

# A picture of health?

The role of technology in UK health and social care



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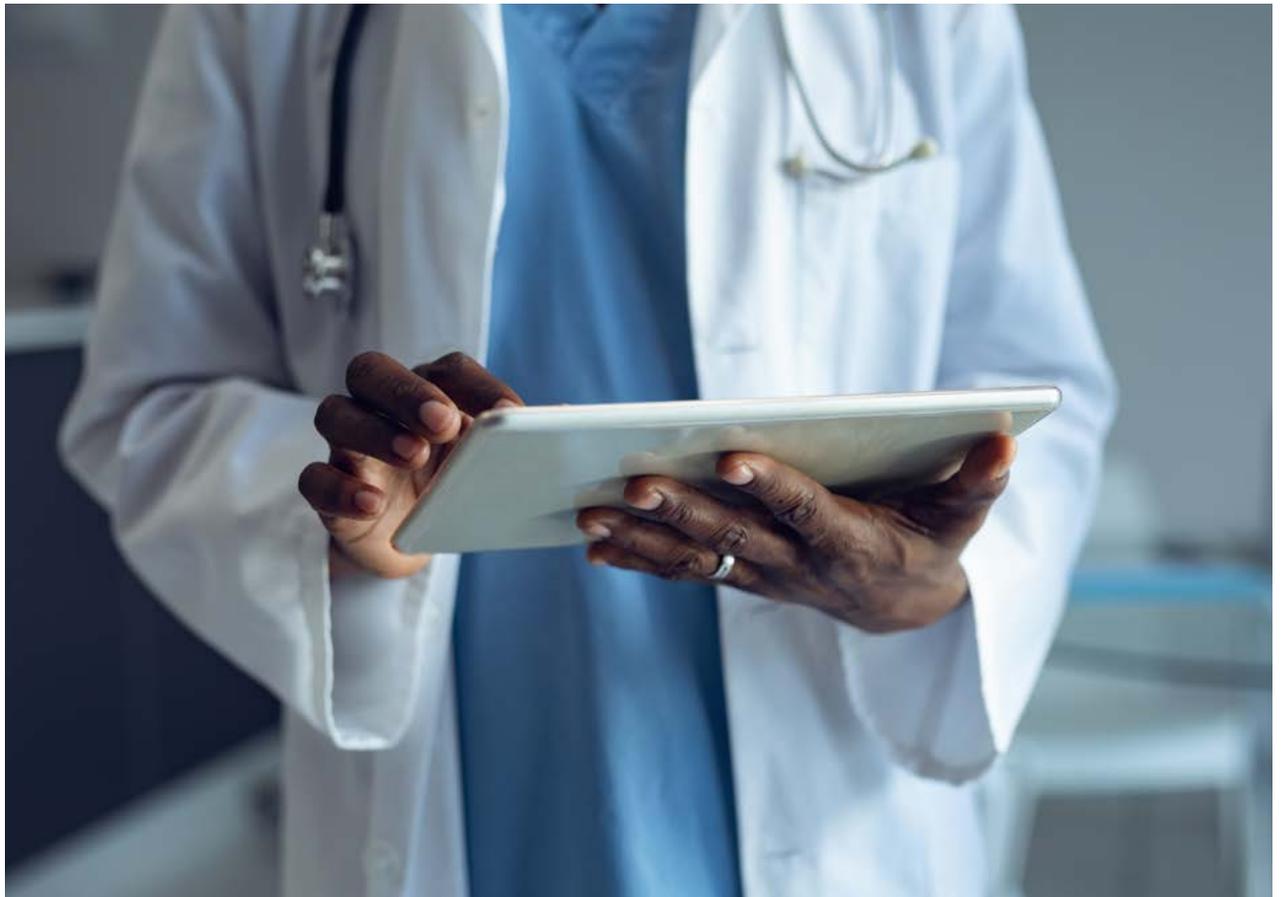
# Executive summary

Technology continues to be a key driver of innovation and efficiency across the healthcare sector.

Technology presents a huge opportunity for the UK's healthcare sector to improve both its business efficiency and the quality of its care. The impact on the sector to date has been fairly mixed, however. At the social care end of the spectrum, technology uptake and usage has been minimal, whereas at the acute end, and certainly in terms of the private hospital sector, it has been significant.

The potential to shift the UK healthcare model from a reactive to a more proactive, diagnostic focus enabled by technology is within reach. Already we're seeing private healthcare providers leading the way in personal, pre-emptive health checks and the increasing accessibility of portable monitoring devices is a step change. At its best, this technology can reduce the burden of monitoring chronic conditions, identify changes in behaviour, provide essential back up for in-home care and give reassurance to patients and their families.

“The potential to shift the UK healthcare model from a reactive to a more proactive, diagnostic focus enabled by technology, is within reach.”



It is clear that these and other solutions have the potential to address the numerous challenges facing the healthcare system. The impact of public funding cuts on NHS frontline services since the global financial crisis may have made the headlines, but there has also been a knock-on effect on the private sector, with referrals for treatment from NHS to private providers down by over 12% in 2017-18.<sup>1</sup> Meanwhile, declining numbers of GPs, a huge reduction in the number of doctors in public health and community specialisms,<sup>2</sup> and continuing nurse shortages<sup>3</sup> are placing incredible strain on the provision of health and social care.

New care models, additional regulation and more advanced medical interventions are also increasing costs across the sector. At the same time, population growth, the UK's ageing population and the subsequent rise in long-term health conditions, such as diabetes and obesity, are placing new demands on health and social care provision.

### **A global sector**

The UK is not alone in facing these challenges. Healthcare is a global sector, with many common themes shared by advanced economies, including changing demographics and the rise of certain disease profiles.

If we review the global response to these challenges, much is driven by technology. Japan, for example, is an innovation hub focused on managing the needs of its ageing population through the development of wearable monitoring technology and the harnessing of artificial intelligence (AI).<sup>4</sup> In the US, digital technology is being employed to reduce costs, increase efficiencies and improve patient outcomes by digitising records, using mobile apps and welcoming virtual reality.<sup>5</sup> Across Europe, governments are embracing technology. Austria and Estonia have fully digitised medical records and other countries are looking to emulate their experience.<sup>6</sup>



## The barriers to transformation

To meet the challenges facing healthcare in the UK and to build a healthcare sector that's fit for purpose in the 21st century, it's clear that we need to embrace technology much more than we do at present. It's a fact already recognised by the NHS Long Term Plan, which clearly states: "Digital services and data interoperability give us the opportunity to free up time and resources to focus on clinical care and staying healthy".<sup>7</sup>

Alongside the many challenges, customer expectations are also shifting. We live in an on-demand, information-driven world and healthcare consumers now expect the same level of communication and efficiency from healthcare as they do from commercial enterprises. Convenience, responsiveness, transparency and accessibility are the new consumer demands placed on healthcare.

These demands highlight the potential impact technology could have across the sector, and those opportunities have directed the theme of this report. Technology is therefore being discussed through the analysis of:

- The current state of play with regards to the use of technology across healthcare, including the challenges and opportunities its implementation presents
- Whether the UK's digital infrastructure is sufficient to support healthcare technologies
- The rise of self-care and wearable technology and the impact that has on businesses and patients

- How the regulatory environment supports the development of technology in the sector
- What the future of healthcare looks like from a technological perspective.

