suit the project

Several sites mentioned flexibility in approach as being important, with some issues requiring an open approach that allows staff to air their views and feel as though they have been heard. They also thought that this was a useful way of recognising issues that those in other roles may not have seen. This is particularly relevant where the project is focused on the design of the final project, rather than the method of implementation.

> *They stopped using the [whiteboard] system in the middle of the night, and we went down slightly on the warpath, thinking: 'They're just being difficult again, and I know who it's going to be.' Actually when I got down there... what I found was that the system didn't work... there was a particular form that's used in A&E [accident and emergency], and we'd reproduced it electronically, but there's more to paper than what's written down on it. In this particular case, once the form was filled, or partially filled out, it was put on to a wooden clipboard. Where that clipboard was hung conveyed information about where that patient was up to in the way they were being processed through the system. Because the people putting together the analysis had only looked at the form, they didn't realise that information which was conveyed by the clipboard had to be captured as well.*
> (Chief clinical information officer)

For other projects where the direction of travel is clearer, for example when purchasing an off-the-shelf product, many of our interviewees felt that it was more important to be firm and consistent, even if others had concerns or were reticent about the changes involved. The Cambridge University Hospitals NHS Foundation Trust, for example, chose to launch its EPR across the entire organisation at once, even though some departments felt that they were not ready for the change or they were not welcoming of the change.

> *The 'big bang' approach meant that you couldn't hide in some cul-de-sacs or services and say I'm not doing this – which is the experience of some places in the*

> *United States where you do it floor by floor and can end up with recalcitrant and stubborn staff at the end of a 10-year change pathway.*
> (Digital leader)

Do not see implementing technology as 'IT projects' – see it as clinical change
None of the organisations we spoke categorised their digital change as 'IT projects'. Instead they saw digital projects as larger, clinical change transformations, and they consistently referred to their projects in this way.

> *I think as time has gone on, I think they've ceased to regard technology, informatics as a project, it's infrastructure. It's one of the things we use to support the changes we need to make. We don't talk about IT projects, we talk about clinical transformation projects, which are supported by technology where appropriate.*
> (Chief clinical information officer)

User engagement

What is it and why is it important?

Good user engagement processes help to make sure that the workforce gains a sense of ownership over the change process and that they feel they can influence and shape the technology involved. The breadth of digital changes going on in the health and care system means that users come from all sectors, professions and roles. As well as clinicians, users are managers, social care workers, health care assistants, GP practice managers, patients and others in different roles. As we described earlier, this report focuses on changes involving staff, so these are our primary users here. Linking users with the people who are leading digital change and the people who build technologies is essential.

The case study sites conceptualised user engagement not only as an event, or a series of events, to support a single project, but also as a continual collaborative process involving users of technology.

There are some key dependencies that need to be in place for user engagement. First, it depends on a mutually reinforcing relationship, with appropriate resourcing, strong supplier partnerships and project leadership and governance. Second, and more broadly, it depends on a workforce – particularly clinicians –

who are empowered and motivated to seek out continuous improvements in the quality and efficiency of the care they deliver, as argued by Ham and colleagues (Ham *et al* 2016).

The barriers to success

We heard about some examples of poor user engagement, from our participating sites where they thought they could have done it better, as well as from participants' past experiences in other organisations. Where organisations had struggled with a particular project, they invariably said that, with hindsight or with more resources, they would choose to improve this aspect of the process. This is something that can still be much improved in the NHS more generally.

Opportunities for users to shape technology is also constrained, to some extent, by important factors: for example, by adopting standards for patient records that will support research and interoperability.

We heard that opportunities can be missed due to under-investment in the technical workforce with the skills to develop and adapt digital systems. Difficult relationships between change leaders and users also got in the way, as did inflexible products from technology suppliers. One consultant described the consequences of how they experienced user engagement: 'It didn't feel like there was much flexibility to our meetings: it felt like rubber-stamping.'

Case study sites reported that delays meant that projects lost momentum between user engagement events and processes and deploying the technology. One site talked about how delays had sown doubts about feasibility in staff who already had a sceptical attitude towards a project; while another expressed frustration at the over-optimism of its suppliers.

Poor communication between leaders involved in change and the larger body of users was also a problem. We heard that framing digital change as a single big event on a particular date reinforced the idea that digital change is an event rather than a process. Yet the 'go live' date is only one part of it.

> *I think expectation management here is really important, that it's not put something in [10 January or 24 January say], then it's all fixed, tick, move on, because that*

> *then reinforces it's an IT project. This is a living way of doing stuff and it's never going to stop evolving and there is going to be some regular pain involved with it.*
> (Digital lead)

Interviewees repeatedly made the point that in every workforce, there are wide variations in attitudes towards digital change. They cited differences in people's disposition towards change in general, their confidence in adapting to new digital tools, and their historical experience of change involving digital technology. One clinician who led the clinical engagement in their trust said that this had to be acknowledged.

> *I don't think you can separate people's experience with a new innovation from people's experiences of changes that have been implemented in the past. So one of the challenges is a sensitivity to when things have been done either badly or generally well but certain people had a bad experience. I guess dealing with vested interests is the wrong word, but past experiences and prejudices about what the system is and what it can do.*
> (Clinical engagement lead)

This last point about historic experiences is worth remembering, given the relatively chequered history of digital change in the NHS.

Participants commonly expressed the idea that there were two distinct cultures involved in digital change in the health and care system. On the one hand, there is a technical and managerial culture, in which developers and users are primarily interested in the information captured by digital systems. Often this group initiates digital change projects when directed by the centre, and with the belief that it will improve the information as well as helping its clinical workforce. On the other hand, there is a clinical culture whereby clinicians are most interested in how technology can help them to deliver care, and they are trained to be sceptical of changes to their practices that lack certain kinds of evidence.

By implication, a fundamental barrier to good user engagement is a lack of awareness of what technology can do for the delivery of care. Users need to have an understanding of what is possible from a digital system in order to play a meaningful role in its development and the change process in their organisation.

> *I think the thing I found very noticeable was in the pre-implementation phase and during implementation, it was almost impossible to explain to the staff, the end users, what they needed to think about. We were going out saying to them: 'What do you do, what would you like us to build with our EPR?' They had no idea. They had no terms of reference for answering that question.*
> (IT analyst)

This means that organisations should be exploring what is possible with technology beyond particular projects and programmes. While this is outside the scope of this report, there are institutions across the system to ensure that this clinical need drives innovation in digital technology as much as possible, such as academic health science networks (AHSNs) and accelerated access collaboratives. Tapping into and getting involved in these networks would help leaders and users to explore how the current state of the art in technology can help to improve care in their area.

How case study sites overcame the barriers

Our case study sites talked about making sure that user engagement is as meaningful as possible, is conducted in a continuous fashion, and brings together the clinical and technical worlds. Some sites also explained how their approach extends beyond the activities set up to support a particular project.

Get users involved early on and make their involvement continuous

Any digital change project needs to make sure that users are involved in the change process as early as possible. Every opportunity needs to be given to shape the technology that will be part of their working lives.

There needs to be continuous feedback too. We heard that teams leading projects would regularly share the outcomes of their activities, relaying what happened at workshops, creating newsletters about the project or disseminating survey results. They did this to ensure that there were no surprises, and that there were opportunities for users to voice concerns, make suggestions or ask for help.

Explore what is possible with digital technology

At a minimum, users need to be involved in exploring what is possible with digital technology, whether for a particular project or more generally as part of continuous engagement and improvement activities. For some of our case study sites, this

involved inviting users to horizon-scanning sessions for new innovations or approaches. For others, it involved including them in market research and enabling them to influence the choice from the many suppliers at the procurement phase.

