

Making the right technology decisions

W
E
E
E
E
E
E
E
E
E

BOARDS

PROGRAMME OVERVIEW

About us

This guide has been prepared jointly by NHS Providers and Public Digital as part of the [Digital Boards programme](#).

Digital Boards has been commissioned by Health Education England as part of their Digital Readiness programme and is supported by NHSX.

Through good practice sharing and peer learning, the programme aims to build board understanding of the potential, and implications of, the digital agenda and increase the confidence and capability of boards to harness the opportunities it provides.

Alongside [our guide series](#), a number of webinars and events are available to trust leaders, focusing on case studies of digital leadership in the NHS and other sectors and practical take-homes for boards. The programme is also offering free board development sessions on a bespoke basis to reflect the development needs of your organisation. To find out more please [contact us](#).

About this guide

Technology plays a critical role in health and care today, with some arguing it is a key **determinant of health**. Trust boards now wrestle with important technology decisions on a regular basis, yet many board members feel ill equipped to do this. This guide is designed to make technology less intimidating and more accessible.

The content included is for all board leaders, not just chief information officers (CIOs) or those directly involved in technology decisions. In fact, it is even more important for those less familiar with technology to read on, given the strategic importance of technology in health and care.

We recommend all board leaders read our *Questions for boards* summary. The rest of the guide is broken down into chapters that can be read standalone. They can be accessed and shared individually, depending on what information you need.

Chapter two sets the scene about why technology is important, how it has changed in recent years, and how the NHS is still at a transition point. Chapter three explores some of the key considerations for boards ahead of making any technology decisions. It then sets out the key strategies for managing technology risks within the NHS. Chapter five poses the questions boards will need to reflect on when making choices that will have long term consequences, and how to avoid making bad decisions. The final chapters are written to make the electronic patient record and interoperability agendas more accessible for board leaders.

This guide is suitable for all NHS trusts, regardless of your level of digital maturity. It builds on our previous **guide on digital strategy**, which trust boards will use to steer and guide their technology decision making process ahead of any go-live.

And it's important to remember that the launch of any new technology is just the beginning, not the end. Boards must understand what the plan is for improvement, maintenance and renewals. More importantly, **every tool needs a team**. Boards therefore will also need to **build and support digital teams** in order to get the most out of technology.

CONTENTS

1	Questions for boards	6
2	Why technology is important	8
3	Before you start	13
4	Managing technology risks	17
5	Making choices	22
6	Avoiding bad decisions	30
7	Understanding EPRs	34
8	Understanding interoperability	41

QUESTIONS FOR BOARDS

Board directors don't have to be experts in technology to make key decisions, in the same way not every board member needs to hold financial qualifications to sign off the trust accounts.

While leaders don't need to be experts, they need to ask the right questions. Based on their experience working with governments, corporations and large public sector organisations, the Public Digital team has suggested a short list of questions that board members – both executives and non-executives – may wish to consider when thinking about the trust's approach to technology.

1 How well is technology working for our staff and patients?

It's important for boards to understand what technology is working well and where the pain points are. Sometimes there is a gulf between the promise of technology – greater efficiency, lower costs, safer care – and the reality for staff who may be grappling with clunky systems that don't talk to each other. Have you assessed whether the benefits of previous technology investments have been realised, or what stopped them being realised? The best way to find out what's really going on is to speak to patients and staff and try out systems for yourself.

See: [Getting closer to the user experience](#)

2 Are we making the right technology investments?

Given limited budgets, boards should aim for a balanced portfolio of technology investments. This will be a mixture of 'keeping the lights on' and making improvements, fixing the basics and investing in transformational technologies. Sometimes large technology projects can be seen as 'too big to fail' – boards can play an important role in making sure the trust is investing in technology that delivers real value to patients and staff. Investment in technology alone is unlikely to result in true transformation: you'll need to back it up with investment in clinical and operational change too.

See: [Making choices](#)

3 What's our biggest current technology risk and how do we plan to address it?

Technology is at the heart of modern healthcare, which means that when it goes wrong it can have a severe impact on your trust's ability to operate. Board leaders have a duty to understand technology risks, and make sure the trust has a credible plan to address them. This means acting on risks, not just documenting them.

See: [Managing technology risks](#)

4 Do we have the right technology skills?

It is becoming more common across the NHS to build technology expertise in-house, rather than rely on an entirely outsourced model. Even if your trust uses off-the-shelf systems, you will need some in-house technology skills to piece it all together and make sure it meets the expectations of patients and staff.

See: [Building and enabling digital teams](#)

5 How do we avoid making the wrong technology decisions?

Most board leaders will have experience of a technology project gone wrong. While there is no guaranteed way to avoid technology failures, there are some practices that make them less likely: focusing on outcomes for patients and staff, involving clinical experts early, avoiding hype technologies, starting small, testing and then iterating. It's likely

that other organisations – both inside and outside the NHS – have tried to tackle similar challenges, so we'd advise looking sideways and seeing how technologies are working in practice elsewhere.

See: [Avoiding bad decisions](#)

6 What's our approach to Electronic Patient Records (EPR)?

Determining your EPR strategy is likely to be the single biggest technology decision your trust makes – you will be living with the consequences of this decision for many years to come. Whether you adopt a trust-wide EPR or undertake a 'best of breed' approach, boards should be aware of the realities and risks: lock-in, costs, commercial models and how implementation will work.

See: [Understanding EPRs](#)

7 What's our plan for both care and technology system integration?

With integrated care systems (ICSs) high on the national agenda, technology will play a critical role in system integration. There's no one-size-fits all approach: shared care records are getting traction, while some trusts are planning to share systems and resources with other organisations. Although interoperability can be a dense, technical subject, board leaders should understand the fundamentals of the trust's interoperability strategy.

See: [Before you start](#) and [Understanding interoperability](#)

8 How are we defending against cyber attacks?

Good cyber security is critical to establishing technologies that are trusted and used widely. Boards should beware of security misconceptions that could prevent them from adopting modern technologies or using data to improve care. Most cyber attacks exploit well-known weaknesses: out of date systems, poorly secured user accounts and staff deceived by malicious actors. Boards should make sure the trust is implementing tried-and-tested cyber security practices, and ensure these controls are regularly tested.

See: [Managing technology risks](#)

As ever, the role of the board is to seek assurance, which involves the triangulation of evidence. What is reasonable to conclude from what you've read, what you've seen and what you've heard? And are the answers based on more than anecdotes? This guide goes into more detail on each of these questions.



As a chief executive I need to be close to the procurement, implementation and optimisation of the technology. I need to be a supportive champion in a way that lets people know this is a top priority. This may mean other projects may have to be sidelined for a period of time so as not to overwhelm people.

Sue Jacques, Chief Executive
County Durham and Darlington NHS Foundation Trust

WHY TECHNOLOGY IS IMPORTANT

2

Digital is more than just technology, it is about applying the culture, processes, operating models and technologies of the internet-era to respond to people's raised expectations.

Across the NHS, **trust leaders are wrestling with common challenges**: workforce shortages, care backlogs, unsustainable workloads and the need for greater efficiency. Trusts are working with other health and care partners to integrate care, tackle health inequalities and improve population health, with **access to only limited funding**. Digital transformation is playing a big role in the NHS' response to these challenges. But it's important to focus on the opportunities too. Digital technologies will help the NHS deliver personalised care, empower patients and service users, and help everyone live healthier lives.

The most successful digital transformations are user-centred and outcome-focused, not IT-led. Simply applying technology without any other changes will have limited impact. Instead, organisations that are thriving in the digital age are those that adapt their **operating models**, rethink services and adopt new skills and ways of working.

But technology is important too. Organisations that lack an understanding of the possibilities and limits of technology are unlikely to thrive in the digital age. And when technology fails, it can have a significant – sometimes existential – impact on organisations.

Many trust board members feel ill equipped to make decisions on technology. It is often seen as too complex, technical and difficult. In a world where technology is playing a more critical role in how trusts operate, this is not sustainable.

Board members don't need to weigh in on which specific solution to use, but they should feel confident in making important technology decisions like which delivery approach to use, which investments to make and what in-house skills are needed. They also need to be aware of the broader organisational changes needed to achieve sufficient uptake and adoption.

All board members need to be more involved in technology decisions, it should not be left to the CIO or CCIO. Public Digital has observed how organisations that fully exploit modern technology are ones with **strong in-house digital teams** who have **the skills to make the most of it**. They also have board leaders who can set the vision for what technology can unlock, and understand the changes that need to be made across the organisation to realise this. Technology literacy is becoming as important to leaders as human resource, quality or finance literacy. It's part of the toolkit of a modern board leader because technology is now a fundamental part of how organisations are run.