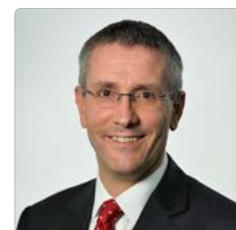
These topics are evaluated through the insight of leading industry experts:

- [Stephen Docherty](#), Industry Executive, Health, Microsoft
- [Martin Jeffries](#), Chief Marketing Officer, Tunstall Healthcare
- [David Liverseidge](#), Chief Information Officer, Nuffield Health
- [Tina Woods](#), Founder and CEO, Collider Health; Co-Founder and CEO, Longevity International; Adviser, National Academic Health Science Network (AHSN) and NHSX Artificial Intelligence Initiative
- [Steve Fergus](#), Relationship Director, Healthcare, Barclays Corporate Banking.

Barclays values their time and contribution as their input ensures the topics covered within this report are informed and analysed from a wide variety of viewpoints.

The experts also share ways that challenges associated with technology can be overcome. This may require investment. At Barclays, we know that the ability to invest over a three-to-five-year time period to achieve long-term benefits can be hard to meet when servicing current needs is a priority. That's why we're committed to helping businesses to grow and invest in their services. We're eager to continue this support, so if you would like to discuss investment opportunities and funding needs with myself or my colleagues, then please do get in contact.

I hope you enjoy this report and that the insights shared help inform and guide your business decision making and future planning.



[David McHattie](#)  
Head of Healthcare,  
Barclays Corporate Banking

# How technology can support healthcare

Technology presents new opportunities for healthcare providers to deliver tailored services that meet patient needs and address the systemic challenges the sector faces.

In recent years technology has had a transformative effect on multiple sectors and healthcare is no different. Numerous factors continue to drive this interest and uptake of technology, and these include:

- Improvements in the quality of hardware
- The development of broader and more applicable software applications
- Greater affordability as the costs of digital technology fall
- Increased familiarity with, and access to, technology (particularly mobile technologies)
- More strain on healthcare services, fuelling the drive for innovative solutions
- Improvements in adaptable technology, such as sensors and robotics
- The development of supportive infrastructure, such as broadband and [5G](#).



*“We’ve seen the UK healthcare sector enter a perfect storm, when the system is under real strain in terms of the demands placed on it, recruitment challenges and a lack of cash available to solve these problems. That’s usually when extreme innovation takes over and you see wholesale system change.”*

*Martin Jeffries*

### **The challenges of transformation**

As with any change programme, the rise of technology within the sector has had its pain points. Underpinning much of the country’s health and social care provision, the NHS is unwieldy and fragmented, hampered by numerous legacy systems, multiple suppliers and diverse strategic priorities. It also has a projected funding gap of around £30bn.<sup>8</sup>

*“The NHS has been using fax machines and pagers until very recently, and both are very old technologies. It’s an example of how slow it can be sometimes to actually adopt new technology. Every big organisation, whatever sector they’re in, can have these legacy systems – compounded by cultural and organisational inertia – and it’s no different in healthcare. It’s a key challenge that the NHS has to confront in terms of being more agile as an organisation in order to embrace these technologies like other sectors have.”*

*Tina Woods*

Standardisation within such a system is vital but challenging. As part of its wider digitisation plans, NHSX has published a list of accredited suppliers of electronic patient records solutions to assist providers with this fundamental step towards digitisation.<sup>9</sup>

*“In previous attempts the country was divided geographically with different suppliers for each, making digitisation too complex. One of the big challenges has been trying to get that whole ecosystem onto a fundamental level of digital records. Making sure that they’ve got common standards so that we have the potential to transfer and interoperate between organisations is absolutely critical.”*

*David Liverseidge*

Steps to enable technology to deliver smoother patient journeys could help ease frustration for both businesses and healthcare consumers. As patient choice increases, steps to make data sharing achievable are increasing.

*“Interoperability with other healthcare data platforms and systems used to be more of a challenge, but it’s really beginning to improve. That’s important for a couple of reasons: not locking data and capability in silos means that it’s available to the multi-disciplinary teams as and where relevant, and it also means that organisations aren’t tied to one vendor. If we operate to the same set of interface standards, organisations can purchase the platform that provides the best solution to their particular requirement.”*

*Martin Jeffries*

Accessing this data, interlinking it and being able to mine it is an essential precursor to the development of other technologies, particularly those dependent on pattern recognition or machine learning.

*“The value of data comes when you’re able to share and link it up and that’s where you can get the very best insights from AI.”*

*Tina Woods*



## Addressing the cultural challenge

It's not only infrastructure challenges that create obstacles to change. Cultural barriers are also an issue.

*"The biggest barrier to adoption is often cultural and organisational. So, one of the big things that came out in the piece of work I did last year with the AHSN Network and the NHS was the importance of workforce training. There's a huge gap between technology happening and it then reaching the frontline staff so it can be used effectively."*

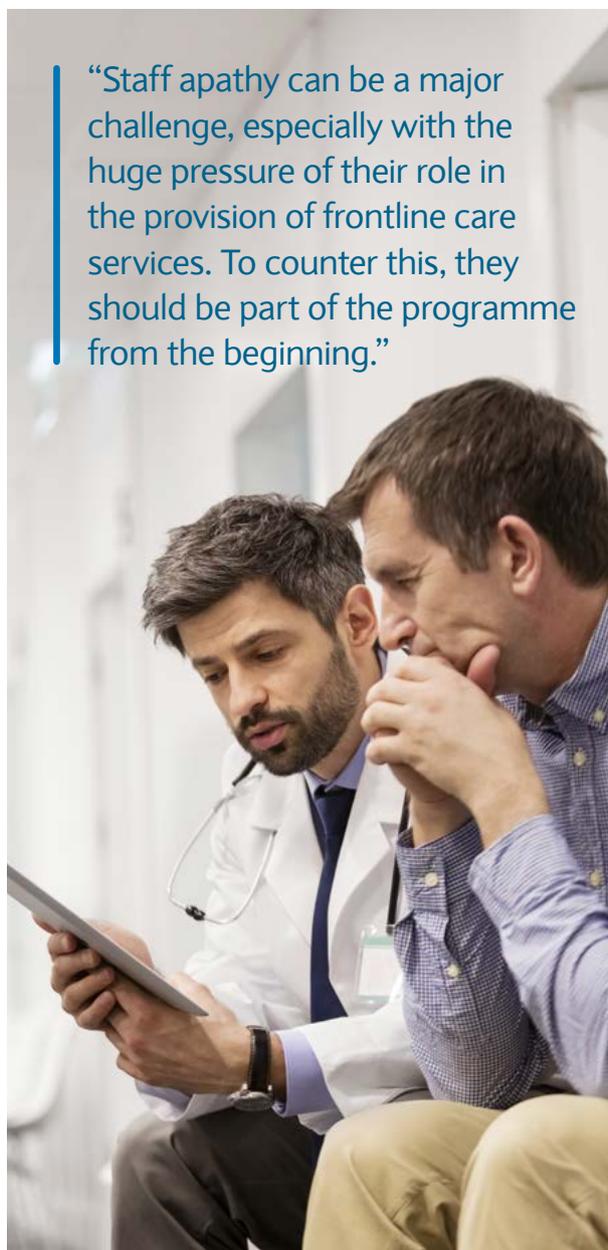
*Tina Woods*

*"There's no point in just saying 'here's technology X, now just get on with it'; you've got to work with your people – and potentially with partners – to get the basics right and help adopt these technologies successfully. Training is key, as is explaining that you're giving them the tools they need and the access to information they require to carry out their role even better. This will ensure technology is being used most effectively to join up the many streams of data and information for the benefit of the practitioners and, ultimately, of the patients themselves."*

*"Staff apathy can be a major challenge, especially with the huge pressure of their role in the provision of frontline care services. To counter this, they should be part of the programme from the beginning. Technology adoption shouldn't be seen as an IT project, it should be seen as a transformation programme with technology elements that everybody can be involved with."*

*Stephen Docherty*

However, a government commitment to improve the uptake of technology and the NHS drive to embrace a new way of working is leading to organisational change that could drive transformation forward.