Berkshire's user engagement in the procurement phase of a digital project

The Connected Care programme provides shared views of information about patients to health and care professionals across all sectors. It also involves patients as the subjects of that information. From the outset, the programme's leadership recognised that they needed to involve these diverse users and patients to gain an insight into their needs and concerns and to make sure that the product eventually chosen would be attractive to them. Engaging users also helped to generate shared ownership of the project, which was extremely important across so many different organisations.

It was during the procurement phase when a lot of user engagement happened. Suppliers had to attend day-long workshops to provide intensive demonstrations of their technology and then engage in long sessions where users and patients had the chance to quiz them on the technology. For their demonstrations, a set of patient stories was created beforehand for the suppliers to respond to. They were asked to show how their technology could be used to improve the care of each of the patients in the stories.

Attendees gave specific feedback on each of the systems and voted on their preferred supplier. The leadership of the programme told us that they incorporated performance on the 'patient stories challenge' as a key part of the procurement decision framework. The partner eventually chosen was Graphnet and its CareCentric shared record software.

Reach across the spectrum of attitudes and bridge cultures

The case study sites told us that it was important to acknowledge differences in people's attitudes to change and to take different approaches to the various types of people.

Several leaders said that they map people out on a spectrum. Some spoke of 'targeting' those likely to be least engaged in a project for more intensive outreach and collaboration. They personally invited less engaged staff (who hadn't responded

to early surveys or invitations to become involved) to more sessions, arranged demonstrations from other teams who were already benefiting from the change and provided users with additional opportunities to learn about the proposed change so that they could be in a position to shape it.

On the other end of the spectrum we heard that it was important to identify the groups more naturally disposed to change, or particularly keen on adopting digital technology. People frequently referred to frustrated groups that compared technology they used outside of work with the limited technology they had access to at work. Members of this technophile group were more likely to volunteer themselves and were often drawn on to be formal 'champions' of digital change or sit on advisory groups. These people were often cited as the change agents who would persuade colleagues to engage with projects and would already have some understanding and ideas about what might be possible with new technology as engagement continued. Most importantly, they were able to support their colleagues as they took to new systems.

One participant discussed how it was important for everyone across these cultures to be 'bought in' to projects.

> *The admin team buy into this because we have to do this, because of the targets that we have to meet with commissioners. But also, I think the administrative staff, because they spend a lot of time with the EPR systems, do things repetitively, and if something can save them time, they'll be the first to adopt it.*
>
> *In terms of the consultant buy-in, the question is always: 'How is this going to impact on patient care?' They have to see a direct relevance for this... It is a small subset of consultants that would be asking the question: 'How are we going to use this technology to transform our practice?'*
> (Clinician)

When working through proposed changes with different groups at a high level, one helpful approach is to return to a common purpose shared by everyone involved: to deliver the best-value care for citizens. All other goals, whether they are ease of use for clinicians or better information about the organisation, should be instrumental to this overarching goal.

Use and support clinical leadership

The distinct cultures (the IT and clinician divide) and the history of digital technology in health (largely growing out of finance and administrative functions) have left us with a lack of clinical involvement and leadership in digital projects. One fundamental problem that the case study sites encountered concerned the credibility of technology among clinical users.

> *I do as much clinical work as virtually anybody. I ran my practice completely paperless nine months before there was any talk of trying to deploy it to the rest of the community. So what that means is that when a clinician stands up in one of those boards and says, and this is a direct quote: 'You have walked us into the Valley of Death!' by trying to get them to use electronic notekeeping, I can stand up and say: 'Well, that's very strange, because I've been doing this for the last six months, and none of my patients have died. What are you doing?' Unless you've got that credibility, if you're a non-clinician, then you've got almost no defence.*
>
> (Chief clinical information officer)

We heard how, in another organisation, the culture has changed.

> *I think as time has gone on, and I think this has in part been driven by the CEO [chief executive officer], I think they've ceased to regard technology/informatics as a project over there, it's infrastructure. It's one of the things we use to support the changes we need to make. We don't talk about IT projects, we talk about clinical transformation projects, which are supported by technology where appropriate.*
>
> (Consultant)

One organisation explained the reasons why they 'pick' clinicians to do these kinds of roles.

> *So I really stress about making sure that the right clinician, the clinicians that we think is going to offer the most, we pick them up and lift them and shift them into digital programmes – somebody with a bit of nous, somebody with a bit of credibility, somebody who the organisation's going to listen to. And that has made a big difference.*
>
> (Chief clinical information officer)

We heard about tangible and structural approaches that our case study sites took to promote more integration of the clinical workforce in particular. Appointing people to clinical engagement roles or ensuring engagement with digital change projects was a recognised core part of their job, rather than an add-on if of interest. This signalled that clinicians' time and insight were valued.

Many sites ensured that these clinician leaders had the time and licence to sit as equals on informatics boards or technology project boards. One partner observed how this made their interactions with the organisation's users more valuable:

> *That's gone from, you know, an IT board of predominantly IT guys and very kind of technical boxes and wires, to rooms filled with clinicians talking about how technology can truly allow them to be able to go on their next wave of development in terms of patient care.*
> (Change management leader)

One consultant talked about his role as a project's clinical engagement lead, employed by the trust to do one of his programmed activities each week. It was a challenge that it so rarely confined neatly to this scheduled time. He felt that the organisation valued the time he put into it, and that it recognised that ensuring his fellow clinicians were involved in technological change was work that needed to be protected.

Boundary-spanning roles – like the chief clinical information officer providing clinical leadership on user engagement – are welcome. Our evidence review showed that they are important in successfully implementing change, and the Wachter Review recommended growing their number to lead digital transformation (**Wachter 2016**). Chief clinical information officers are often but not exclusively people with clinical backgrounds. They are executives with experience and training straddling both the technical and clinical worlds, with a particular focus on user engagement in the development of technology. The NHS Digital Academy inaugural cohort started their qualifications in April 2018. Their training means that increasingly organisations will be in a position to employ a new generation of leaders of digital projects, and it is hoped that more will be employed exclusively as chief clinical information officers.

Essex Partnership University NHS Foundation Trust's clinical innovation lab

At Essex Partnership University NHS Foundation Trust, there is a regular monthly open meeting, where clinicians of all ranks can brainstorm ideas for innovation, with senior trust leadership and the chief information officer in attendance. A non-judgemental attitude is taken towards proposals and several projects have already been taken up after being first proposed at the lab, including Improving Access to Psychological Therapies (IAPT) online treatment tools, a medication reminder app and physical health check tools for the trust's EPR system.

Attendance is encouraged not just for those who want to propose new ideas, but also those who want to influence the progress of current projects, which are regularly updated at the lab sessions for the wider group. This enables clinicians not just to give feedback on new, developing ideas, but also to raise concerns about projects in progress in front of senior leadership in an open environment where such challenge is expected.

Senior managers at the trust have reported that they appreciate the breadth of opinion they hear at the meeting, with clinicians responsible for setting the agenda, and being given a forum to discuss the implications of change on the care they provide.

Avoid imposing fixed solutions

Part of the challenge of making digital change a success is technology's fixed nature. Hardware and software are finalised and delivered to users by suppliers and technical teams. Those tools are what people are required to use, within some fixed parameters, for a period of time. This 'sticky' nature of technology is compounded by the historic approach in health care and the NHS, often with long periods of time before things are updated, and limited resources available to develop, tweak and adapt the technology. Some approaches, such as using more 'cloud' services, an approach recently approved by central bodies (NHS Digital *et al* 2018), could serve to reduce this stickiness.

To take one example, EPR implementation programmes involve digitising how organisations capture and use information across complex organisations. This involves technical staff understanding the processes that users of existing systems go through and seeking better, optimised workflows for the technology about to be implemented. We heard that it is a necessary challenge to understand what the existing practices among users are.