Boards must show the same level of interest in digital as in other areas like clinical safety and finance – after all, digital impacts every aspect of an organisation and contributes to all other agendas. Digital matters because it is a patient safety issue. Successful boards have grasped this connection.

Andy Kinnear, former NHS Chief Information Officer and
Advisory Board member of College of Healthcare Information Management Executives

Modern technology means a different role for board leaders

Technology is now faster and cheaper than ever before. This has opened up a new role for boards. It is now fundamental to doing business, not just an add-on.

Previously, delivering a new system was a long process that required physical infrastructure and – at the very least – months of planning. Changes were costly, so they were to be avoided. Governance was about measuring adherence to plan, rather than measuring value delivered or reprioritising. This meant the role of boards in technology development was limited to reading progress reports. Largely, IT was left to the IT team. The National Programme for IT (NPfIT) demonstrated the pitfalls of this approach. It failed in part because *“there was no comprehensive strategy to engage clinicians or NHS executives to ensure they understood the reasons why NPfIT was being developed or implemented”*.

Technology has radically changed: things that took months and millions of pounds now take days and thousands of pounds, and the cost of change is much lower. **The key question leaders should be asking is not whether a technology project is delivering ‘to plan’, but rather is it working for its users (i.e. patients, service users and staff), or should we invest in something else?** Boards should be demanding fewer memos and more demos.

How technology has changed

Over the past few decades, there have been a series of landmark technologies that have had a profound impact on society and economies:

- **The internet** provided a single, global network for everyone. These common rail tracks negated the need to build your own private network.
- **The web** emerged as an open standard for applications and information sharing. There was no longer any need to install (or update) applications, other than a web browser. While the Internet acted as the infrastructure that connected everyone, the web allowed users to access and share information.
- **Cloud computing** enabled anyone to run reliable, scalable systems without investing in expensive physical data centres. Instead, users could buy services and storage on a “pay-as-you-go” basis. This lowered barriers to entry, costs and lead times. All you needed was a credit card.
- **Open source software** provided a lego kit for software developers to build their own systems, made available with no license fee. This enabled developers to focus on solving the problem at hand, rather than building everything from scratch.
- **Mobile** put huge computing power into people’s pockets, combined with sensors, always-on connectivity and cameras.

All of these technologies have become commodities, much more accessible than ever before. For many organisations, technology is no longer an expensive bespoke activity exclusive to large corporations.

Getting technology to work in a reliable, secure, scalable and useful way is still hard but these changes make it a lot easier.



Board leaders need to have an appreciation of the ‘health’ of their current IT and network estate – both the ‘gaps’ and ‘opportunities’. Risks occur when boards do not translate this into a clear digital strategy and roadmap which outlines how any existing and future digital improvement can best serve their patients, staff and organisation.

Lynne Mellor, Non-executive Director
York and Scarborough Teaching Hospitals NHS Foundation Trust

The NHS is still at a transition point

While every trust has at least some experience of the big technologies of the past few decades, the NHS still lags behind other sectors in adoption.

Many of the systems in place today pre-date these technology changes. Data centres in hospital basements and private communication networks like [N3/HSCN](#) are still commonplace. Few health applications were designed natively for the web or mobile.

This is largely true for trust-wide electronic patient record (EPR) systems, too. Very few EPRs take full advantage of cloud computing or mobile technologies, for example. And implementing an EPR across a trust is a huge undertaking that will still take many months and significant investment to achieve.

Therefore, operating in the world of NHS technology requires pragmatism: an awareness of modern technology approaches combined with a realism about what technologies are available – and useful – in health and care today. Many modern technology practices – user-centred design, agile delivery, multi-disciplinary teams – can be applied to good effect, regardless of the technologies being used.

CASE STUDY

Promoting collective board ownership at Milton Keynes University Hospital NHS Foundation Trust

“We know as leaders we will sometimes get it wrong. The challenge to the board is how they will come together to respond to failures, pick themselves up and get it right in a different way. It is the responsibility of the whole board to have the confidence to invest in technology and create this space for innovation.”

JOE HARRISON, CHIEF EXECUTIVE
MILTON KEYNES UNIVERSITY HOSPITAL NHS FOUNDATION TRUST

Context

The trust understood that digital success would stem from strong leadership at board level. Rather than appoint a single digital leader to the board, the board set about restructuring its governance model to encourage collective ownership of digital amongst all board leaders.

Approach

All board members are expected to contribute and discuss digital at board level. Digital initiatives are grouped into four categories which makes it easier for directors to navigate the digital agenda:

- 1 Infrastructure:** Includes getting the basics right, such as wifi, devices and ongoing work on the electronic patient record. The ambition here for the trust is to become totally paperless.
- 2 Patient technology:** Focuses on giving patients more autonomy and power over their data. It tends to be spearheaded by the board's governance lead but operational and clinical leads also take a significant interest in empowering patients with insights and giving them greater flexibility. For example, the trust's [MyCare portal](#) is now used by over 100,000 patients, allowing them to change and cancel outpatient appointments on their phone, as well as receive clinical letters electronically.
- 3 Staff technology:** The trust's vision is to enable staff to do as much as possible on their own devices. This includes staff training, bank staff scheduling, booking leave and accessing pay slips. It also means weekly incidents can be pushed to staff phones, and more people can be set up to work from home. HR and finance leaders often drive "staff tech" initiatives.
- 4 Clinical technology:** Led by the executive medical director to encompass any technology innovation driven by clinicians or that simply improves care delivery. The board tries to never say "no" to clinician-led innovation which helps foster ownership and excitement. For example, Milton Keynes was the first trust to use [surgical robots for major gynaecological surgery](#). The trust's ambition on "clin-tech" is also helping services attract new staff.

Key considerations for boards

- **Think about the long term:** Systems in the NHS tend to stick around for a long time. That means if you're implementing outdated technology today, it will be even more outdated in a few years' time. Is this the right option for your trust?
- **Be pragmatic:** You may not always be able to adopt systems that make the most of modern technology, given the options available in the market.
- **Look outside of the NHS:** There may be technologies you can use that are not marketed specifically for use in the NHS or healthcare, but will work well for your trust. You may find that your needs are not as NHS-specific as you think.

BEFORE YOU START

What's the vision?

This may sound obvious, but it is worth restating: the board must start by asking what the trust is looking to achieve before considering any technology solutions.

Ideally this vision should **flow from your strategy**. For example, Portsmouth Hospitals' design principles, as **set out in their digital strategy**, inform all decisions on technology: any solution has to make things simpler, better connected, faster and more secure to enable the transformation of care pathways. Northampton General Hospital has an ambition to be ranked the most digitally mature trust in the country by July 2023, with **clear and straightforward success criteria**.

All too often leaders get hooked on a specific solution or tool and then spend time trying to justify their decision. Beware any technology enthusiasts showing shiny new tools before the board has an agreed vision. And board leaders shouldn't wait to receive full business cases before asking questions: start the conversation early so you understand how it supports your vision. This may take time, but this approach is fundamental to making the right technology decisions.



As a CIO I need support from my chief executive to hold the line on technology investments and ensure any decisions are aligned with our strategy. The board must not falter on this, even if it means making the hard decisions to turn down bid opportunities that are not in line with the trust's priorities and do not solve a genuine business problem.

Amy Freeman, Director of Digital Transformation
University Hospitals of North Midlands NHS Trust

Trust, ICS or place level?

With Integrated Care Systems (ICSs) due to be placed on a statutory footing, trust boards must consider the decisions they are making within their emerging system context. Indeed, NHS England and NHS Improvement has placed digital and data at the heart of system working, with the [ICS design framework](#) calling for system leaders to “identify ICS-wide digital and data solutions for improving health and care outcomes by engaging with partners, citizens and front line groups”.

NHSX’s [What good looks like framework](#) takes this a step further, with seven success measures for ICSs, which include among other things having “an ICS-wide approach to the use of data and digital solutions to redesign care pathways across organisational boundaries to give patients the right care in the most appropriate setting”. The framework calls for ICSs to have a clear digital and data strategy, which will guide trusts’ decision making on their technology decisions. Like other significant investments, ICSs will also be empowered with [certain digital funding decisions](#). The principles for system-working on digital are really no different to ICS collaboration more generally:

- design for real patients and service users and involve them early in the process
- raise the profile of system level priorities within the trust boardroom
- when decisions are needed, get the right people in the room from across the system
- share resources where you can.

This is of course easier said than done. System maturity varies across and within ICSs. In some systems, such as Hampshire and the Isle of Wight ICS, trusts are already [submitting joint bids](#) for funding on things like enterprise-wide schedulers. The East Midlands Imaging Network (EMRAD) is jointly supported by eleven acute trusts, and its cloud based service has already [saved around £130,000 in twelve months](#) in postage costs, with turnaround times for medical imaging slashed from seven days to just one.