**“Staff apathy can be a major challenge, especially with the huge pressure of their role in the provision of frontline care services. To counter this, they should be part of the programme from the beginning.”**

*“Across the sector, a lot of the new roles that are springing up within the various health organisations – such as ‘chief digital officer’, ‘chief digital and partnership officer’, ‘chief digital and information officer’ – are all board-level roles. So, the organisations are starting to get it and I think that having a clear vision and strategy is going to help.”*

*Stephen Docherty*

## Unlocking the funding challenge

Compounding the challenges around legacy systems and cultural issues, prioritising investment in new technology at a time when budgets are squeezed and today's demands trump tomorrow's needs, is a massive task, particularly in the care home sector.

The ability to set money aside for capital expenditure in even a simple, integrated IT system to help with staffing, time or attendance, never mind the potential of AI or robotics, just isn't viable in a sector where funds are quickly swallowed up by human labour costs. The availability of low-paid staff to fill care worker or agency roles is a real issue for care homes, particularly in the mid-market, and one that eats up budgets quickly.

The immediacy of that challenge means that many of these businesses are simply unable to look much beyond maybe 12 months in terms of their planning and, at times, just getting through each day or each week and making sure their clients are being looked after is tough. They don't have the time and space to look ahead and plan investment, despite a deep understanding that it could save money in the longer term and improve care.

“Patients’ expectations are that because they’ve had a scan at one facility, we at a Nuffield Health facility should be able to easily access and view it.”

As the shift in appreciation of the potential of technology disperses from acute to social care, we could see greater incentives for these providers to invest.

*“Money drives behaviour, so greater innovation with the appropriate governance in terms of how we change and optimise reimbursement to support new care models is something we could be much better at.”*

*Martin Jeffries*

The availability of funds to unlock that investment and achieve that potential is key.

*“There is a huge amount that can be done on the social care side of things, looking after people who have not necessarily got acute illnesses but just have day-to-day needs – the elderly, children, people with learning difficulties. And it’s about introducing our clients to technology providers and sharing information about what’s actually out there, as well as providing finance to bring it within reach.”*

*Steve Fergus*

### Meeting customer expectations

Technology is also being driven by customer expectations around healthcare service accessibility, greater transparency of information and convenience. Customers are now concerned about service delivery in terms of providing timely treatment, value for money, quality clinicians and convenient appointments.

Technology that enables information to be shared and accessed more easily means that patients don’t have to repeat their symptoms multiple times to different professionals or carry hard copies of their digital images to different specialists. They increasingly expect interactions with healthcare providers (particularly in non-acute medicine) to be as responsive and seamless as any other service they receive.

*“Patients’ expectations are that because they’ve had a scan at one facility, we at a Nuffield Health facility should be able to easily access and view it. However, the transfer of that type of information is still pretty clunky and manually intensive in the UK.”*

*David Liverseidge*

“It’s about introducing our clients to technology providers and sharing information about what’s actually out there, as well as providing finance to bring it within reach.”

Personalisation through the harnessing of data and its delivery through technology is also now a reality that can help meet customer expectations for a tailored or bespoke service. Whether it’s monitoring blood sugar levels through sensor technology, or the NHS 100,000 Genome Project, it could pave the way to new models of efficient preventative medicine for public health providers. Meanwhile, for private providers which can use personalisation to target customers and respond with treatment programmes, it can help boost brand loyalty.

*“We’re seeing a big drive from clients towards personalisation and we’ve developed new products and services to meet those expectations. Our partnership with Technogym and the Mywellness app allows us to have conversations with clients based on the data captured through their use of the equipment, for example. We can then tailor an exercise routine to them.*

*“From a customer perspective it gives a much better experience and we’re seeing massive changes in our net promoter scores because people are really excited about being able to access both the equipment in the gym and our services throughout their journey.”*

*David Liverseidge*

### Key points:

- Technology can address many of the challenges faced by the health and social care sector, such as increasing demand for services, availability of staff, high cost of delivery
- Customer expectations around the delivery of services and the demand for faster, more responsive and efficient access to health and social care are increasing
- The uptake of technology by health and care providers faces challenges in terms of legacy systems, cost and funding, and cultural shifts.

# The UK digital infrastructure

Can the UK's digital infrastructure support advances in technology?

The UK government has committed to a vision that sees digital, data and technology as the foundation of future healthcare.<sup>10</sup> However, while the capability and capacity of technology to deliver solutions that address issues around accessibility, deliverability and efficiency certainly exist, ensuring there is the infrastructure to support these solutions, one which is both available and robust, is essential.

## Mass availability of technology

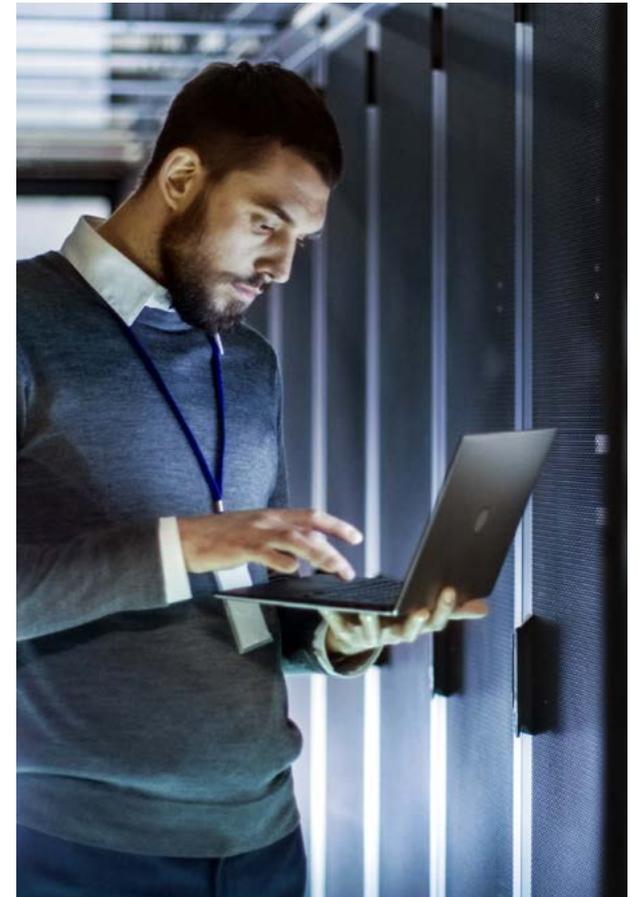
Digital technology has transformed the way we live and work in recent years. Advances in mobile technology have boosted affordability and accessibility, with 78% of UK adults owning a smartphone.<sup>11</sup> The growth of the Cloud means that data can be accessed by multiple users from anywhere, whenever it's needed, and the rise of fibre broadband, 4G and the promise of 5G means that we are more connected than ever before, with nine in 10 people able to access the internet from home.<sup>12</sup> And it's not just the younger Millennials and Generation Z adults who are most capable of understanding the benefits this can provide.