> *In the process of the change, one of the first things you need to do is to define what precisely is the workflow that needs to be followed. In terms of who needs to take which step and who then has the next step, it's like a flowchart, but very precise.*
> (IT analyst)

We heard from informatics teams working in trusts that mapping existing workflows can uncover variations in practice and workarounds that have being going on for a number of years. In many cases, they were frustrated or alarmed by this, identifying inefficiency, patchy records or potential safety issues.

> *Sometimes we uncovered work practices that were not approaches. We inadvertently became the police of what people were doing. Because when they asked you to replicate it, it was like: 'Hmm not entirely certain we should be doing this'.*
> (Information specialist)

It is at this point that opportunities for making improvements to the practice and workflow of staff arise, and when the most detailed, painstaking work with users is often done. Clinicians will bring expertise about what care should be given to patients, and how information might best be captured and used in their care, whereas informatics professionals and managers will have interests in the quality of the information captured. It is important at this stage to ensure that clinical leaders and clinicians achieve consensus on what the ideal workflow to be implemented is.

However, it is important to be careful about how this is communicated to people affected by the change. There is a risk that leaders and technical teams frame digitisation in a way that might be construed as policing or penalising staff for their practices. Many workarounds or exceptional practices may have emerged with existing systems, some better than others. But there is a need to be considerate of the reasons why staff adopted these workarounds in the first place, recalling that there are different cultures and values for different user groups, and returning to the overarching goals of the organisation. We heard that it was common for staff to have surprisingly low levels of familiarity and confidence with digital technology, even with old technologies that were being replaced. It is important to factor this in.

> *User engagement processes are an opportunity not only to help users adopt better practices, but also to generate insights about how technology can help them. Done well, they allow staff a chance to reflect on their practices and take action to improve their approach: 'That's the challenge: you've got today's practice and you're just trying to just get it digitised, but as soon as it's digitised, they realised that's not really what they want, they want to do something different'*
> (IT analyst)

Decide on an appropriate implementation model

One of the fundamental decisions to make about a digital change project is when to deploy new systems. In general, teams face a choice between implementing technology as a 'big bang' or taking a phased approach, introducing it to new people, teams, departments or organisations over time.

> *It was a conscious decision to say 'right we're going for a big bang', mainly because the practicalities around doing it in one corner of the hospital and not everywhere else was difficult because it meant labs or radiology would suddenly have two systems depending on where the patient was. And if a patient moves from one place to another then you've got big problems because how do you move the paper notes to electronic notes or electronic notes to paper.*
> (Chief clinical information officer)

Across different technologies, we saw the following factors as particularly important in choosing an implementation model.

- **Risk associated with change.** Moving to new systems is disruptive for those involved and can be associated with teething trouble. Good user engagement practices as outlined above can help to identify and prepare for risks. Having a focused period in which the organisation prioritises bedding in the new system can help when risks are high – such as for a big EPR rollout.
- **Interdependencies.** Can one team or organisation adopt the change without affecting how it works with others? If so, we heard that phased approaches can work better, allowing different teams to go through the change before others, providing lessons learnt and a growing source of peer support for future users.
- **'Adoption challenge'.** Sometimes new systems are compulsory for staff to use, while others are opt-in, such as the shared care record that users may adopt when they see value and convenience.

How the case study sites adapted and evolved

Digital change is becoming a constant feature of work in health and care. As Wachter argues, health systems need to understand that after digitising an aspect of work, it might be desirable to redesign and improve the work (Wachter 2016). This means we need to treat user engagement as a continual process, not an event that supports a single project.

Having a clear strategy for user engagement, with clinicians and technologists working in partnership, and users interested in digital change, are a useful resource for any health and care organisation. These users become a source for new ideas. We heard how this ranges from ideas for new innovations that organisations can capitalise on and spread across the system to ideas for the ongoing use and adaptation of technology and smaller quality-of-life improvements.

There are opportunities for policy-makers to link up with users, technologists and suppliers. Where the centre has responsibility for contracting with technology partners – for example with primary care IT providers through the centralised GP Systems of Choice contracts – they should use their considerable leverage to ensure that suppliers spend time with users such as GPs and practice managers, and professionals and patients outside the traditional user base, to look at improved design. NHS Digital has an opportunity to do this now, as GP Systems of Choice negotiations for the change of contract in December 2018 are in progress. The same applies for other important nationally commissioned systems, such as the electronic referral system, NHSmail and the summary care record.

Information governance

What is it and why is it important?

Information governance in the NHS is the way that organisations manage and safeguard the process around the collection, use and sharing of the personal information of NHS patients. While the principles of good data management and sharing for NHS organisations are described in the Information Governance Toolkit (NHS Digital 2017), the application of these principles when a new technological project is started can often throw up challenging issues both technically and culturally.

Good information governance is something that all NHS organisations that hold patient data need to consider and is vitally important to keep the data confidential. This means preventing people from accidentally or maliciously gaining inappropriate access to information. As well as being the legal responsibility of health and social care organisations, handling data responsibly is also important for maintaining citizens' trust.

Our report, *Transformational change in health and care* (**Dougall *et al* 2018**), found that confidentiality is often an initial reason that people give for not sharing, but that this issue is resolvable with proper processes. So information governance is sometimes seen as a blocker to sharing data or incites fear from those that hold patients' data. However, sharing data is just as vital as keeping that data safe, and our case study sites were unequivocally positive about building the right infrastructure for allowing data to flow.

> *What we set out at the start of the [information sharing] programme was to fundamentally address that issue of the myths around information governance, the myths around the legal aspects of sharing, and fundamentally pin down what it is that we need to be able to see clinically across each of these particular scenarios.*
> (Change management leader)

The case study sites stated that the returns from upfront investment in information governance built organisational collaboration and trust. Good information governance can provide benefits by smoothing the path for new technologies to be implemented. However, the sites recognised that processes were never perfect, and that information governance teams needed to have an appropriate level of risk-appetite to avoid projects getting mired in process. As one clinical steering group chair commented: 'Having good information, governance, a team that accepts a small degree of risk in terms of new projects, is another fantastic advantage.'

Many of the risks in data protection come from the sharing of data between organisations, and our case study sites offered insights into their experiences of this and the barriers that get in the way of good information governance.

The barriers to success

Information governance can throw up challenges with ensuring that the processes for handling data are safe and correct. Our case study sites needed to identify significant resources upfront to dedicate to thinking through the challenges. This was built in from the very beginning of projects, frequently in the form of information-sharing agreements. These agreements describe appropriate data flows between organisations and how these flows should be managed. Sites setting up such agreements found that identifying the due process for data moving from one organisation to another was difficult. Also, in setting up role-based access to data, different clinical groups needed to negotiate about what information would be necessary for the different roles.

> *We had quite a lot of challenge from clinicians; from consultants to nursing staff to mental health professionals, having a different interpretation of what information is necessary to carry out their work better – quite a lot of clinical debate about what information is sensitive.*
> (Informatics manager)

The question about what health information should be shared and accessible by different organisations tended to be a key point of contention in negotiations about role-based access. Some types of health information, for instance mental health diagnoses, held special concerns about how that data would be used and who would have access to it.

> *In mental health they just asked a few more questions and [for] a few more guarantees within what we did [so] that we could show it was going to be safe. [It was not about the scope of data.] It was much more about the safeguards for the data when it's there.*
> (Information governance lead)

Case study sites also recognised that sharing information between the NHS and social care presented unique roadblocks. For example, there was a technical challenge that social workers often input information into their records in free text. Recording details in free text, as opposed to coding into forms, means that social care records contain information about third parties who are not involved in the receipt of care but play an important role in the social care user's care, such as carers or neighbours. Third-party information ought to be minimised, as consent cannot be sought for the sharing of this information.