And of course, it is shared care records where much progress has been made in recent years. It is thought that [37 of the 42 ICSs now have some form of shared care record in place](#). Amongst other things this record includes connectivity between primary and secondary care and utilises the [Health Systems Support Framework](#) to ensure future interoperability. Shared care records enable trusts to access health and care records safely and securely. This is particularly helpful for mental health, community and ambulance trusts who are more likely to span multiple ICSs. Shared care records, such as [Connecting Care](#), are also helping reduce unplanned admissions and improving discharge times. The foundations are now in place for most to explore more data driven and digitally integrated working.

Collaboration across providers within a smaller footprint presents further opportunities for digital. Some trusts are beginning to explore the possibility of jointly procuring technology solutions, including EPRs. The [Surrey Safe Care programme](#) is a single instance EPR programme shared between two trusts, Ashford and St Peter’s Hospitals NHS Foundation Trust and Royal Surrey NHS Foundation Trust. The potential benefits of collaboration include [interoperability, economies of scale and pooling risk](#). Other trusts

share certain IT support services, such as the Health Informatics Service, hosted by Calderdale and Huddersfield NHS Foundation Trust, while others have appointed joint digital leadership to align digital priorities.

Admittedly not every trust can pursue collaboration in these ways. Legacy systems, constrained funding and different priorities may make it difficult. But when trusts have successfully collaborated, it is because board leadership is fully driving the opportunities.

CASE STUDY

Choosing a joint EPR for the Bath, Swindon and Wiltshire Acute Hospital Alliance

“You need to put a lot of energy into collaboration if you’re making a decision across multiple trusts. Recognise the biases of your organisation but ultimately keep patients and clinicians at the centre of everything you do.”

DAVID McCLAY, CHIEF INFORMATION OFFICER
ROYAL UNITED HOSPITALS BATH NHS FOUNDATION TRUST

Context

The three acute trusts have been [working together in an alliance for some time](#) and are now producing a strategic outline for a single electronic patient record. Historically, each organisation has taken a different approach to EPRs which has resulted in different digital cultures.

The alliance’s memorandum of understanding has defined the clinical model for the joint EPR. Each trust wants to ensure that digital services operate smoothly and seamlessly across the three trusts, which in turn will build resilience within services. Previously patients were moving between trusts but this was unmanaged with unclear processes.

Approach

The joint EPR is led by each of the trusts’ medical directors. The journey hasn’t been easy: each trust had different strategies, priorities, timelines and biases. But a deadline for one of the trusts has now focused minds. And there have been strong signals from each of the boards about the desire to make it work. Executives have set clear direction, and the boards have been honest about pain points (such as timelines). Board leaders themselves have made the case to staff why the joint approach is better for the organisations than a single EPR, explained within the ICS context. That said, when there are difficult conversations to be had between the parties, a neutral party coordinates and facilitates these discussions.

Key considerations for boards

- **Learn about your partners' technology plans:** It's likely that your organisations are facing similar challenges. How can you start to align on priorities?
- **Avoid one-way door decisions:** Think about the long term consequences of technology decisions you're making today. If possible, start with decisions that have a lower impact or can be easily changed. For those that can't, consider whether you should consult with your ICS, provider collaborative or place partners before committing.
- **Level up:** Are there any quick wins to help level up organisations across your system? Everyone has a vested interest in working together and exploiting opportunities, but the system is **only as strong as your weakest link**.
- **Start small:** Trying to implement new technologies across a single trust is difficult enough, doing this across multiple organisations in an ICS is even harder. It's best to start with a small test project in part of the ICS, then grow from there. Don't try to solve every case straight away but do consider what the ICS is aiming for, and what you'll need to do to scale up.

MANAGING TECHNOLOGY RISKS

Digital transformation is a huge opportunity for trusts, but when technology goes wrong it can have a major impact on your ability to operate. Trust leaders have a duty to understand technology risks, and make sure the trust has a credible plan to address them.

Understand your risk appetite

Boards need to have explicit conversations about risk appetite. Perhaps the trust carries scars from previous technology failures that are driving you to choose the least risky option. Or perhaps there is a pressure to take a risk – for example, a ‘big bang’ rollout of a new system – due to budget constraints. For important technology decisions, boards should have the opportunity to discuss these trade offs.



The board needs to have explicit conversations about their level of risk appetite, and an understanding of the source of any aversion, including past scars. Proper risk analyses must be done to gain assurance in the same way you get assurance from clinical experts. A mature approach to risk will mean you don't blame experts for not foreseeing something. Review the risk register properly as a live resource.

Paul Devlin, Chair
Nottinghamshire Healthcare NHS Foundation Trust

Make it safe to fail

When it comes to technology, it's best to plan for something going wrong. Many modern technologies are designed to be fault tolerant, the system will keep working – to some extent – even if some parts of the system are repeatedly failing. The question for trusts is, how can we make our organisation fault tolerant, as well as our technology systems?

This is undoubtedly more difficult in health and care where, as the Academy of Medical Royal Colleges **has pointed out**, the tech mantra of “move fast and break things” does not fit well when applied to patient care. But there are ways NHS leaders can begin to address this. For example, boards can look to **support the professionalisation of CIOs** which will help with safer transformation.

Promote a learning culture

Much like in patient safety, technology failures are far less likely to happen in the future if there is a **just culture** where people can talk openly about them without fear of blame. Many digital teams hold regular retrospectives where participants are reassured that:

“Regardless of what we discover, we understand and truly believe that everyone did the best job they could, given what they knew at the time, their skills and abilities, the resources available, and the situation at hand.” Norm Kerth, Project Retrospectives: A Handbook for Team Review

Once lessons have been identified, a learning culture also means making sure teams have the time and resources to take action. For example, after a major outage boards should be asking whether the teams responsible have what they need to address the root causes and reduce the chance of it happening again.

Implement systems incrementally

Modern technology makes it cheaper and easier to try something new – in a way that wasn’t possible with the big, expensive systems of the past. Starting small, testing and then scaling up is one of the best ways to reduce the risk of a new system not working as intended, or not meeting the needs of patients and staff. The Great North Care Record programme’s **vision statement** is clear about the expected pace: “these changes will not be achieved in a single leap. Our ambition is to build maturity over time”.



Your biggest challenge as a leader is holding people’s attention for a three year programme which doesn’t immediately deliver significant outputs. Therefore, it’s important you don’t over promise. Instead, be honest about the limitations and explain to people that the change will take time.

Dr John Byrne, Executive Medical Director
Humber Teaching NHS Foundation Trust

Keep your options open

Sometimes large technology projects can be ‘too big to fail’. Too much actual and political capital has been spent. Contracts have been signed that are near impossible to break. However, beware the **sunk cost fallacy**: in these situations it can be worthwhile considering your options.

Boards – and in particular non-executives – can play a role in opening up this conversation, especially when senior leaders are closely tied to a particular project. Use these situations as a learning opportunity: smaller technology projects delivered incrementally with more flexible commercial terms is one of the best safeguards against this happening again.

Manage risks, don't just document them

Sometimes risk management can become an industry in logging theoretical risks on a spreadsheet, rather than taking action. Be clear on the difference between risks and live issues that are already in play. Boards should push to actively test risks where possible, for example through incident simulations. Leaders should look out for technology issues that arise when rehearsing major incidents. This will help you better understand what actually might happen, or how certain risks will play out differently than anticipated.

There's no shortcut to a mature risk management approach, promoting a learning culture will help, as will opening up regular, open channels of communications between delivery teams, senior leaders and boards. As board members, assurance will be sought through what you hear, what you read and what you see (the triangulation of evidence).

The risk of doing nothing

Implementing new technology can introduce risk, but so can standing still. As technology ages, trusts can be exposed to layers of risk they're not fully aware of. Systems can be running normally for years, but break when they're overloaded with more data than they were ever designed to cope with. Or perhaps a system that was implemented many years ago is now so old that none of the current staff know how it works, or how to fix it if it breaks.

Boards should be aware of the biggest incumbent technology risks faced by the trust, and understand the plan to address them. It is also worth reflecting on the need to balance short term and long term risk: failing to innovate now can leave organisations behind as technology moves forward.

CASE STUDY

Introducing new systems incrementally at North West Ambulance Service NHS Foundation Trust

"The success of the SafeCheck work was driven by a clear sense of purpose, the leadership of an authentic clinician, the incubation of ideas, rigorous testing, rapid modification and a clear understanding of 'why?'"

MAXINE POWER, DIRECTOR OF QUALITY, INNOVATION AND IMPROVEMENT
NORTH WEST AMBULANCE NHS FOUNDATION TRUST

Context

Vehicle, equipment and medicine checks are required before an ambulance can be taken on the road. These checks were previously recorded on paper which meant records were difficult to update, monitor, track and effectively respond to. It made it almost impossible for the trust's leadership to identify trends, and the board struggled to gain assurance on non-compliance.