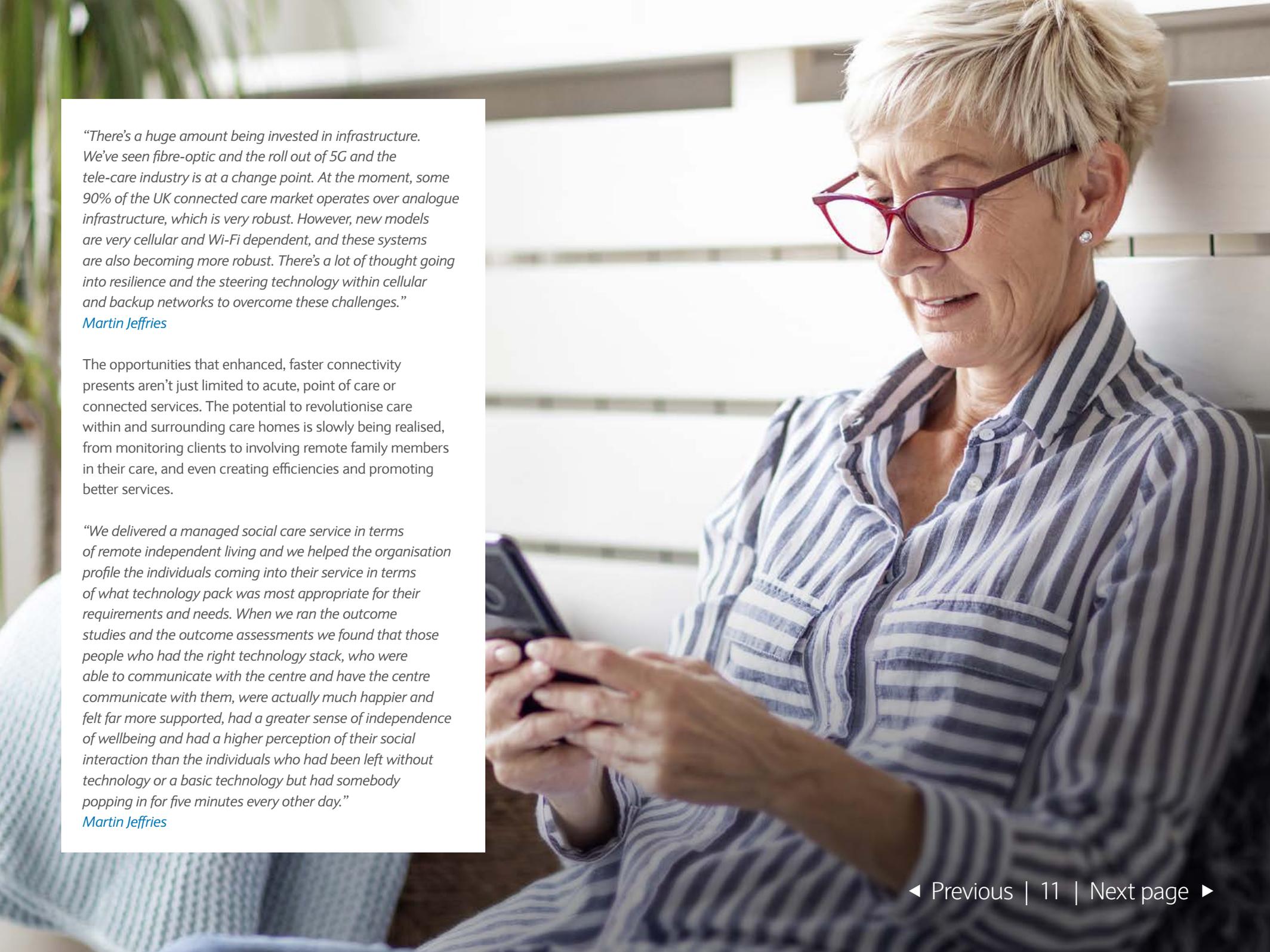
“We need to create incentives for suppliers to demonstrate why it would be better to move to new technology.”

*“The thing we need to be careful of is viewing people in health and social care as technology averse. We did a survey last year looking at retirement living and 85% of those people already had smartphones and were frequent users of them. The people now moving into retirement living have generally adopted the internet and cellular communications, so they're a lot more tech savvy than we may initially presume.”*

*Martin Jeffries*

Although around 85% of the UK population has access to 4G service,<sup>13</sup> the number of properties able to access full fibre broadband is relatively low at just 5% although it is increasing.<sup>14</sup> This means the UK is significantly lagging behind countries such as Latvia (50.6% household penetration), Sweden (43.4%) and Lithuania (42.6%).<sup>15</sup> Despite this, there is a sense from within the sector that digital infrastructure investment is buoyant and able to support technology development.





*“There’s a huge amount being invested in infrastructure. We’ve seen fibre-optic and the roll out of 5G and the tele-care industry is at a change point. At the moment, some 90% of the UK connected care market operates over analogue infrastructure, which is very robust. However, new models are very cellular and Wi-Fi dependent, and these systems are also becoming more robust. There’s a lot of thought going into resilience and the steering technology within cellular and backup networks to overcome these challenges.”*

*Martin Jeffries*

The opportunities that enhanced, faster connectivity presents aren’t just limited to acute, point of care or connected services. The potential to revolutionise care within and surrounding care homes is slowly being realised, from monitoring clients to involving remote family members in their care, and even creating efficiencies and promoting better services.

*“We delivered a managed social care service in terms of remote independent living and we helped the organisation profile the individuals coming into their service in terms of what technology pack was most appropriate for their requirements and needs. When we ran the outcome studies and the outcome assessments we found that those people who had the right technology stack, who were able to communicate with the centre and have the centre communicate with them, were actually much happier and felt far more supported, had a greater sense of independence of wellbeing and had a higher perception of their social interaction than the individuals who had been left without technology or a basic technology but had somebody popping in for five minutes every other day.”*

*Martin Jeffries*

## The data challenge

One of the key challenges in shifting the UK infrastructure to enable new technological solutions identified by our contributors is the presence of legacy technology and the lack of access to data.