> *There are significant IT issues that nobody was aware of at the time of letting contracts. The people who did the initial work had the concept of 'we want to share'. It's only when you get your hands dirty in the system [you realise] that we don't actually hold that [data] in a way that can be shared.*
> (Local authority lead)

Interviewees generally recognised that most of these technical issues could be resolved quite readily.

The cultural part of the change was more challenging. Information governance arrangements are built on trust between many actors in a local area: hospitals, local councils and GPs all need to agree how to share data with one another. Some GPs were particularly protective over their patients' information and it required a greater investment of time to get them on board with data-sharing plans.

> *There was a group of GPs with an ethnically diverse population, and their doctors felt very protective and we discovered this very early in the project, that as soon as we started trying to get their data in to create a master index [a database], we found we spent a disproportionate amount of time to go and meet with them. We had special evening meetings, went to their patch meetings, anything they wanted us to come to. We had one-to-ones with them and talked through their concerns and demonstrated how we would safeguard the data in the system.*
> (Information governance lead)

Case study sites told us that, in the short term, GPs may see less utility in a shared care record as most health information is held in GPs' records. This combination of GPs having a large trove of valuable patient data and feeling personally responsible to their patients for confidentiality leads to a more risk-averse attitude to sharing among some.

Individual actors were not the only cultural barrier to agreeing terms of information governance. We also found signs of organisational inertia within wider sharing schemes. Information governance professionals tend to be hired by single organisations as a means of looking after the personal data collected by that organisation. Their capacity is in demand and limited. Picking up additional responsibilities for cross-organisation information governance initiatives, such as a shared record, can be difficult.

Organisational inertia was compounded by a lack of senior buy-in to and understanding of information governance. Some case study sites mentioned that information governance is not on the radar of many trust boards, despite big changes to organisations' legal obligations under the new General Data Protection Regulation (GDPR).

> *The senior people in all of the partner organisations need to understand at senior level what their new responsibilities are and how they change under the legislation. Whether they like it or not they are legally responsible for how their data is being shared. And that doesn't get talked about seriously at most board meetings.*
> (Information governance lead)

The General Data Protection Regulation

An issue that was on the horizon for information governance professionals during the fieldwork was the introduction of the General Data Protection Regulation (GDPR). The GDPR is a new European Union-wide law that came into force on 25 May 2018, after most of our fieldwork took place. Its implications are far reaching for health organisations that hold a lot of personal data.

The regulation includes changes to what can be considered a legal basis for using and sharing data, as well as a requirement for every public sector organisation (including small ones, such as GP practices) to appoint a data protection officer, with responsibility for monitoring personal data processes.

The case study sites were considering the implications of the GDPR at the time of interviewing, recognising that it would require rethinking some of the processes and policies they had in place, especially the regulation's emphasis on documenting the legal basis for using and sharing data and, where appropriate, consent.

Changes in data protection legislation were affecting every organisation we spoke to, although they were having more impact on areas where a lot of data sharing was taking place. This meant extra resources, although at the time of the fieldwork no organisation found that it would fundamentally change what it could share. An information governance lead commented: 'We need to GDPR-ise everything we're doing. There are some differences. For example, our data controller model doesn't exist in GDPR, so we have to change it for a new model and work out for each group that they understand what that means.'

Some case study sites felt that support in terms of the GDPR was lacking. Toolkits do provide areas with some guidance, but many that were advancing data-sharing plans found that there was sometimes confusion in the guidance. Case study sites often looked to national regulators for guidance on changes to data protection law but voiced frustration at the lack of national guidance they had received.

> *NHS England and NHS Digital still do not have published guidance on the GDPR. Here we are, it's January, it's supposed to be done by the end of May. At the moment what we do is take our best guess at what it's going to say. We do what we can, in the knowledge that when they publish their guidance we may have to tweak again and adapt.*
> (Information governance lead)

Meanwhile, an interviewee from a local authority mentioned a misalignment between guidance from NHS England and the Local Government Association.

The challenges around effective data sharing are numerous and often feared, but all case study sites spoke positively about addressing the issues that arise.

How the case study sites overcame the barriers

Information governance is a cultural issue

The case study sites' solutions to information governance problems focused on the cultural rather than the technical aspects. Sites with a particular focus on information governance talked about the importance of establishing where the expertise and capacity would come from early on in a digital project. Where the resources came from depended on the site: Berkshire and Frimley identified new resources as part of its Connected Care programme, while Liverpool made use of cross-city expertise in its shared informatics service, providers, the CCG and the local authority.

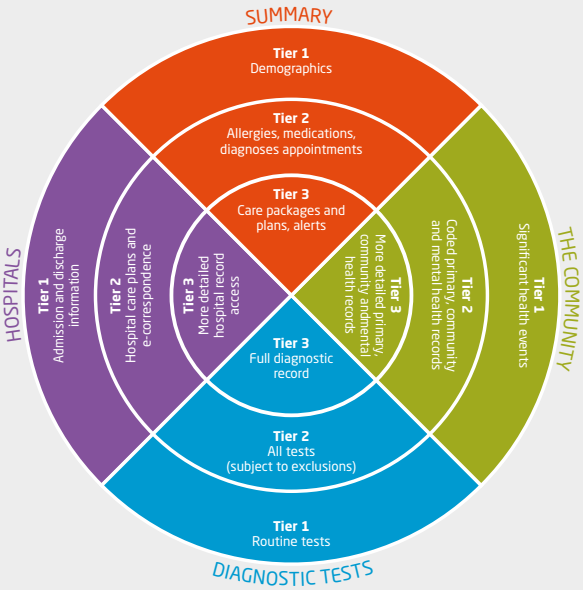
iLinks Information Sharing Framework (Liverpool health and social care economy)

Liverpool agreed a cross-organisation Information Sharing Framework early on in its digital development (iLINKS 2017). This was prompted by a desire to share records between primary care and community care. However, it made the decision to make the framework comprehensive, to cover future cross-city sharing technologies. All health and social care organisations have signed up to the principles of information sharing, ready for when more extensive data-sharing programmes are put in place.

Liverpool's Information Sharing Framework gives role-based access for different kinds of data and provides a model for all data sharing across the local area. For example, a GP can access all information about a patient except for the most detailed parts of hospital information. Conversely, administrative staff have no access to patient information, except demographic information from the patient's summary record.

The individual sharing agreements then sit beneath this framework, supporting it from a contractual perspective (*see* Figure 1). This means there is a consistent and shared vision for the depth of information that should be viewable by different health professionals.

Figure 1 iLINKS information sharing model: role based access*



* Every member of staff has different permissions based on their role. For example, a district nurse could see tier 3 summary information and community information, and tier 2 diagnostic and hospital information. Meanwhile, administrative staff have permission to see just tier 1 of the summary information.

Source: adapted and simplified from iLINKS 2017, p 10

continued on next page

iLinks Information Sharing Framework (Liverpool health and social care economy) *continued*

Liverpool's framework was accompanied by increasing collaboration between health and care organisations. Interviewees found that the process of engaging clinicians and information governance professionals in conversations about information governance had a positive impact on trust and relationships in their local area. Information governance was the first major digital question the city tried to answer, and all parties felt they had a stake in getting the framework right. In this way, Liverpool's experience of designing its Information Sharing Framework laid down strong foundations for future collaboration.

Information governance tests local trust

The case study sites took the view that information governance work should be undertaken early on in a project, even before any technical work begins. This is important not only for technical reasons, as information governance needs to shape the technological solution, but also for testing the trust between organisations in a patch.