Approach

A small team, led by senior paramedics, was empowered to design and develop a new digital quality assurance platform for recording these checks. The trust's leaders permitted the team to run a six week testing cycle, using a Plan Do Study Act (PDSA) approach to test and iterate a prototype system. A set of design principles were also developed to ensure the new system would meet both user and organisational needs. This included making the new system accessible on all vehicle types, ensuring real time audit and reporting functionality, and ensuring it could be accessed on all mobile phones and devices. A notice board was placed inside the ambulance station where the new system was tested, so all staff on different shifts could see the changes being implemented. Detailed user feedback was captured throughout the testing as the [SafeCheck](#) system was developed and then scaled across the trust.

Cyber security risks

Given how much we now rely on technology, cyber security is critical to the resilience of NHS trusts. Responsibility for making sure trusts have good cyber security sits firmly with boards. The impact that the WannaCry ransomware attack had on the NHS underlined both the importance of this, and the weaknesses in some parts of NHS cyber security.

The threat of cyber attacks is real for all trusts, most attacks are opportunistic, using known techniques. The sensitive nature of patient data increases the stakes considerably. However, boards should beware of security 'myths' that could prevent them from adopting modern technologies or using data to improve care. It's commonplace for people less familiar with modern technologies (i.e. Internet, web, open source, cloud, mobile) to worry that these are somehow less 'secure' than the technologies they are used to.

The truth is that no technology has a monopoly on security, it's down to how it's set up, the controls around it and – ultimately – how it's used by staff and patients. Cyber security shouldn't be a blocker to technology progress – in fact, good cyber security is critical to robust systems trusted by all. And ongoing investment is also key, sweating technology assets and just "keeping the lights on" can leave organisations exposed.

There is plenty of support available to help trusts improve their cyber security. [NHS Digital](#) has invested heavily in this area in recent years, and the UK's National Cyber Security Centre has published a [Board Toolkit](#) for organisations to encourage discussions between boards and technical experts. In 2018, the National Cyber Security Centre (NCSC) posed these [five questions on cyber security](#) for board agendas:

- 1 How do we defend our organisation against phishing attacks?
- 2 How does our organisation control the use of privileged IT accounts?
- 3 How do we ensure that our software and devices are up to date?
- 4 How do we make sure our partners and suppliers protect the information we share with them?
- 5 What authentication methods are used to control access to systems and data?

Given the recent attacks on NHS organisations, we would also add:

- 6 What are we doing to reduce the potential impact of a successful attack (e.g. ransomware)?



There's a tendency within the NHS to document risk and not actually do anything to manage and mitigate those identified. Instead, you need to have active engagement and a really clear plan which includes the costs of managing and mitigating.

Barry Thurston, Chief Information Officer
London Ambulance Service NHS Trust

Key considerations for boards

- **Don't be scared:** Technology can be an intimidating topic for some board leaders, and many carry the scars of technology failures. But standing still isn't a viable option – boards need to balance risks with the opportunities technology can provide.
- **Things will go wrong:** Trusts should create a fault-tolerant environment where risks are acted on, changes can be safely tested and failures can be talked about openly without fear of blame.
- **Cyber threats are real:** There are tried-and-tested ways to protect against cyber attacks, and boards should make sure this work is prioritised given how serious the consequences of a successful attack on the NHS can be.

MAKING CHOICES

5

Technology decisions can have long term consequences. The board is there to ask the right questions to make sure the trust is making high quality decisions with the information available today. This means going beyond anecdotes, and asking what is reasonable to conclude from what you've read, what you've seen and what you've heard? Constructive challenge is critically important – board members shouldn't shy away from asking tough questions, even if they are less experienced in technology. There is nothing in a boards' business that is not capable of explanation to a director whose professional expertise lies elsewhere.

There are some common, long running challenges to investing in technology within the NHS. NHSX has recognised many of these and is seeking to address them within the *Who pays for what* proposals. These include:

- **Complex funding arrangements:** general uncertainty within the sector about what money is available, a lack of transparency, misalignment of priorities, timeliness of money being released, the wrong mix of revenue and capital made available, single-year budgets and burdensome bidding processes.
- **National policies that impede innovative technology investment:** such as organisational financial targets focused on non-recurrent savings, activity-based payments and limited incentives for trusts to invest in digital transformations.
- **Lack of innovation and measurements for optimising technology investment:** a lack of oversight over how much organisations are spending on technology, lack of understanding of measurable benefits and an inability to measure financial payback on certain investments.

In addition to this, over the last few years there has simply been insufficient funding available for the NHS to invest. Given these constrained budgets, trusts have faced tough decisions on technology funding.

The board should also have a shared understanding of digital inclusion and clarity on their priorities for action. This doesn't mean avoiding decisions on technology, instead it'll mean **offering digital technology solutions to those that can, so you can spend more time with those who can't**. Good patient and citizen engagement is important in bringing people along with you. For example, the Yorkshire and Humber Care Record team has produced explainers on **data and population health management** for their patients and service users.

Where should we invest our limited technology budget?

Board leaders should aim for a **balanced portfolio** of technology investments. The composition of this portfolio will depend on your organisation's circumstances, but it is useful to think about these dimensions:

Keeping the lights on vs. making improvements

A significant proportion of technology budgets are spent on running costs: support, maintenance, critical upgrades and infrastructure. Too little spent on running costs makes outages or unreliable systems more likely, diverting attention from other priorities. Equally, focusing exclusively on running today's systems will store up trouble as those technologies become obsolete.

Boldness vs. safety

Some cutting edge technology initiatives are high risk, high reward. Early stage Venture Capital firms specialise in taking calculated bets, hoping that 1 in 10 of the start ups they invest in will become hugely successful (although most may fail). Trusts are generally not well suited to invest and incubate in this kind of innovation, but some – especially those with strong academic ties – have been successful. For example, **Medway NHS Foundation Trust's innovation institute** allows teams and services to bid for innovation seed funding.

While it may make sense to place a couple of technology 'bets', the vast majority of a trust's technology portfolio should be invested in initiatives that have a high chance of success – solid business cases, tried-and-tested technologies with clear demand from users. Beware of these 'bets' consuming management time and distracting from the real priorities.

Short term returns vs. long term returns

Large-scale, organisation-wide technology changes can take months or years to implement, and even longer for the full benefits to be realised:

*"The history of the productivity paradox points to a lag of 10 years or more before the full benefits of health IT are realised." **Making IT work**, Wachter Review 2016*

These benefits are not always financial, technology can make a major contribution to the quality and safety of care.

While these big transformations are important, there will be lots of ways to make tangible improvements in the near term without a huge investment. Boards might want to ask:

- How can you design a portfolio that makes space for these kinds of small, no regrets investments alongside major projects?
- Do your funding, approvals and governance processes provide a fast track for low cost, low risk improvements?

Andy Kinnear, a former NHS CIO and now CHIME International faculty member characterises NHS IT spending as falling into four distinct categories:

- running the operation: e.g. support desks, breaking and fixing things, standard service delivery
- essential investment and renewals: Windows upgrades, pressuring to reduce running costs, server colocation, new desktops
- digital development: digitising paper based processes, EPR implementation
- transformation enhancement: population health management tools, artificial intelligence.

Funding modern technology

In addition to deciding *where* to invest in technology, trusts also need to determine *how* to invest. There are some practical considerations when trying to deliver modern technology using traditional public sector funding models:

- **In-house technology teams**

It's now more common to build technology expertise in-house, rather than rely on an entirely outsourced model. Even if you rely on vendors, you'll still need to invest in some in-house skills to get the most out of them.

- **Technology as a contributor to outcomes, not a distinct cost centre**

If your view of technology is primarily as a cost centre, it's unlikely you'll get the most out of it. Instead, it's likely you'll focus on reducing the cost and variance of technology. If you can shift to funding outcomes you can then have more informed conversations about whether your priority is improving your outcome, or in reducing costs.

- **Technology as a revenue cost**

Software and infrastructure are now more commonly purchased as services (ongoing revenue expense) rather than physical goods (one-off capital expense). This can sometimes create perverse incentives for technology teams to adopt legacy technologies or contracting approaches based on the type of budget available, rather than choosing the most appropriate available technologies.

- **Technology as a service**

The traditional model of public sector technology investments is to fund projects, rather than services. This can lead to a cycle of 'feast or famine', where systems are starved of investment once an implementation project has been completed, until a new project is started years later to replace that system. Internet-era organisations think about technology as a service, with a need for ongoing investment to make incremental improvements rather than big-bang projects.