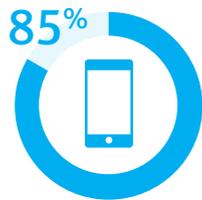
*“The infrastructure is getting there, although it is still very vulnerable. It’s the legacy technology that makes progress challenging, particularly around accessibility.”*

*David Liverseidge*

*“We’ve got this treasure trove of data but a lot of it is very inaccessible. Recent announcements on the data framework and digital innovation hub offers a massive opportunity to connect up and access data for research. There’s lots of government money going into this, including the £250m going into the NHSX AI Lab, to support access on a much wider level and enable us to tap into that data, speed up research, develop new medicines and treatments, and better diagnose, all with a view to saving more lives.*

*“But having said that, we still have a long way to go in terms of creating a data infrastructure that is acceptable and fit for purpose. The way that the NHS is structured means there’s a very complicated network of individual trusts each with their own databases etc. and this causes obvious challenges.”*

*Tina Woods*



of those in retirement living already had smartphones and were frequent users of them

*“The foundation for an effective but still secure information-sharing infrastructure is to move away from on-premise hardware. We should be using the Cloud – allowing information to be accessed wherever the clinician is based. This will have the added benefit of removing the administrative burden and driving healthcare further towards a paperless ecosystem. We are already seeing some of our NHS customers use robotic process automation and AI in helping to reduce that administrative burden, removing people away from repetitive processes to give the sector more resource to increase patient-facing time.”*

*Stephen Docherty*

## Shifting away from legacy technology

Government commitments to address legacy technology and standardise accessibility is one thing, but incentivising both end users and suppliers to invest in new technology is where we could start to see significant strides in its deployment in healthcare settings.

*“Legacy technology is self-perpetuating and quite hard to move away from. We’ve previously put in older but very important technology such as radiology imaging, lab systems etc. However, there’s limited incentive for suppliers to advance that technology as quickly as we might like in today’s climate. There are probably competitive reasons for these suppliers to just enhance their existing products rather than create new ones, and if they’re an incumbent, it’s probably quite difficult for the healthcare provider/buyer to move away from it.*

*“In response, we need to create incentives for suppliers to demonstrate why it would be better to move to new technology – giving easier data sharing, for example. I think the route to that is exposing the potential of that new technology to patients.”*

*David Liverseidge*

## Key points:

- The availability, capacity and capability of technology to transform health and care settings is growing
- Infrastructure challenges, for example, the availability of full fibre broadband lags behind many countries
- Legacy technology is preventing accessing, sharing and efficient analysis of data that could unlock huge potential in patient care
- Shifting reliance on legacy systems is necessary to secure the opportunities that digitisation presents.

# Connected clients

Connected technology delivers efficiencies and reassurance, but must be used with caution.

As digital technology becomes increasingly ubiquitous, opportunities to harness consumer technology to support self-care are also on the rise. In the US, for example, sales of wearable digital medical devices are expected to increase to USD\$55bn in 2022, up from USD\$10.5bn in 2017.<sup>16</sup> Here in the UK, the NHS celebrated its 70th birthday with the inclusion of 70 apps within the NHS Library, offering a range of self-care, advice and signposting to core services.<sup>17</sup>

## Supporting clinical efficiency

When combined with other monitoring technologies, such self-care devices could help alleviate pressure within the UK healthcare system.

*“The opportunity for technology to enhance healthcare is limitless. For example, patient-reported and patient-generated data are two sources which can be combined with an electronic health record to create an almost digital triage for an individual. Comparing their data against the greater population should mean preventative therapies being identified earlier, with individuals being nudged earlier about what they should be doing, eating, drinking etc. This will free up healthcare time and resource, which can be focused on patients requiring enhanced treatments and care.”*

*Stephen Docherty*

*“It won’t be an overnight thing, but gradually more and more automatic capture updates will remove the need for healthcare professionals to do things like write information down, draw a graph, calculate early warning scores etc. That definitely gives them the opportunity to spend more time providing high-quality patient-facing care.”*

*David Liverseidge*

**“If someone is wearing an Apple Watch (or an alternative fall device), a service provider can reach out within 60 seconds of the alarm to check they’re ok.”**

The technologies offer huge opportunities within the social care system in particular. They enable remote monitoring of patients, which means they can stay in their own homes, and provide reassurance for family members.

However, there are some issues about their use and they really work best only when part of a wider monitoring or support network.

*“The Apple Watch includes fall detection, and fall detection in our social care demographics is an important issue. However, this detection is only part of falls management.*

*“If a relative who lives two hours away is wearing an Apple Watch and I get a fall alert, I now have a problem I’ve got to address while being a very long way away. However, if they’re wearing an Apple Watch (or an alternative fall device) and I’ve also got the support of a service provider such as Tunstall, they can reach out within 60 seconds of the alarm to check they’re OK. If there’s no response then they dispatch first responders immediately, two hours earlier than if it had been left to me. Having that support means a problem is getting solved and being managed properly through technology.”*

*Martin Jeffries*

Within care home settings, the potential of wearable technology is significant. Tracking technology to monitor whereabouts of vulnerable clients, including those with learning disabilities or dementia is an obvious boon. Devices that monitor chronic conditions, such as diabetes may also be useful for care home client sectors where there are difficulties in more hands-on monitoring, such as learning disabilities. Not only is there potential to improve monitoring and client wellbeing, but potentially reduce staffing levels and deliver cost-savings.

*“It is going to have real benefit to reduce administrative burdens, early detection of health issues but also to help us to manage the population as we go forward.”*

*Stephen Docherty*

#### **Encouraging more proactive healthcare**

It's not just organisations that stand to benefit from the greater efficiencies these connected devices offer; patients are better able to take control of their health and wellbeing. Wearable devices, and other mobile apps, can potentially support a cultural shift away from seeing healthcare as something you access when you're sick, to something that can support healthier lifestyles and improve mental and physical wellness.

*“When the NHS was set up it was very much focused on looking after sick people who needed help. We now need to move away from a system based on ‘sick care’ to one more focused on keeping people healthy and well and out of hospital. The accessibility of health technology with consumers is already changing things and preventative health is a very important area where I think the wearable technologies and the internet of things (IoT) have a huge role to play.”*

*Tina Woods*

#### **Awareness of the limitations of technology**

However, despite the many benefits, all of our contributors recognise the limitations of this technology and sound notes of caution around its use.

*“You've got to be careful how far you go with it so I think there is an important line as to whether you're using it as an indicator or whether you're using it as an absolute result.”*

*“Health technology is already changing things and preventative health is a very important area where I think the wearable technologies have a huge role to play.”*

*“We would never expect anyone using a fitness tracker to assume it’s giving them a clinical diagnosis but we might analyse the readings and the trends of their activities to suggest they should get some tests done. And we would always get those tests done in a clinical setting under controlled circumstances and get that properly recorded. It’s around making sure that the human conversation happens alongside the device capture.”*

*David Liverseidge*

*“Once it’s introduced into the system, you have to be really careful about how technology might have effects that weren’t actually anticipated at the time that it was developed – the ‘unintended consequences’. For example, Babylon, the GP at Hand, attracted lots of attention and created quite an uproar in the healthcare community because they found it was the slightly better patients – the ones who weren’t so ill – who were actually using this technology and, of course, Babylon would then take the fee for that. The traditional doctors were left to cope with the much more ill patients with complex chronic diseases who required much more time and care, yet they didn’t get any extra fee for that.”*

*Tina Woods*

*“There are also concerns around cybersecurity which need to be resolved, and it is something Microsoft is taking really seriously and invests huge amounts of resource. But we must also be cognisant of the opportunities that this presents us to manage the health of our population and reduce the burden on the current health system.”*

*Stephen Docherty*

### **Future opportunities in self-care**

Developments in the scope and capability of self-care devices present exciting opportunities both for patients and healthcare organisations.