> *In those areas where you do try and rush, you can undo a lot of technical work. If you don't have the confidence in your partners (a) for them to share data and (b) for that data to be used and accessed responsibly, you're not going to get the signatures on an information-sharing agreement and all of the information governance you need to have in place.*
> (Project manager)

In the case study sites, relationship-building was a core part of a cross-organisational information governance strategy, and often the most time-consuming element of a project. Some GPs needed careful and sensitive engagement to convince them of the value of data-sharing projects.

Berkshire and Frimley's information governance clinical engagement

Berkshire and Frimley's Connected Care programme is developing a shared care record with health and social care organisations across the area. The programme has hired an information governance specialist, through a supporting partner organisation, to provide dedicated support and advice to the programme boards.

An information governance board is chaired by the leader of the local medical committee and attended by information governance professionals and local clinicians. The board discusses papers prepared by Connected Care's information governance specialist, ensuring clinical input into the policies as they are designed.

Berkshire discovered that there was a group of GPs in one area who were particularly concerned about the confidentiality of their patients. These GPs raised concerns over the governance of Connected Care initially. The information governance specialist invested time in meeting with them on their terms, to talk through their concerns, strengthening some of the language that described the safeguards in place to protect patient data.

GPs also wanted Connected Care staff to attend their patient participation group meetings to answer patients' concerns. One by one, the practices became satisfied with the governance arrangements, until a single practice held out with concerns. After several meetings, it was this practice's patients who persuaded the practice to sign the information-sharing agreement as the patient group had heard about the benefits that Connected Care could offer.

The programme leaders also had to work closely with some secondary care organisations to ensure that they bought into the information governance arrangements. Organisations collecting information about mental health diagnosis required further engagement to ensure that their concerns around security of the data were listened to.

Despite the additional effort required to engage with different actors in the system, the case study site did not have to fundamentally change its plans as a result of people's concerns.

Be transparent about sharing information

The case study sites spoke about the importance of being transparent about what could be done with information. This was as important to patients as it was to clinicians. Sites looking at cross-organisational sharing offered citizens an

opt-out from their data being shared, usually on their website. The sites did not report substantial opt-out rates or any sign of public concern, but some people did recognise that more should be done to inform citizens about data-sharing programmes and engage with them.

Some technical barriers in relation to information governance proved more intractable than others. The issue of third-party information in social care records, for instance, was not easily solved and so free-text information was not immediately included in the data-sharing arrangement. The long-term solution to this issue, though, will be to train social workers to avoid collecting unneeded information about third parties altogether, where possible. Some information governance solutions rely on retraining so that processes generally can be more robust, and it is better to share what can be shared in the short term and then look for long-term improvements in data-sharing processes.

Build a positive case for sharing data

The case study sites also ensured that they had legal expertise and support for their data-sharing programmes to ensure that agreements were legally sound. They said that this was important in gaining the trust of other information governance stakeholders in the local area. Interviewees appreciated signals in national guidance that confirmed that sharing data is important. One interviewee cited the second Caldicott review as particularly important in this respect (National Data Guardian 2013). This review added an information governance principle that stated: 'the duty to share information can be as important as the duty to protect patient confidentiality'. One information governance lead commented: 'Dame Fiona Caldicott added an additional principle about sharing, about it being more dangerous not to share than to share. And that's helped a lot.'

Our interviews made clear that overcoming the challenges of information governance was as much about building positive relationships and trust as about mobilising technical expertise.

How the case study sites adapted and evolved

Protecting data requires resources, expertise and time. The drafting of information-sharing agreements is where much of the work lies, but there is also ongoing information governance work to be done across the lifecourse of a digital project.

Building trust over information governance can make it easier to make changes

One area that required ongoing attention from information governance specialists in the case study sites was additional requests once the principles of the technology had been proved. Although data may have initially been collected to deliver patients' care, the dataset holds potential for things like research or population health management. From an information governance perspective, research and population health management are a different purpose for the data. Each new use of data will require updates to policies and information-sharing agreements, for example in relation to terms of use and controls on the data. This not only requires additional expert capacity, it also means more careful engagement with information governance stakeholders to explain to them the benefits of and safeguards for the new data uses.

> *People from the [system] are saying we've got this population data now, can't we do something more with it?… All these things are coming along, and there's no problem with doing them, but we've got to get the governance right on those as well. We're trying to run while we're still walking. We've not got the headroom and the space to get all the partners on board.*
>
> (Information governance lead)

Case study sites that already had comprehensive data-sharing agreements in place found that this made it easier to go back to stakeholders to extend the agreements. With each redraft of the agreements there was increased trust as organisations saw that other organisations were able to handle their data without major breaches. Individuals therefore did not have the same concerns on subsequent redrafts of policies as they might have had for the initial agreements.

Partnerships

What are they and why are they important?

In this subsection, we describe some of the partnerships that were central to the case study sites. While the term 'partnership' can cover many different relationships between health and social care organisations, we use it to describe how organisations undergoing digital change were supported by other bodies to support that change. This mainly covers suppliers, but some sites also discussed commissioning support units (CSUs) and academic health science networks (AHSNs).

Some partnerships specifically support change management, while others can arise from existing contracts, for instance as part of a technology contract.

A good partnership can provide support and help health and social care organisations to meet timescales. A bad partnership can lead to an untailored service and can be counterproductive, especially in under-competitive markets. One high-profile example of this is 'vendor lock-in', where NHS technology suppliers have been less than forthcoming in opening up systems to exchange data with other suppliers (Read 2017).

> *We didn't necessarily need to engage in the way we perhaps should have done in the beginning. The downside of this is that we find ourselves with a different EPR to [local organisation]. I think if we had been engaged then we might have all found ourselves in a better position.*
> (Chief clinical information officer)

Despite these concerns, in our case study sites we found that building mutually reinforcing partnerships can lead to better change in organisations.

The barriers to success

Some case study sites discussed the poor partnership practice they had experienced. Poor time management was a common issue, and this meant that it was difficult to plan other activities, such as training. Some changes can be dependent on technology, and if the wait leads to lengthening timescales this can have knock-on effects. These effects can be exacerbated by poor communication from the supplier. One commissioner noted: 'They don't tend to provide realistic timelines... Suppliers have sometimes left conversations about slipping timelines until the eleventh hour.'

Case study sites also complained that the products that suppliers provided were not bespoke. Some staff who worked with the technology did not feel it reflected their working practices. Suppliers of acute sector EPRs are based in the US, and so these systems are rooted in US terminology and practices. Suppliers could change some parts of the EPR, but other parts could not be feasibly tailored.

> *We had to rebuild nursing care plans since the rollout because it's not an intuitive system. I think it works on the way American nurses work and not how British nurses work. We've had to re-implement that whole using our own internal team... It's just clunky flow: we tried teaching, comms [communications], individual support, we tried changing and simplifying content... We tried for about a year, but we found people were just free-texting in a note because they couldn't get on with the flow... It would be nice if everything was as intuitive as the interfaces on your iPhone. It's not high on their priority list.*
> (Chief information officer)

Suppliers varied in their willingness to tailor the system to the English way of thinking and speaking, but Americanisms inevitably remained in US-developed EPRs. New technologies already require staff to work differently, but learning a new terminology that feels alien can discourage people.

> *Having an American slant to the software was a big challenge… in changing the way that people think… The American system is a very different system to ours – they have 'orders'. And orders include everything – blood tests, chest x-rays, drugs, what the nurses do... That requires a complete change in mindset for all of the staff to think in an American model. That was met with a degree of resistance initially.*
> (Chief clinical information officer)

The incentives that exist for potential NHS partners were not considered to be fit for purpose by everyone. Interviewees were frustrated by competition in the supplier market. The previously mentioned vendor lock-in was one consequence of this competition. We also heard more general concerns about partnerships becoming walled gardens, where information and learning were considered commercially sensitive and therefore not shared with other NHS organisations. Sites noted that CSUs and AHSNs are caught in this competitive web, which frustrates the sharing of best practice.