Leaders need to set realistic expectations for the return on investment – boards must understand that in the case of EPR and digital transformation, return on investment is measured in years and not months.

Dr Ayesha Rahim, Deputy Chief Medical Officer and Chief Clinical Information Officer
Lancashire and South Cumbria NHS Foundation Trust

Should we invest in a new system, or try to improve or scale what we have?

Many trusts are struggling with legacy technology that is:

- unsupported by the vendor
- impossible to update
- no longer cost effective
- clunky or inefficient to use
- difficult to integrate with other systems.

Sometimes these technologies can be so old and unwieldy it is easier to move to something new. However, trusts should think carefully before deciding to invest in a new system. You may end up spending a lot of time and money to move to something new that doesn't provide any greater benefit than your existing system. Beware of:

- **The attraction of the 'new':** New technologies can be exciting for technology specialists and leaders alike. However, trusts should be wary of being led by the latest fashions. Improving an existing system may not be as eye-catching or announceable, but it may be the right choice.
- **'Not invented here' syndrome:** This is the belief – common in some technology teams – that systems built in-house are inherently better than those built by others. Although it may be initially harder for teams to support systems they are unfamiliar with, this is likely to be an easier problem to overcome than replacing a system.
- **Artificial commercial imperatives:** Understand your vendor's incentives – sometimes they may push you to upgrade for their benefit rather than yours.

Board members should ask: have we really explored the option to improve existing technologies? What benefits will we get from this new system?



The board observed that saying no to things that were contradictory to the trust's strategic intent is a consistent theme from the leading global digital exemplars. Therefore our regular communication about a consistent vision is important in carrying forward due diligence and delivering an information system that meets the needs of our patients and clinicians.

Noel Scanlon, Executive Director of Nursing and Patient Experience
County Durham and Darlington NHS Foundation Trust

Should we buy or build?

A common technology question is often framed as 'should we buy or build?' However, the answer is rarely a binary 'buy' or 'build'. Trusts will often end up doing a blend of both.

Buying technology is the main pattern in the NHS. There are many common needs that trusts have, and software markets have developed to serve these. In an environment where technical skills are in short supply, not having to build and maintain your own software is an attractive proposition.

The downside of buying technology is a loss of control and flexibility, you may have some ability to configure commercial software but there will be limits to what you can do with it. Any feature requests you make to the vendor may take time, contract changes and additional money to realise – it is likely they already have a lengthy backlog of requests from their other customers. Your leverage over the vendor will be weaker if you're a small customer, and will weaken as the more embedded their system becomes in your organisation and the threat of your trust switching to another system becomes less credible.

Don't knit your own underpants

Most trusts have at least some software that has been *built* – even if it was built for them, rather than by an in-house team. This could be a website, or a data service, or an integration between systems. There are some things, however, that trusts should avoid building. There's usually no point in building technologies that are readily available as a commodity, especially where the needs of your trust are not unique or special. Productivity and communication tools like email and building blocks like databases and storage are all now available as cloud services or open source software.



If you are going to 'build', build things that will fundamentally change healthcare and deliver real innovation. It is a waste of valuable NHS resource to build digital solutions that will just maintain parity with the external market.

Gary McAllister, Chief Technology Officer, OneLondon

Beware of 'fake' off-the-shelf systems

Commercial off-the-shelf systems of the type used in trusts are rarely as straightforward as the name implies. Large off-the-shelf systems can take months and armies of consultants to implement. This can often come as a surprise to organisations who have been promised a simple, 'turn-key' solution by vendors, but find that the reality requires a significant amount of customisation to make it work for their needs. Some have compared this to "*ordering a new car and instead getting a large box of car parts*".

This kind of 'fake' off-the-shelf system can be the worst of both worlds, the amount of customisation required can negate many of the benefits of adopting an off-the-shelf system in the first place. Heavily customised systems often can't receive the regular updates from vendors and lock your organisation into a long term relationship with the vendor. These systems end up looking like 'built' systems, except they are more expensive and less flexible.

Technology options are always changing

There are lots of things that are now commoditised that weren't a decade ago. Building your own on-premise data centre is a lot harder to justify now than it was in the 2000s.

But there are also things that are making *building* technology easier. Cloud services that can be assembled so easily that it's better to have the flexibility that comes with gluing them together yourself rather than paying for a packaged solution.

The right answer to build or buy is not static: it changes over time as technology evolves.

CASE STUDY

Adapting to changing needs at York and Scarborough Teaching Hospitals NHS Foundation Trust

“The board need to remain open-minded to fresh thinking. Horizon-scanning is ever more important. Everything in the digital world is moving so fast so you can’t get wedded to one solution.”

LYNNE MELLOR, NON EXECUTIVE DIRECTOR
YORK AND SCARBOROUGH TEACHING HOSPITALS NHS FOUNDATION TRUST

Context

York and Scarborough Teaching Hospitals NHS Foundation Trust had built their own Core Patient Database (CPD) EPR system. CPD had evolved over the last 30 years and was developed in-house by clinicians and IT. It was seen as leading-edge for many years and popular with staff. However, maintaining the current system began to prove costly as patient and staff needs changed, technology shifted and the need to integrate with the wider care system became increasingly important.

Approach

The trust, in collaboration with the ICS has now decided to develop an ‘open platform’ integrated care record solution with a preference to develop/procure a cloud-based solution. The benefits of this approach include:

- opportunities for better health and care outcomes for patients as clinicians have a more easily-accessible holistic view of the patient’s health and care record
- reduction in costs with the development and deployment of one integrated care record across the system
- faster future technical agility as the digital and supplier landscapes continue to change.

This decision was not taken lightly: the board has accepted this is a large undertaking which must be done carefully and securely in alignment with patient, staff and partner needs and is likely take five to ten years for completion from inception, to delivery, to embedding the change.

But the trust’s leaders will continue to be open- minded and flexible in their thinking. The board accept they need to have the wherewithal to pivot when the time comes to change again.

Key considerations for boards

- **There's no one-size-fits-all:** Whether the decision is to 'buy' or 'build', implement a new system or invest in an existing one, there is no 'right' answer. You need to make these decisions based on your trust's context and constraints.
- **Balanced portfolios:** Don't put all your eggs in one basket. A mature approach to technology is one that balances between old and new, short and long term, basics and transformation.
- **Changing the way digital is funded:** Making the most of modern technology requires a different approach to funding. Boards can explore creative ways to invest – within existing rules – that enables teams to deliver and decisions to be made at the right level.

AVOIDING BAD DECISIONS

Ignore the hype

Trust leaders can feel pressure to innovate by adopting new technologies. However, this often results in the *“appearance of innovation without changing anything that matters”*.

The hype cycle is a well observed phenomenon in technology. New technologies emerge, with early adopters attracted by the novelty. Media attention raises awareness, causing a surge of interest in the technology. Vendors use it as a buzzword, customers feel pressure to try it out. These high expectations are difficult to live up to, and the initial enthusiasm in the technology wanes. Eventually, organisations figure out how to get the most out of these technologies, and they enter the mainstream.

Blockchain, robotic process automation, artificial intelligence and digital twins have all gone through this cycle. Boards should be cautious about these kinds of hype technologies, especially those promoted by vendors and consultants. Often, these are presented as a ‘magic wand’ that can solve difficult problems, but the reality is usually far less impressive. Limited bets on emerging technologies can be useful, but not at the expense of applying proven technologies to your trust’s problems. Given the NHS’ limited means, it is important to have the fundamentals in place first and avoid getting distracted.



The board needs to understand what its areas of expertise are, but you can’t expect everyone to know everything. You’ll need access to the right level of understanding in order to ask the right questions. But you should also be alert to what is driving the advice you’re receiving. Make sure you’re having the peer-to-peer conversations to understand how it’s being done elsewhere.

Paul Devlin, Chair
Nottinghamshire Healthcare NHS Foundation Trust

Adopt a problem-first mindset

Boards should be cautious of technology-led approaches that lack clinical involvement and clear outcomes for patients and staff.

Digital transformation is about more than just applying technology to your organisation. The right approach is often to **work backwards**. Start with a clear outcome, find out who your users are, understand their problems, design a service to address them and *then* figure out what technologies (if any) can help. This is harder than just implementing an existing system: it requires thinking in terms of problem statements and outcomes rather than specific types of systems.

However, this can sometimes be too heavyweight an approach. Often the right approach is to pattern-match. If something has been solved many times before, there is no point in trying to reinvent the wheel. If you need an email system, you don't need to run a **discovery** and design your own system – you just need to adopt a commodity service tried and tested by others. All board leaders should consider joining networks and communities that will allow them to **share ideas, case studies and learn about pitfalls** to avoid.