*“It’s a sector within health that I think has got a long way to go. There are now smart rings [jewellery] that are being used as wellness trackers, similar to smart watches. By tracking heart rate and sleep activity, this next generation of wearables will be smarter and faster than today’s.”*

*Stephen Docherty*

*“Amazon, Google and Apple are investing hugely in health, so clearly they see a huge future in accessing consumer data and developing technology to keep people healthy and well, through technologies that are seamless, invisible and easy.”*

*Tina Woods*

While this undoubtedly shows the potential for further development and signifies that this is a sector ripe for investment, whether investment from the tech giants will manifest in greater support for existing industry members, or a challenge as they seek to enter the sector more obviously, remains to be seen. Consumer responses to these developments also remain unknown – will familiarity with these mega brands bring acceptance or caution? The role of disruptors and businesses new to the sector will be explored further in a report into the future of healthcare, which will be released in 2020.

*“It’s making people more self-aware, but the challenge with any technology that the consumer has chosen is the lack of interpretation, so technology should never (and certainly it won’t in my lifetime) replace the medical professional.”*

*Martin Jeffries*

### **Key points:**

- Sales of wearable digital medical technology are growing as consumer familiarity with technology increases
- Used carefully, this could alleviate pressure within the healthcare system
- Connected devices offer opportunities for efficiency within a care home setting through lower reliance on human labour
- Wearable, connected technology could support a shift from reactive to proactive care.

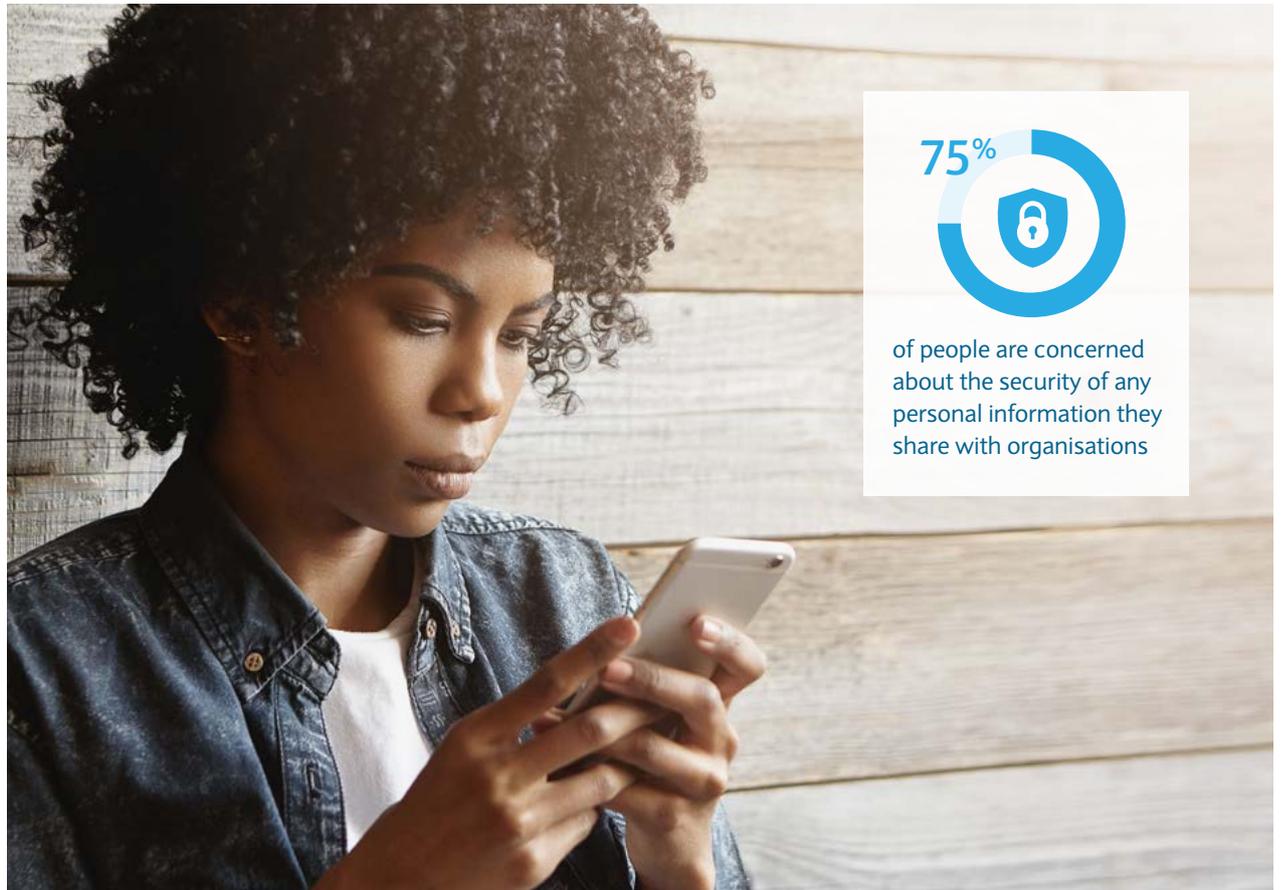
# Technology and regulation

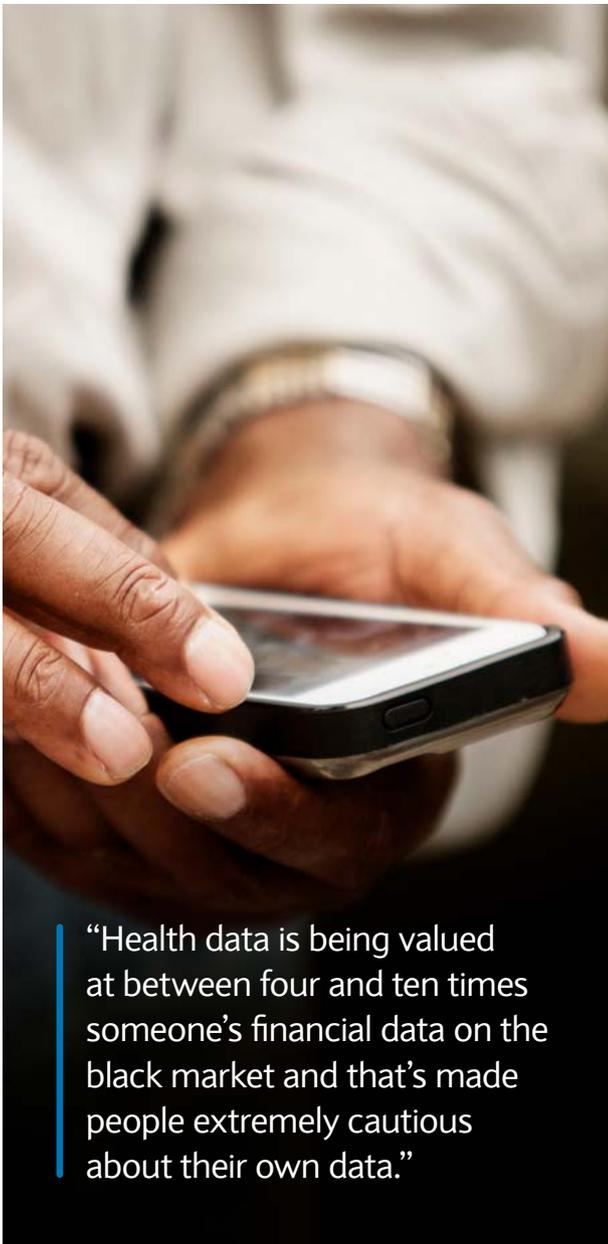
Connected technology delivers efficiencies and reassurance, but must be used with caution.