> *This artificial competition piece really gets in the way. So academic health science networks won't speak to me in some areas. The CSU [commissioning support unit] won't share stuff with other partners because they treat stuff as intellectual property... we couldn't be tripping ourselves up more if we tried. And playing into the hands of suppliers.*
> (Digital transformation director)

How the case study sites overcame the barriers

Put effort into building relationships

The case study sites recognised that a good partnership cannot be built into a contract. It requires work from both sides. It may seem simple, but face-to-face meetings with suppliers can overcome the challenges. One CCG chair commented: 'I think what we've nailed in [our organisation] is the really really difficult stuff. About information governance and working with your supplier. About getting suppliers in the room and developing relationships, and you can't contract that stuff.'

In the case study sites, much of the work in building a healthy partnership came during the procurement process. And many of the technologies that sites were implementing involved very large contracts, with long procurement processes.

Facilitate conversations between technology users and partners

Clinical involvement in digital change was key for the case study sites for two reasons. First, it made sure that clinicians were on board (as has been detailed in the subsection 'User engagement' above). Second, it meant that suppliers were aware of how to work with the NHS organisation and allowed them to start thinking through what a tailored product might look like. Two sites mentioned going through a process like this, and both achieved near unanimity among stakeholders as to which supplier should be chosen for the project. In this way, sites saw the procurement process as an important opportunity to build a shared vision between partners, clinicians and commissioners.

> *Having clinicians around the table and asking them which would be the one you'd pick out of the ones you've just seen. Clinicians, patients, transformation, operational, about 95 to 98 per cent of people picked the same supplier. If we've made a mistake, at least we've all done it.*
>
> (CCG digital transformation leader)

Use suppliers for their change management expertise

After procurement, though, the case study sites wanted suppliers to provide more than just technological support. They recognised that suppliers had considerable experience of the implementation of technology elsewhere and that this expertise was invaluable in supporting the change. Time that suppliers could dedicate to change management varied, especially as a number of them were US based, but there were positive examples of suppliers working with organisations to support the change.

> *Visitors from [the supplier] came over when we signed the contract in 2013, to talk to staff about what it would look like. People who were interested but couldn't be seconded (like me) could go to a series of meetings to discuss the work plan and whether we thought it acceptable.*
>
> (Consultant)

However, the sites mentioned that it was in suppliers' interests to invest more time in the trailblazing organisations that were often among the first in England to adopt their technology. Suppliers have an incentive to invest their resources in change support so that projects are successful, but it remains to be seen whether such resources will be forthcoming for future projects.

The partnership between Cambridge University Hospitals NHS Foundation Trust and Epic

When the Epic EPR launched in Cambridge University Hospitals NHS Foundation Trust in 2014, the implementation was criticised and cited as one of the reasons behind the trust being placed in special measures (Shah 2015). This story has not been reflected in accolades that the trust has been awarded since, including its GDE status. It was also not a story that was reflected in our interviews with managers and clinicians who had a much more nuanced experience of the implementation. Interviewees reflected on some initial challenges with staff adapting to the new EPR, which were straightened out following the implementation through partnership with the supplier.

In advance of the EPR launch at the trust, the eHospital team and Epic colleagues had managed the process of connecting to the Spine – the NHS's central information exchange – in record time. Epic provided Cambridge University Hospitals with hard deadlines and they met their own timescales. Interviewees cited Epic as a hard taskmaster but reflected that, without this, the EPR would never have been delivered on time.

Staff and clinicians were also given the opportunity to visit Epic in the US and see how the technology worked in a clinical setting. This allowed staff to understand the change process better from those who had been through it already. Similarly, visitors from Epic also came to England and talked to staff about what the changes would mean to them.

Different interviewees spoke about the positive relationship with Epic, although there were some things that they felt could be improved. Crucially, the eHospital team are trained and certified in Epic applications, and they have been given the tools and knowledge they need to make nearly all requested changes to the Epic system themselves.

Get a single vision of success across partnerships

The Cambridge University Hospitals NHS Foundation Trust case study illustrates how an effective partnership can help to drive a project forward. Partners can offer both expertise and capacity for digital change management. Organisations such as CSUs and AHSNs can do this, although a good supplier might also do it. Investing time in building a single vision between partners and NHS organisations has paid dividends for the case study sites by getting partners bought in to the project's success.

Delineate clear roles and responsibilities in the partnership

Partners can support health and social care organisations by providing them with clear roles and responsibilities, giving them all the information they need to get their tasks done.

> *Without doubt the reason that we did it in the timescales was because the [supplier's] culture is that you will do this by that date, you will do this by that date. Have you done it? Right, carry on... Their build notes that they had for us to follow, all of that, it was very precise, very specific. As a company they'd done this so many times, and we went live on time.*
>
> (Chief clinical information officer)

Partners also bring valuable outside perspectives, which might otherwise be lacking from health and social care organisations. Some interviewees said that a more commercial mindset could bring its own fresh ideas, while others mentioned that those in CSUs and AHSNs had interesting and diverse backgrounds in comparison with those in traditional NHS management roles. Some case study sites sought these different backgrounds for their project boards as well. One chief clinical information officer noted: 'When you bring people in from external, and that's why in our GDE bid we're working with a number of different organisations, they bring in a different take on things.'

Choose a supplier that is open to sharing data

Good partnerships ought to be mutually reinforcing, producing ongoing benefits for both parties. Some case study sites had decided to move GPs and community providers onto the same EPR supplier in order to overcome some of the interoperability issues presented and facilitate more consistent sharing. This has helped one case study site to put off the vendor lock-in challenge, as well

as providing ongoing business for the supplier. A change management leader commented: 'So we then have a scenario over recent years where we've got community health services and general practice on [supplier]. So we've been able to enable sharing through just working with [supplier] and working with our trust.' It remains to be seen, however, whether this is a long-term solution to the problem of vendor lock-in: data sharing in local areas will eventually need to go beyond the borders of a single supplier.

Organisations should work together to get the best deal from partners

Some case study sites decided that if they clubbed together in negotiations with suppliers, this could lead to a better deal for their area as a whole. One site looked again at contracts with one of its suppliers and realised that two organisations in the same patch were paying for the development of the same system. It was through overcoming some of the competitive tendencies of individual NHS organisations that they were able to achieve a better partnership with their supplier together.

> *We started to work out how to stop the same types of organisations getting charged twice for the same thing. For example, we've got two [organisations on the same EPR supplier] in our system. We said: 'We want this developed once. Cap your costs for development.' Because everyone knows they're not going to develop it twice. That's something that's not normally done before. We had central money we could fund the development costs from; so we could make it clear… we were only paying once.*
>
> (Chief information officer)

The case study sites often had tricky relationships with partners, but it was also clear that they are heavily reliant on them to manage digital change effectively.

How the case study sites adapted and evolved

Aim to become self-sufficient in the medium term

The case study sites often embarked on long-term partnerships, with contracts lasting 10 years or more. However, the relationship was rarely static, and often fluctuated depending on whether a technology was being developed, or just maintained. As projects bedded in, some technologies required less support from the supplier and further changes could be picked up in-house. This meant that organisations had to think about how they could be largely self-sufficient.

For example, they had to ensure that in-house teams were trained well and confident in navigating the tools they had for maintaining the technology and making any changes to it.