You will, however, **need a team responsible for any new tool**: even if it is a system you buy, you'll need to configure it, improve it and make sure it is adopted across the organisation. Many new off-the-shelf systems fail because organisations don't have a team responsible for spotting when pattern-matching has gone wrong, and lack the feedback loop necessary to fix it.

The approach you end up taking will depend on the skills, experiences and – to some extent – biases of your teams. In the NHS, technology teams are usually expert in procurement, project management and operations within healthcare rather than software design and development. This is part of the reason why buying technology – especially systems marketed specifically to NHS organisations – is far more common than building software. Boards should help the trust build a **diverse technology team** with experience of different approaches and a strong understanding of modern technology.

And any decisions on technology should be made by diverse groups with inclusivity at their core, **otherwise you risk prioritising the needs of one group over another**. Diversity of culture, experience and thought helps you avoid making bad decisions. Board leaders should consider joining groups such as the **Shuri Network** and take an active role in fostering equality, diversity and inclusion within the digital agenda.

CASE STUDY

Widespread engagement at County Durham and Darlington NHS Foundation Trust (CDDFT)

“From a chief executive perspective, it is key to establish what it is you are trying to achieve. What is the aim and ambition, and then ask how does the technology play a part? For CDDFT this was about enabling clinicians to spend less time on administration and more time caregiving.”

SUE JACQUES, CHIEF EXECUTIVE
COUNTY DURHAM AND DARLINGTON NHS FOUNDATION TRUST

Context

County Durham and Darlington realised that their previous 'best of breed' approach to EPR was no longer viable. They were faced with around 25 legacy systems in place, several of which required repeated patching. Staff were frustrated by these slow systems that required multiple sign-ins.

Approach

The board quickly established a clear and single ambition that any new system fundamentally needed to allow clinicians to spend less time on admin and more time caregiving. This would be the driving force behind any technology decision. Improvements to back office functions and cost savings would be important but secondary aims. This clarity of focus guided the board in their strategic discussions, clinical engagement and the EPR supplier tendering process.

The trust's leaders decided to pursue a large EPR system to replace their previous 'Clinical Portal'. The trust moved quickly to build project teams and rollout engagement across the organisation, led by the medical and nursing directors. They proceeded with a "ground up" scoping process in which digital champions were heavily involved in articulating the clinical needs, and engaged in due diligence. A CIO, CCIO and digital nurse matrons were appointed. All clinical staff were encouraged by board leaders to speak with other trusts and potential suppliers, in order to investigate the available options. Over time, County Durham and Darlington has appointed one sixth of its workforce as digital ambassadors for the EPR programme.

The trust's two staged approach of aligning on the vision and then empowering clinicians to do "ground up scoping" has given board members the confidence that their chosen system is clinically suitable and strategically aligned with the wider needs of the organisation. The high level of staff engagement puts the trust in a strong position for success during implementation.

Automate the right things

Technology isn't always the answer: sometimes organisations try to implement technology when a manual solution would be better.

Trusts should avoid automating too soon. If a process is new, it's not usually advisable to build a system for it. Let it bed in and improve, otherwise you risk burying it in concrete: it is much harder to improve processes that also require technology changes.

Some processes – even mature ones – are ill-suited to automation. Technology is the best solution for some problems, for example: standardised, repetitive tasks and complex calculations. But things that require judgement and empathy are probably best left as manual processes.

You also cannot 'automate away' inefficient clinical processes. Even where automation may eventually bring benefits, you will need to do the hard, human work of solving the process problems before you involve technology.



Within the NHS, there is often too much reliance on the 'digital' bit of digital solutions. You need to holistically consider processes and everything else that goes around the technology. EPRs cannot be implemented differently in different parts of the organisation. Trust leaders must therefore break down any reluctance to the organisational development work that is needed for implementation to be successful.

Sandra Betney, Director of Finance and Deputy Chief Executive Officer
Gloucestershire Health and Care NHS Foundation Trust

Key considerations for boards

- **Outcomes-first – but don't reinvent the wheel:** It's always a good idea to start with the outcome you're aiming for and work backwards. But for problems that have been solved many times before, there may be tried-and-tested solutions you can adopt quickly.
- **Start with the basics:** Solving real problems for patients and staff with mature technology may not be as exciting as adopting cutting edge technology, but it's where trusts should focus their attention.
- **Technology isn't always the answer:** Sometimes a manual solution may be better than automation, especially for new or rapidly changing processes.

UNDERSTANDING EPRs

Electronic Patient Records (EPRs) are a major part of healthcare IT today. Determining your approach to EPRs is likely to be the biggest technology decision a trust will take: a huge investment with consequences that will last for decades. Going live is just the start. Here are some questions boards should consider when making decisions on EPRs.

Should we adopt a trust-wide EPR?

Many trusts have decided to adopt a single trust-wide EPR – ‘one system to rule them all’ – rolled out across the whole organisation. These systems promise to enable virtually everything a trust would need: patient record keeping, prescribing, diagnostics, decision support, task management, communications, appointments, transfer of care, planning, analytics, finances, patient apps and modules for every clinical speciality.

The alternative to a trust-wide EPR is often presented as ‘best of breed’, where trusts adopt the ‘best’ system available for each function or speciality, integrating them where it makes sense. This allows trusts to retain systems that are already working well, and reduces the risk of lock-in to a single vendor.

For some, trust-wide EPRs are the only truly viable option. The ability to share clinical records across the organisation and enable cross-department communications is usually the winning argument for adopting and sustaining this approach. Having a single source of truth, and one tool with one login for staff to use are seen as major benefits.

However, trust-wide EPRs have attracted criticism from frontline staff as clunky, poorly designed systems that slow down, rather than speed up, care. In the US, where EPRs have been widely adopted for years, there has been **vocal criticism** of them from some clinicians.

The danger is that these large systems need to serve lots of different needs, which makes it less likely they will serve all of them well. When compared to modern consumer technology, these systems can fall well short of expectations.

There is no universal right answer to whether your trust should adopt a trust-wide EPR: this will depend on the context of your organisation, the needs of your users, the maturity of your existing systems and available technology skills.

An increasingly important follow up question will be to ask whether the EPR should cover more than one organisation. Some ICSs are now looking for a single EPR system that will cover multiple providers, reducing the need to integrate shared care records and opening up more opportunities to collaborate.

What problems will this EPR solve?

It can be tempting to use all the features provided by an EPR from day one, but this will add considerably to the complexity of your implementation. Instead, it's best to focus on the functionality that will deliver the biggest benefits. That's why "go live" is only just the beginning of your EPR journey.

Will this EPR be the only system we need?

Although trust-wide EPRs may promise to provide virtually everything you need, it may not be the best solution for everything. In reality, once fully implemented trust-wide EPRs become a trust's major system, but far from the only system.

Make sure you understand the weak points of the EPR. It may make sense to keep some of your existing systems (or adopt new technologies alongside the EPR) and integrate them, rather than use a sub-par solution provided by the EPR. Ease of integration and costs will be major considerations here.

It's also likely that – even with an EPR – you'll need to build some of your own software, or get someone else to on your behalf. See [Should we buy or build?](#)

Is this EPR right for your type of organisation?

Perhaps you're a community and mental health trust with a dispersed workforce, where remote access is critical. Or perhaps you are a highly federated trust, with very different ways of working across the organisation. It's important to understand the EPR's model of how an organisation should work, and how compatible it is with how yours actually works.

Is this EPR really a single system?

Despite appearances and marketing materials, EPRs may not deliver the fully integrated nirvana they promise. Often, EPR vendors have grown through acquisition of smaller technology companies, resulting in a suite of products that aren't well integrated with each other.

How does it really work in practice?

Boards should go beyond the flashy presentations. If possible, visit other trusts where the EPR is working – and not just the flagship implementations with visits stage managed by vendors. Speak to frontline staff and see how it's working for them, ideally in a trust similar to yours. Speak to other board leaders too. And – if you can – try before you buy. Put it to work in one part of your trust to learn more about the system.



Don't think of it as being just about the technology implementation. It is about technology and culture change. Never forget that. Before you implement anything, go out and see it in action. Make sure your board colleagues, multi-disciplinary clinicians and patients have too.

Owen Williams, Chief Executive
Northern Care Alliance NHS Foundation Trust

What about open source EPRs?

EPRs are usually commercial systems, although some trusts have adopted systems that are – to some extent – open source. Some commercial vendors are also adopting an **open specification** to guide the design of their systems. Proponents of open source or open specification EPRs point to lower risks of vendor lock-in, greater flexibility, lower licensing costs as key benefits. Trusts should look at the range of EPR options emerging, and decide what is most suitable for their needs.

How can we reduce the impact of lock-in?