Following the introduction of the EU General Data Protection Regulation (GDPR) in May 2018, privacy and data security has been a key focus for both consumers and organisations. Technology is evolving so rapidly that much of the regulation we see today is playing catch-up, and this is the case across all sectors, not just in healthcare.

## Data security and privacy concerns

Security and ownership of data is an issue for the general public, with a recent survey showing that 75% of people are concerned about the security of any personal information they share with organisations.<sup>18</sup> Data, as we have already seen, is the key to unlocking the full potential of many of these technologies, particularly in the AI space, so gaining public trust is crucial. In summer 2019, the UK government published its 'Code of conduct for data-driven health and care technology', presenting 10 principles around the ethical use of data and the security of that data.<sup>19</sup>





“Health data is being valued at between four and ten times someone’s financial data on the black market and that’s made people extremely cautious about their own data.”

*“The UK is in many ways leading the world in the ethical use of data. The code of conduct is recognised worldwide as being very advanced in terms of its principles and the need to be more agile. Regulation tends to always be a step behind technology, so the code of conduct tries to answer that by creating guiding principles and behaviours that innovators and anyone developing AI technology can follow to ensure safe, responsibly applied AI.”*

*Tina Woods*

Managing concerns around cybersecurity is crucial to support the development of transformational technology that could revolutionise health and social care, from acute settings to care homes. It’s an issue that developers and clients are focused on.

*“Obviously there are concerns around cybersecurity and this is something that Microsoft is taking really seriously. We invest a lot of money and resource in cybersecurity and I think that if you consider 5G coming downstream at us, you know there are pilots that are being conducted right now. I think this change in information is going to be rapid. Although we need to be considerate around the issues of cybersecurity, we must be cognisant of the opportunities that this presents to us to manage our population. If we can manage our population you reduce the burden on the health system and help people to live longer, happier lives.”*

*Stephen Docherty*

### **Creating a framework of reassurance**

The value placed on personal data both by individuals and organisations, particularly when it’s related to health, intensifies the desire to protect it. Getting the parameters around acceptable use right is a necessary foundation for taking the next step towards employing technology further.

*“Health data is being valued at between four and 10 times someone’s financial data on the black market and that’s made people extremely cautious about their own data. This is impeding the pace of change.*

*“There’s also friction because most IT strategies use cloud services rather than their own data centres as this allows things to be accessible, robust and sharable. However, to protect that information, the provider has to have the right controls over it. Contractually it’s in their hands, but the actual mechanics of it is often engineered by a third party. Generally, people take a safety-first view on information about them, especially if it’s clinical, and that has the effect of potentially not moving the use of data as far forward or as quickly as we could, even though it can enhance healthcare in the long term.”*

*David Liverseidge*

## Trust in authority

Transparency is a core element of building that trust. However, deeper cultural and social challenges to public trust in authority are emerging within the UK, particularly regarding government authority. This could lead to barriers within the UK that other European countries have already overcome.

*“In Finland they have a national data policy so everything that is collected in Finland is now available for the Finnish government to use in terms of healthcare research. They’ve been completely upfront and transparent. My understanding is that you can opt out if you want to, but it’s assumed you’re opted in.”*

*Martin Jeffries*

*“Estonia is considered the most advanced digital society in the world. Its e-Citizen digital platform is very secure and citizens consent for their data to be accessed and shared with both public and private providers, which has enabled a whole innovation ecosystem for the development of products and services to satisfy the population’s needs.*

**“Principles and behaviours are so important to act as a mechanism to ensure that regulatory concerns are addressed as well as the needs of the general public.”**

*“In both cases [Estonia and Finland] public trust is very high in their governments. In the UK, NHS England’s care data programme ‘failed to win the public’s trust and lost the battle for doctors’ support’, according to the BMJ, and today’s broader issues regarding Brexit and government are certainly not helping to build trust.”*

*Tina Woods*

## Data sharing for individual or societal good

One of the ways to address concerns around the use and security of data is to appeal to people’s philanthropic natures, outlining that the collection of even anonymised data is helping for the greater good.

*“Commercial and government organisations need to be mindful that in encouraging the donation of data, there’s a return benefit to the individual. For example, by saying: ‘If we’re allowed to look at your data we not only give you the most appropriate advice and guidance to support your health, but if we retain it in an anonymised way and compare with other people, then we can offer them the same health benefits that we are giving you.’ In that way, I’d feel part of the community and feel as if I was delivering some value.”*

*Martin Jeffries*

The success of clinical trials and the UK Genomes Project shows that there is a willingness for people to share data to support research into new medicines or treatments. However, people will only do that so long as their concerns around the use of their data are managed. Therefore, it is vital that the guidelines, principles and ethical codes being brought in are strongly supported, particularly when regulation can lag behind.

*“Regulation will never keep up and it’s never going to be perfect just because technology’s always going to be quicker. What we’re seeing now is that it’s exponentially developing, so this is where the principles and behaviours outlined in the code of conduct are so important. They must be acted upon as a mechanism to ensure that regulatory concerns are addressed as well as the needs of the general public.”*

*Tina Woods*

## Key points:

- There’s an increasing focus on privacy and security from both consumers and organisations
- Regulation is often playing catch-up to advances in technology
- Voluntary codes of conduct and ethical approaches are critical to reassuring the public and furthering change
- Philanthropy could hold the key to greater data sharing.

# The future of healthcare

The role of technology in the future of healthcare is clear.

From the Topol Review published in February 2019 that aims to 'prepare the healthcare, workforce for a digital future', to Health Secretary Matt Hancock's announcement of the creation of a 'national artificial intelligence laboratory', there is a real drive to pursue advanced technology and digitisation to create efficiencies within the healthcare system.

*"Historically, the degree of technological adoption has increased at increasingly faster rates. This will only continue, especially for healthcare, because technology is intrinsic to everything we do. It's growing in importance because there's an understanding that adopting new technologies is something we simply have to do, whatever the challenges."*  
*Stephen Docherty*

Addressing the challenges, specifically those linked to the standardisation of data collection, is absolutely critical to enabling this technological leap.