> *Not being reliant on the company to make changes to your EPR is really important because for the first six months… we were completely dependent on them to change things for us. Now they're an American company, a big company, so we weren't very high on their list.*
> (Chief clinical information officer)

Think ahead when choosing a partner

The case study sites discussed the importance of considering the long term when procuring a supplier. Judging them on their change management track record could be as important as their technological capability. Some sites prioritised suppliers' willingness to share information, especially as an unwillingness to share could cause problems in the future. An important lesson that some areas had learnt the hard way was to future-proof relationships to ensure that they will continue to deliver what the commissioner needs in the coming years.

> *We have a technical problem with four practices who are on [the supplier's] system, who are the most difficult people in the world to work with because they want everybody to use their system. So we are still struggling with the issue of the [supplier] practice's data.*
> (Information governance lead)

One area brought in the CSU to provide expertise and capacity for its digital change process and found that the unit played a pivotal role in building links between health and social care organisations in the area. While this was necessary to deliver the project, over the longer term some of these links had grown beyond that which was necessary, sparking new ideas and projects. Interviewees commented that it would have been challenging to achieve this same system-wide collaboration without an impartial third party, such as a CSU, to build the links.

> *The role that the CSU [commissioning support unit] is taking is very much a facilitator to bring together our partners who might not have worked in this way previously. [The programme] has instigated new ways of working and sown seeds that have grown into much wider collaboration, particularly between health and*

social care… it's made those connections between people and we've now got those relationships to work in a much more synergised manner.
(Project manager)

Resourcing and skills

What are they and why are they important?

In this report, 'resourcing' refers to the finance, capacity and people an organisation has to support digital transformation, while 'skills' refers to the ability, attitudes and experience of the people delivering transformation that an organisation has. Both are key enablers for getting a digital project started and subsequently delivering it. The current economic climate among providers means that finances are often the focus, but the case study sites emphasised that organisations need to consider the people and skillsets they have or need to obtain as well.

Large-scale change in health and social care can be complex. In digital transformation in particular, these changes can be overarching, affecting multiple aspects of clinical practice. A large degree of planning is therefore required so that they do not have a negative impact on care. This usually means that digital transformation projects are resource intensive, requiring large amounts of financing and the capacity and people to get it right. The opportunity cost of bad planning and poor outcomes may be reduced resources for future projects.

However, planning and management are not static and only done at the outset of a project. The deployment of resources and skills has to be adaptive to shifting priorities as the project progresses. Proper planning and management ensures that outcomes are delivered throughout.

Good resources and skill management does not just mean being efficient with finances, or maximising people's capacity. A lot of it concerns how you manage and motivate the workforce delivering the change, ranging from upskilling clinical leaders to ensuring that the informatics team are equipped with the infrastructure they need.

The barriers to success

Many case study sites discussed the pressure on NHS finances as a challenge in adequately funding large-scale digital projects. They talked about these pressures limiting what could be embarked on or accomplished.

They also said that financial pressures could foster a myopic view of outcomes when digital projects are initially developed. One interviewee noted that adequately planning the number of people and amount of finance needed from the beginning really made a difference in facilitating the long-term outcomes of digital projects.

> *I think one of the key lessons for me is the amount of ongoing support both financially and people resource support that the hospital needs to optimise its investment in both the hardware and the software was insufficient and it remained insufficient. And I suspect a common failing, which is to not recognise the real cost of ongoing support if you want to really implement change for the long-term future.*
> (Digital leader)

With a short-term view on finances, IT programmes are in danger of lacking ambition or long-term considerations, constraining the scale of change.

Another common theme among the case study sites was a shortage of leaders who possessed both clinical and digital expertise. The need for leaders is important in asking challenging questions about a technology's benefits for clinical practice. Often those with a clinical perspective are able to describe workflow issues that someone from an IT background would not necessarily consider. Clinical leaders can also be effective conduits for fostering buy-in from the board and from the end user. Some sites discussed a trade-off between choosing to invest in these leaders by expanding in-house capability or procuring the necessary skills externally.

> *Had to develop their in-house capability to better support change and save money – lots of times we would have previously had to go out to consultants, which takes a long, long time to bring around any kind of change. So, upskilling all of my team, being able to understand the product well enough – we work quite closely with the vendors of the product to understand the back end of it and understanding the scope of what it can do and how it can achieve that.*
> (Digital change manager)

Interviewees mentioned a lack of digital change experts in the wider system. Training digital change management staff and providing them with the experience of developing a specific patient record system brings a risk of poaching from other NHS organisations. A senior nurse commented: 'And especially now that there's other [EPR] hospitals coming up that actually those analysts are very sought after. So actually, it's managing that as well. Because they have huge knowledge of [the EPR].'

Case study sites highlighted that expectations were another challenge for resourcing. Sometimes there is an expectation among users and stakeholders that change can happen without additional upfront time investment from frontline staff. This is a difficult proposition even when the financial constraints that organisations face are not considered.

Sites highlighted that they did not feel adequately supported in their resourcing of digital change programmes. A key concern was that 'bandwidth' in NHS organisations was low: with too many priorities, the space people have for processing digital change is insufficient and can put implementation at risk. For some sites, frequent personnel changes at board level meant that business cases were being rewritten.

> *But that is something that's really critically important and if you're going to do this very major change programme you've got to allow people some air cover to get this done without still having to comply with every target that's going during that period of change, because it is just not feasible to hit every target, and you'd be training staff and introducing the IT for a period of a few months.*
> (Digital leader)

Sites spoke of the initial difficulties in setting up digital projects that spanned trusts and organisations. The more organisations and partners that were involved in a project, the more difficult it became to ensure that all parties were motivated to invest time, people and finances into the project.

Interviewees also mentioned that national priorities were ever changing, making it hard to build a long-term plan for digital change, and many felt that their roles were being stretched. They were aware that digital change is not yet business as usual.

> *I think many projects fail before they even have a chance to deliver because of the number of things we set out to try to achieve. In this particular context of digital, there's only so many things that the exemplars can do at the moment because they're scattered across the country and there has to be some element of allowing catch-up as well.*
> (Digital leader)

While many case study sites discussed the positives of the GDE programme, some interviewees noted the unintended consequences it brought, in particular that it had slowed progress in their organisations. For some this was due to uncertainty and delay in the process of awarding GDEs, as organisations that applied waited to hear whether they would have additional money for projects. Other interviewees worried that some organisations might put their projects on hold while they turned to see how the exemplars progressed.

> *It stopped all their development for a year really, because until you could be sure of the cash. We never had any cash, we were just using our own, so we carried on and got ahead ironically. By the time they had got to about now, the money's started to come in, a year and a half has gone by. We're already on our next project.*
> (Chief information officer)

How the case study sites overcame the barriers

Plan how you will deploy your resources at key points

The case study sites frequently mentioned an upfront plan of how to maximise the resources invested as being a key way in which they overcame barriers in resourcing digital transformation projects, although they differed in their approach to this. For example, one case study site deployed resources in a phased manner when managing the digitisation of its patient notes, with one interviewee explaining the rationale for deploying the change over a weekend.

> *There was various discussions about when it was going to be rolled out. I think it was rolled out over a weekend actually and lots of extra doctors were employed to be on that weekend, to make sure that there's a workforce. So they thought they'd do it at weekends because various departments, particularly pharmacy, were quieter. So, you know, it was going to be a massive task of suddenly changing over*

> *every inpatient prescription from a paper chart to an electronic chart on one day. And pharmacy was much quieter over the weekend, so I think that was one of the main drivers for that.*
> (Clinical department lead)

Identify the skills you need from those managing and facilitating your project

The case study sites also discussed the issue of how to identify the leaders who could develop and manage large-scale digital projects. Some sites mentioned that leaders needed to be effective at balancing risk and reward in deploying resources. Meanwhile in Liverpool an emphasis was placed on clinical leaders who were respected by their peers. Their belief in the product coupled with the respect they commanded was thought to be an effective way of fostering clinical engagement among staff.