Lock-in is inevitable when adopting a trust-wide EPR: whatever you adopt, it is likely to be around for a long time. While this provides more long term certainty, it can also reduce your flexibility and introduce some commercial risks. There are ways you can reduce the negative impact of lock-in:

- Think about how you'll move away from the system before you start using it. The cost of change will be high, so make sure you've factored that into your business case.
- The more modules of the EPR you use and the more widely you roll it out, the deeper ingrained it will be in your organisation. Think carefully about how far you want your EPR implementation to go, and whether it makes sense to put some of your eggs in another basket.
- Understand what you will be able to do with this system in-house, and what will you be dependent on the vendor or third party consultants for. Vendors often have commercial incentives to sell services on top of the software, so make sure you understand how system improvements can be made without expensive contract changes.
- Understand how you can get data in and out of the EPR. Just because this is your main system, it will never be your only system. What guarantees do you have about APIs (Application Protocol Interfaces – connections between systems that enable data to be shared) and data standards? Will you need to pay the vendor more money to build integrations when you need them?

- Finally, avoid customisations that substantially increase the risk of lock-in to the EPR. The more bespoke changes made to the system, the harder it can be to upgrade, integrate and support. While some customisation is necessary to make the EPR work for your trust, you should be careful not to lose the benefits of a standardised 'off-the-shelf' system used by lots of other organisations and supported by the vendor.

How mature is the EPR's ecosystem?

When you adopt an EPR, you're not just buying into a system, you're making a bet on the health of the ecosystem around it. Make sure your trust understands this:

- How many technology specialists with expertise in this system will be around in the next few years?
- Will there be a healthy market of third party plugins, apps, devices and integrations that extend the functionality of the EPR?

How much will it cost?

- **Implementation costs** are likely to be higher than you plan for. Optimism bias – the tendency of individuals to expect better than average outcomes from their actions – explains why projects often take longer, cost more and generate lower benefits than anticipated. Rolling out a major system across your trust will require changes to the way people work and changes to the system that are hard to predict before you start.
- **Running costs** are more than licensing, hosting and staff costs. You should also account for an ongoing cost of change. Once the EPR is implemented, it is far from 'done'. Your organisation is always evolving, and your EPR will need to keep pace with changes to your structures, ways of working, clinical practice and regulations.
- **Long term costs:** Your EPR will be around for a long time – probably longer than the initial contract. What assurance do you have that the supplier will price it fairly and not hold you to ransom for an ageing piece of technology?
- **Beware hidden costs:** Licensing deals can be complicated. Push for as much simplicity as possible, and make sure you have a clear agreement for the cost of changes.

What is the supplier's commercial model?

Before entering into a commercial relationship with an EPR vendor, your trust should have a good understanding of when and where they are making their money. Is it in upfront costs or further down the line in terms of development and licensing? How does the supplier make decisions? Who is authorised to make decisions and what is the process? When can the supplier help you and when will they not have the answers? And equally, when they want something from you, what will be the cost to the trust?

Should we roll out the EPR in a 'big bang' or gradually?

Implementing a trust-wide EPR is a significant undertaking that will change how staff work across the trust. Some trusts take the view that it's best to get the pain out of the way in one go by launching the entire system for everyone at the same time. Many trusts take the view that they need to launch across the whole trust at the same time to realise the benefits of deploying a trust-wide EPR. There may also be practical reasons for this: the need to avoid dual running costs, contract end dates, the added burden of staff working across multiple systems and the complexity of keeping data in sync across old and new systems.

However, this approach carries risks: if something goes wrong, the impact can be severe. Modern technology practice is to test and iterate before rolling out a new product. While this may be more difficult to do with a large EPR system, testing the system with a smaller set of users before your main rollout will help you identify problems early, in a lower stakes environment.

Beyond implementation

Whether you decide to do a 'big bang' launch or not, there is still much to do after an EPR is rolled out. Implementing an EPR is not a straightforward technical change. It is a complex development that requires clinicians, managers and technology experts to work together to adapt ways of working and optimise the system.

Calderdale and Huddersfield NHS Foundation Trust categorised their EPR journey

into four stages, which only started with implementation and "go live". This was followed by a stabilisation period, where enthusiasts were identified and where the trust began to understand how the tool was being used. Since then, the trust has been optimising their solution, ahead of what has been identified as the "full transformation phase".

Throughout an EPR's life, there will also be a need to develop new documentation processes for clinicians. [Jim Ritchie, chief clinical information officer at Salford Royal NHS Foundation Trust](#) has identified nine design principles for doing this (although some are more relevant to acute settings):

- **The document serves the patient and the user, not the organisation:** Prioritise patient care needs over commissioning for quality and innovations (CQUINs) and key performance indicators (KPIs).
- **Better doesn't always mean faster:** Quality is paramount.
- **An EPR is not an implementation tool:** Documentation supports process and behaviour change but it cannot enforce them.
- **Clinical documents are part of a workflow, not the workflow:** Understanding what else the users' need will identify further opportunities for improvement.
- **Show don't tell:** The clinical documentation must ultimately give clinicians the right information at the right time.
- **Nudges do work:** Users will respond so don't be afraid to experiment.

- **Reuse, reduce, recycle:** A lot of this is about ensuring consistency across the organisation.
- **Don't ask impossible questions:** "Looking at documents in use and critically examining for gaps, workarounds or fields that promote garbage answers is vital to allow informed iteration and improvement."
- **Integrate, don't segregate:** EPRs need to reflect the multidisciplinary nature of health and care delivery.

CASE STUDY

Ensuring EPR launch readiness at Lancashire and South Cumbria NHS Foundation Trust

"It sounds obvious, but change is hard, people don't read their emails, they forget their training. You have to accept people will struggle with a new system (but never accept risks to safety). So don't underestimate the level of support needed during deployment. Ask the questions you may not feel comfortable asking. My job as a CCIO is to make board leaders feel comfortable."

DR AYESHA RAHIM
DEPUTY CHIEF MEDICAL OFFICER AND CHIEF CLINICAL INFORMATION OFFICER
LANCASHIRE AND SOUTH CUMBRIA NHS FOUNDATION TRUST

Context

Lancashire and South Cumbria NHS Foundation launched their new RiO EPR system during the middle of the pandemic, with minimal disruption. Leading up to the launch, the trust's leaders took necessary steps to thoroughly mitigate risk and ensure organisational readiness for the new system.

Approach

The project team focused staff readiness for launch across three areas: operational, technical and clinical safety. Crucially, this 'tripartite of readiness' had executive oversight. Regular deep dives, chaired by either the chair or the chief executive and with several executive directors present, were regularly taken throughout the build up to go live. These deep dives increased accountability, built relationships with frontline staff, and created a buzz and momentum about the new EPR.

The board hasn't been naive: there has been negative feedback, some reporting has gone awry. It's been important to avoid getting lulled into a false sense of security as some of these issues have only materialised after the first few weeks. There has been a clear support system with escalation routes for when issues arise, including silver command that escalated more major risk issues to executive directors. Gold calls were previously scheduled daily but stood down after a couple of weeks.

Key considerations for boards

- **Explore your options:** There's no right approach to EPR, this will depend on the context of your trust, the needs of your users, the maturity of your existing systems and technology skills.
- **Go in with eyes open:** Once up-and-running, EPRs provide huge benefits. But getting to this point can be an arduous – and expensive – journey.
- **Try before you buy:** Go beyond the marketing materials: find out how the EPR works in practice, in trusts similar to yours. And then try it out on a small scale before making a big commitment.

UNDERSTANDING INTEROPERABILITY

8

Technology teams are working hard to share data with other trusts, connect to shared care record systems in ICS, national systems and social care systems run by local authorities.

For example, [North Cumbria Integrated Care NHS Foundation Trust](#) set up an information sharing gateway and brought in an interoperability product specialist to help facilitate data sharing between primary care, secondary care and social care across Cumbria.

Organisations with trust-wide EPRs can find they need to do work to share data with other systems in the trust – or even parts of the EPR itself, despite claims from vendors that their suites of systems are fully integrated.

Interoperability – getting systems to talk to each other – is one of the biggest technology challenges in our federated health system. It's hard because, amongst other things, different parts of the health and care system work in different ways, using different ways of communicating. While interoperability can be a dense, technical subject, it is important that board members understand the basics given its importance to delivering joined up health and care. The key aspects of interoperability are:

Technical interoperability

There are well-worn methods to transfer data between healthcare systems:

- **Standard file formats and languages** provide a common way to represent data – in a similar way to how a PDF file can be opened on any computer.
- **Messaging standards** exist to give systems the context they need to interpret the data and send it to the right place – a bit like a letter with a subject line and to/from addresses.
- **Transport mechanisms** act as tunnels to send data from one system to another. These are sometimes known as integration or interface engines.

Information modelling

However, interoperability is not a pure technical challenge. If anything, technical interoperability is the easy bit. Even if there is a way for systems to talk to each other, they may still be talking different languages. The big challenge is that there is no universal way of modelling medical information, and different systems use different standards.

This is a hard problem: medicine is a dense, ever-evolving field with different perspectives. And it is equally difficult in the care sector where there are even fewer technical standards. Full interoperability requires a standardised way of modelling information about the human body, everything that can go wrong with it, how it can be treated and what care can be delivered across the entire health and care system. This requires both technical and clinical expertise.

Terminology and coding (also known as semantic)

Even once there is consensus about how clinical information should be modelled, there can still be a gap in terminologies and classifications. If one system uses the term “tuberculous meningitis” and another uses “meningitis tuberculous”, interoperability requires a way of translating this. Coding standards like [SNOMED-CT](#), the [Dictionary of medicines and devices \(dm+d\)](#) and structures recommended by the [Profession Records Standards Body \(PRSB\)](#) aim to overcome this issue, but adoption is not universal.

Data quality

Another practical challenge is data quality: missing, wrongly coded and incomplete data is commonplace, especially when data originates from older systems. Some clinical information is stored as free text without any structure or coding, which is difficult for systems to interpret. Part of the challenge here is getting data input in the correct way without slowing down staff. If looking up correct coding slows staff down, they’re more likely to look for shortcuts. There’s a design challenge here, making sure systems are designed in a way that balances the need for good quality data with a good user experience. Cleaning it up once it’s in the system is expensive, so it’s worthwhile investing upstream.

Commercial barriers

Some software vendors see interoperability as a commercial threat, they think that the easier it is to get data in and out of their systems, the less locked in you are as a customer. These vendors may claim interoperability in theory, but in practice they make sharing data extremely difficult by adopting standards slowly (if at all). Other vendors treat interoperability as a revenue stream, charging both customers and third parties a premium to integrate with their systems. In the US, there is now federal legislation preventing these kind of vendor practices – termed [information blocking](#).

Legal and ethical barriers

Even if data *can* be shared between systems, this doesn’t mean that it always *should* be. The controversies surrounding [care.data](#) and General Practice Data for Planning and Research (GPDPR) demonstrate the need for trusts and their partners to think carefully about how they share data, consult with patients and service users and understand their responsibilities under UK General Data Protection Regulation (GDPR). [NHS leaders and trusts can sign up to the Ethics Charter](#) for public services.

There is of course a coordinating role for the national bodies here too. NHSX has suggested that ICSs will drive an **'interoperable by default'** approach. And they have set out their **five key priorities for interoperability**, essentially focused on the development of national standards:

- 1 A new end-to-end process and governance model for standards development**, that are co-developed with key users and relevant communities.
- 2 Developing a standards and interoperability strategy.**
- 3 Releasing an open source playbook**, providing tangible guidance and advice to providers and commissioners looking to adopt and implement open source solutions.
- 4 Long term roadmap for standards and interoperability**, setting out a pipeline for new standards and priorities for the implementation of existing standards.
- 5 Develop a standards portal** that will include a registry of standards used across health and care, providing clarity on which standards are applicable, to enable trusts to search for and easily locate the artefacts needed for implementing a standard.

Key considerations for boards

- **Interoperability is a means, not an end:** Given the complexity of interoperability, it's easy to lose sight of outcomes. Interoperability can improve clinical safety, enable joined-up care and make it easier for health and care professionals to do their jobs. These goals – not technology – should drive decision making.
- **What will make a tangible impact in the near term?** Interoperability is a complex topic, and projects can take a long time to deliver. It's best to focus on specific use cases and deliver some tangible improvements, rather than waiting for perfection.
- **Do systems actually have to talk to each other?** While having systems share data in a way that can be accurately interpreted and stored in other systems is often the most desirable solution, it's also usually the most difficult and expensive. If the goal is to enable staff to access information held in different places, there may be other ways to achieve this – like linking from one system to another – in a much faster and cheaper way.

Suggested citation

NHS Providers (December 2021),
Making the right technology decisions.

Interactive version

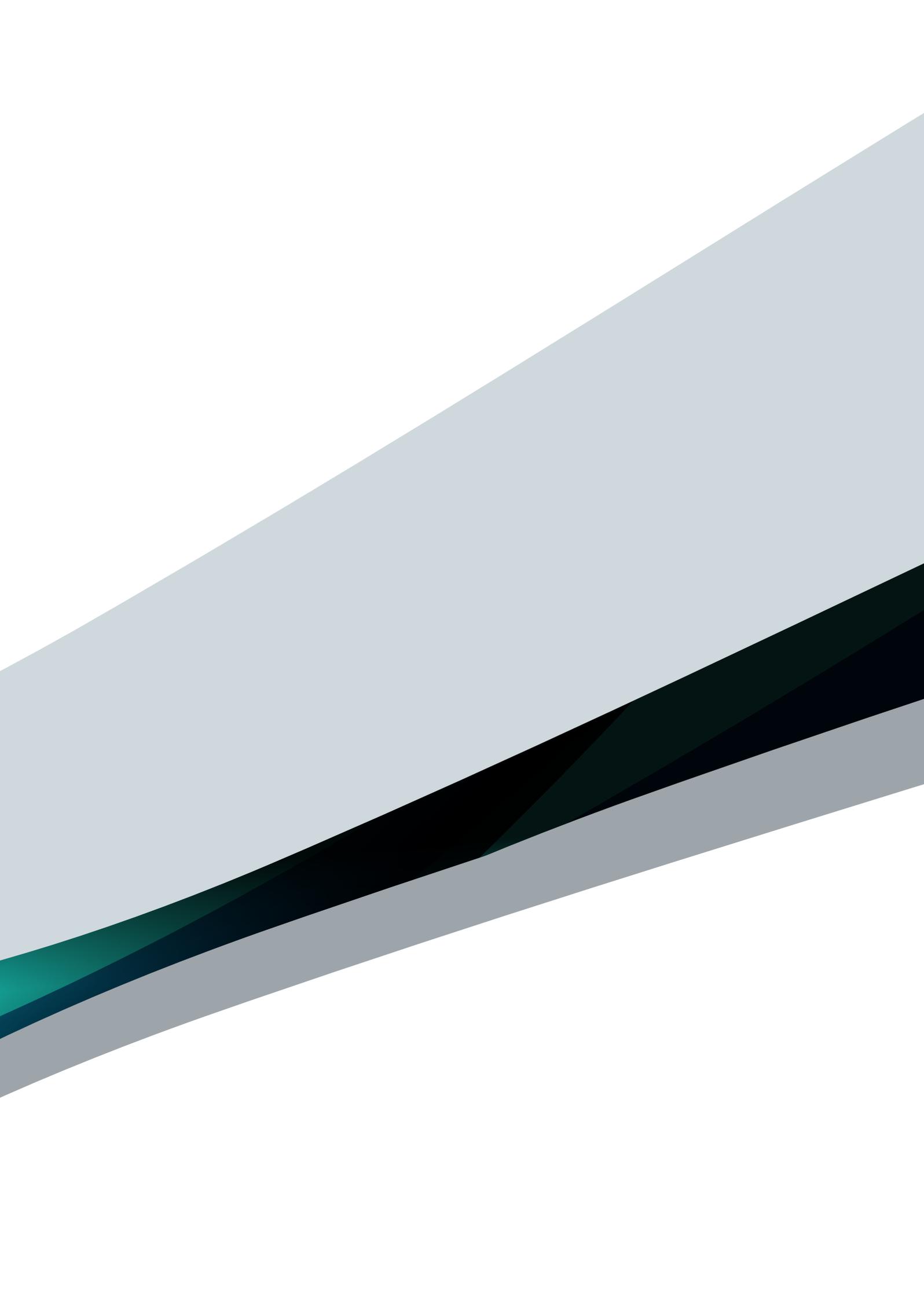
This report is also available in a digital format via:

www.nhsproviders.org/making-the-right-technology-decisions

For more information

Please contact:

digital.boards@nhsproviders.org



NHS Providers is the membership organisation for the NHS hospital, mental health, community and ambulance services that treat patients and service users in the NHS. We help those NHS foundation trusts and trusts to deliver high-quality, patient-focused care by enabling them to learn from each other, acting as their public voice and helping shape the system in which they operate.

NHS Providers has all trusts in voluntary membership, collectively accounting for £92bn of annual expenditure and employing more than one million staff.



One Birdcage Walk, London SW1H 9JJ
020 7304 6977
enquiries@nhsproviders.org
www.nhsproviders.org
[@NHSProviders](https://twitter.com/NHSProviders)

© Foundation Trust Network 2021

NHS Providers is the operating name of the Foundation Trust Network
Registered charity 1140900
Registered in England & Wales as company 7525114
Registered Office
One Birdcage Walk, London SW1H 9JJ