Interviewees felt that people who could bridge the gap between the clinical and the technological were valuable in the development of digital pathways. However, some cautioned that clinical leadership could be seen as disingenuous if the leader was not seen as sufficiently clinical.

> *The difficult bit is the clinical leadership bit. I strongly believe I'm helped with that by the fact that I'm not one of those CCIOs [chief clinical information officers] who spends my life in an office, receiving reports and giving diktats to my colleagues. I do as much clinical work as virtually anybody. I ran my practice completely paperless nine months before there was any talk of trying to deploy it to the rest of the community… I can stand up and say: 'Well, that's very strange, because I've been doing this for the last six months, and none of my patients have died. What are you doing?' Unless you've got that credibility, if you're a non-clinician, then you've got almost no defence against that sort of wrecking.*
> (Chief clinical information officer)

Give your team incentives to bring about change

The case study sites that had been through a major implementation needed to make sure that they were able to retain the staff who had gained important experience overseeing the change. In some areas, this meant recognising the skills that they had gained. This applied to technical IT staff, such as software developers, as well as other staff. Organisations understood that the private sector would pay more for their skills than the NHS. They attempted to counteract this by providing additional incentives for technical staff, such as sharing profits from software they had helped develop.

A chief information officer commented: 'Providing software developers with a cut of the money provides them with the incentive to stay and do a good job.'

How does successful resourcing facilitate change?

Without resourcing, digital projects do not even get off the ground. Successful resourcing can do more than just get a project started, though. It is a vital enabler for all stages of a project and also for the long-term changes that follow long after the completion of the project.

A good track record makes getting additional resources easier

Successful resourcing can also act as a signal to the rest of the system. Case study sites found that prior investment and demonstrating competency in managing digital change could encourage further investment. With experience of enacting large-scale change, making additional large commitments of resources becomes less of a risk and the business case to commissioners in an area becomes easier to make.

> *This isn't about what we're investing now. This didn't start last week, last year, two years ago, this started back in PCT [primary care trust] days. Hospitals invest in some of their technologies and then the commissioners through contracts identify it as a priority area. [We] historically invested an awful lot in digital.*
> (Chief clinical information officer)

Invest in your people – it equips them and motivates them at the same time

The case study sites often mentioned their efforts to have digital skills in-house. Investing in people equips them with the skills needed to deliver digital change and provides them with an incentive to contribute to or even drive change. If done well, this can be an effective way of fostering involvement among staff and encouraging change to be delivered from the bottom up rather than it being filtered down from the top.

How the case study sites adapted and evolved

The case study sites noted that financial constraints that many hospital trusts face have knock-on consequences for the resourcing of digital projects. Managers had to be both flexible in how they shaped digital projects and creative in making use of resources.

Go further than the initial transformation: aim for continuous improvement as well

Following on from the introduction of a digital technology, often many case study sites looked to implement quality improvement initiatives to keep the momentum of digital change going. All sites had to identify how resources should be allocated to maintain the technology. Principally, this involved training new staff on the technology when they joined the organisation, and identifying how to make changes to the technology. Changes could either be applying fixes to the technology when issues arose or tweaks to the technology that added new features. Deciding which changes to apply would be a prioritisation process.

> *Each area in the hospital has a design authority that should have operational and clinical staff from that area, sitting in that, and we take to them all the requests we've had from that area, and it's their job to tell us which are the most important for them.*
> (IT analyst)

Managing resources for ongoing use – Addenbrooke's helpdesks and design authorities

The analyst team at Addenbrooke's aimed to find unique methods to improve the quality of parts of the recently implemented eHospital suite of digital change projects – mainly the EPR system based on supplier Epic's infrastructure.

There was no lack of enthusiasm from clinicians, who produced a flow of troubleshooting and change requests (requests from users for additional features, tools and so on). But the team ran into workload issues as they were receiving more requests than they could reasonably handle, and so they used two approaches to manage them.

The first approach was to set up a helpdesk geared towards actioning requests related to problems that users had with the system. This centred around user training as the team found that many perceived issues with the system were actually down to unfamiliarity on the part of users. The second approach involved managing how change requests were filtered. There is now a designated design team in each department whose members are responsible for deciding whether a change is necessary, and if it is, they prioritise the changes that the analyst team need to make to the Epic system. The design teams are led by the trust's operational and clinical staff, with eHospital team members advising on the resource commitments necessary for each change request.

Evaluation is key to recognising both successes and failures in a project

Most case study sites did not have a robust plan for the long-term evaluation of their projects. Yet establishing the benefits and associated costs of a digital project is important – to recognise success and failure and where there is room for improvement. Important lessons can be learnt from this in terms of how an organisation approaches its future digital change projects. Interviewees commonly cited a focus on the short term, restricted funding and difficulties in measuring project benefits as reasons for not undertaking evaluation. A clinical digital leader noted: 'We don't do that type of rigour across the NHS. We do randomised control trials and we do policy deployment. Very rarely do we do the full iterative cycle.'

Some mentioned that the GDE programme encouraged them to think in a more evaluative way. GDE organisations are part of a national evaluation that aims to understand how successful they are. Another clinical digital leader commented: 'Our approach to evaluation globally is usually an afterthought – it's not our core business. GDE has added that degree of "what does success look like?".'

However, evaluation was something that some sites said they should prioritise. Those that had not sometimes expressed regret, as it made it harder to show benefits and improvements over time. Given the scale of investment in digital technologies, it is concerning that so little emphasis is currently being placed on robustly understanding impact. A trust chief executive summed it up: 'Not doing an evaluation meant that there was no evidence to show benefits realisation.'

5 Conclusion

Although digital change shares many similarities – in terms of the process and the values of the leaders involved – with other forms of clinical change, it comes with its own unique challenges. The expertise that is needed for successful digital projects, and the constraints that health and care organisations face in terms of both their workforce and their budgets, can be key barriers to success.

However, as we have shown in this report, these barriers can be overcome. We hope that by providing some of the learning gained from the case study sites that have already dealt with some of these issues, others will feel empowered to undertake their own large-scale digital change projects.

Providers who identify people with a passion for delivering this sort of change should embrace that drive and find support in neighbours or partners that have expertise in their local area. Business cases are best constructed on improved information, patient safety and planning, rather than purely cost savings.

Implementing large-scale digital change can be a once-in-a-generation effort for a care organisation, making a huge difference to the way clinicians and managers use information. With the divide between care providers weakening and the health and social care system coming together to form an integrated one, implementing this sort of change has perhaps never had more potential to underpin new systems of population-based care.

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New technology is promising to transform a health and social care sector that is increasingly struggling with the need to do more with less funding. Many providers and commissioners are looking for opportunities to use technology to improve services and better cope with the long-term demographic pressures that the system is under. But what is important when managing successful digital change?

Digital change in health and social care looks at the key elements of implementing large-scale change involving digital technology drawing on experience from our case study sites, backed up with a review of published evidence about large-scale digital change in health care.

The authors identify five key themes for areas looking to embark on digital change:

- identify the right leaders and manage relationships carefully, considering the need to address different working practices and to keeping things moving
- foster user engagement early and throughout the project
- use information governance to develop robust processes and build trust locally
- take the time to create strong partnerships, with clearly assigned roles and responsibilities
- have the right people, assets and skills, and design a clear but adaptable plan for deploying these.

Digital change will gain momentum and legitimacy by being locally led. Current national policy has been somewhat supportive of local goals, but it needs to ensure that it continues to allow digital initiatives to bloom from the ground up.

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