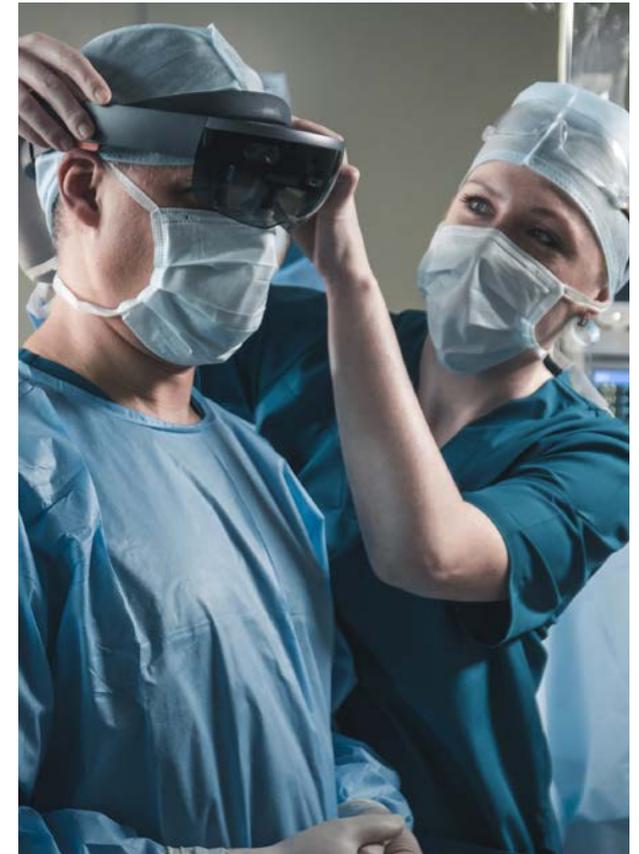
*"Lots of investment is going into technology, and the new AI Lab will be a massive focus of NHSX moving forwards. But the biggest challenge is getting the data foundation right, followed by getting FAIR data, that is, data that is 'findable, accessible, interoperable, and reusable' for AI."*  
*Tina Woods*

## Underpinning efficiency and quality in care

The Care Quality Commission has highlighted some examples of the use of technology to promote high-quality care, including:<sup>20</sup>

- Electronic medication management to support accurate medication records and enable them to be shared with other health professionals
- Audio sensors to allow staff to respond quickly if clients are in distress
- Voice recognition software to support sensory disabilities.

Already, many care homes are utilising technology to improve client welfare and drive efficiency. In Airedale, Yorkshire, for example, using tele-video technology to enable clients to access their regular GP rather than an unfamiliar one local to the care is seeing results. These include a reduction in hospital admissions from the participating care homes of 35%, A&E admissions fell by 53% and the total number of days spent in hospital beds by the sampled residents reduced by 59%.<sup>21</sup>





*“It’s not about reductions in staff, it’s about giving people time back to spend with patients, giving people jobs that are less repetitive because they should be using AI and robotic process automation to reduce that administrative burden.”*

*Stephen Docherty*

Taking this a step further, the development of AI in Japan is set to revolutionise a sector where growing demand for elderly care and a lack of young people to deliver it, is a key challenge. Humanoid robots are increasingly being used in nursing homes to improve quality of life and deliver patient interaction. For example, in Natori, Miyagi Prefecture, a Telenoid robot enables remote communication via a microphone and camera.<sup>22</sup>

#### **The global healthcare sector**

In the global field of healthcare technology, there are some exciting developments. The University of Turku in Finland, for example, has developed a smartphone app that can detect atrial fibrillation that causes strokes. The technology addresses a challenge that’s long frustrated medics and boasts 96% accuracy.<sup>23</sup>

In the US, collaboration between the technology and healthcare sectors is driving the use of machine-learning in a range of healthcare settings.<sup>24</sup> For example, to analyse and predict ‘at risk’ patients in intensive care settings and to develop personalised cancer treatments.

**“We’re in a great position to really become one of the best healthcare sectors from a technology and information perspective globally.”**

In the UK, we’re already seeing the benefits of closer links between health and technology. Research conducted by Moorfields Eye Hospital, Google’s DeepMind and University College London has found AI to be as accurate as world-leading eye experts in spotting serious eye conditions.<sup>25</sup> Meanwhile, use of DeepMind’s Streams app at the Royal Free Hospital in London has found that it could save the NHS an average of £2,000 per patient by alerting clinicians to acute kidney injury sooner.<sup>26</sup>

*“The UK is in a strong position to be a world leader. We have got a health system that’s been in place for 70 years and we’ve got huge amounts of data. We’ve got a thriving health technology start-up sector and I think we’re in a great position to really become one of the world’s best healthcare sectors from a technology and information perspective. At Microsoft we believe in empowering every organisation and every person on the planet to achieve more, and health is fundamental to our mission.”*

*Stephen Docherty*

## Harnessing AI in healthcare

The opportunities AI offers are undoubtedly significant and offer particular potential in areas that are highly data intensive, labour-draining or where pattern-spotting is key.

*“AI really has been harnessed in drug discovery. In the old pharma model it took many years to develop a new drug, whereas Insilico Medicine was able to identify a new treatment in 21 days for a specific drug target and that is unbelievable.<sup>27</sup> Essentially what this is doing is using a machine to imagine new molecules with particular properties rather than a human – disrupting the traditional pharma drug development model. Harnessing AI to analyse multi-modal data sets and understand patterns means it will have a massive role to play in understanding risks for certain diseases and the interventions to manage those risks in the emerging field of ‘predictive prevention.’”*

*Tina Woods*

## Proceed with caution

However, AI does have limitations and several of our contributors sounded a note of caution around its widespread adoption, particularly around the speed of its adoption.

*“I think we just have to be a bit careful about AI. There are some massive benefits from applying computing power and prediction onto data set images and all those kinds of things. However, I think the best action for the sector is that we see AI as ‘assisted intelligence.’”*

*“We need to use it to give our clinical people the absolute best information and trends, but don’t remove them from the loop. If we over-automate healthcare procedures and diagnoses, but then find that something goes wrong, then we’ll be put back many, many years and I really don’t want that to happen.”*

*David Liverseidge*

*“I think AI is going to have a massive role and there will be lots of hype around it. Technology is enabling us to predict, to prevent and intervene in a way that was never possible before, which is great. But, on the other hand, we must ensure we focus on developing technologies that are truly going to help people, to protect people, to provide benefits and avoid harm – all those things that are written in the doctor’s Hippocratic Oath.”*

*Tina Woods*

## The potential for systemic change

Technology in healthcare offers huge opportunities assuming we can overcome the fundamental challenges in terms of data access and investment. It’s undoubtedly going to be an area of huge growth in the years ahead and offers significant potential for the improvement and efficiency of patient and client services.

*“By getting very good at collecting data, our connected healthcare strategy means we cannot just be good at getting people. We’ll be showing that we also want to maintain people’s health and give them the best gym or other life-extending experiences that are all linked up.”*

*“We’re saying to the UK populace that we can provide a combination of services that will be linked through the data we know about them to ensure their health, and that of the nation, is improved substantially by the services being provided.”*

*“Technology has to underpin that because you can’t do that through manual processes. That’s the Holy Grail we’re aiming for and that’s why we’re taking the investment in technology really seriously.”*

*David Liverseidge*

## Key points:

- The UK government is heavily invested in future digitisation within the health and social care sector to create efficiency and manage the challenges of increased demand
- There is a real drive within the health and technology sectors to overcome the challenges and limitations of today’s technology and to exploit the opportunities it presents for the future
- In an increasingly global sector, advances overseas offer potential to revolutionise care in the UK
- Personalisation, the increasing use of AI and robotics will disrupt the current status quo and are within the sector’s grasp.

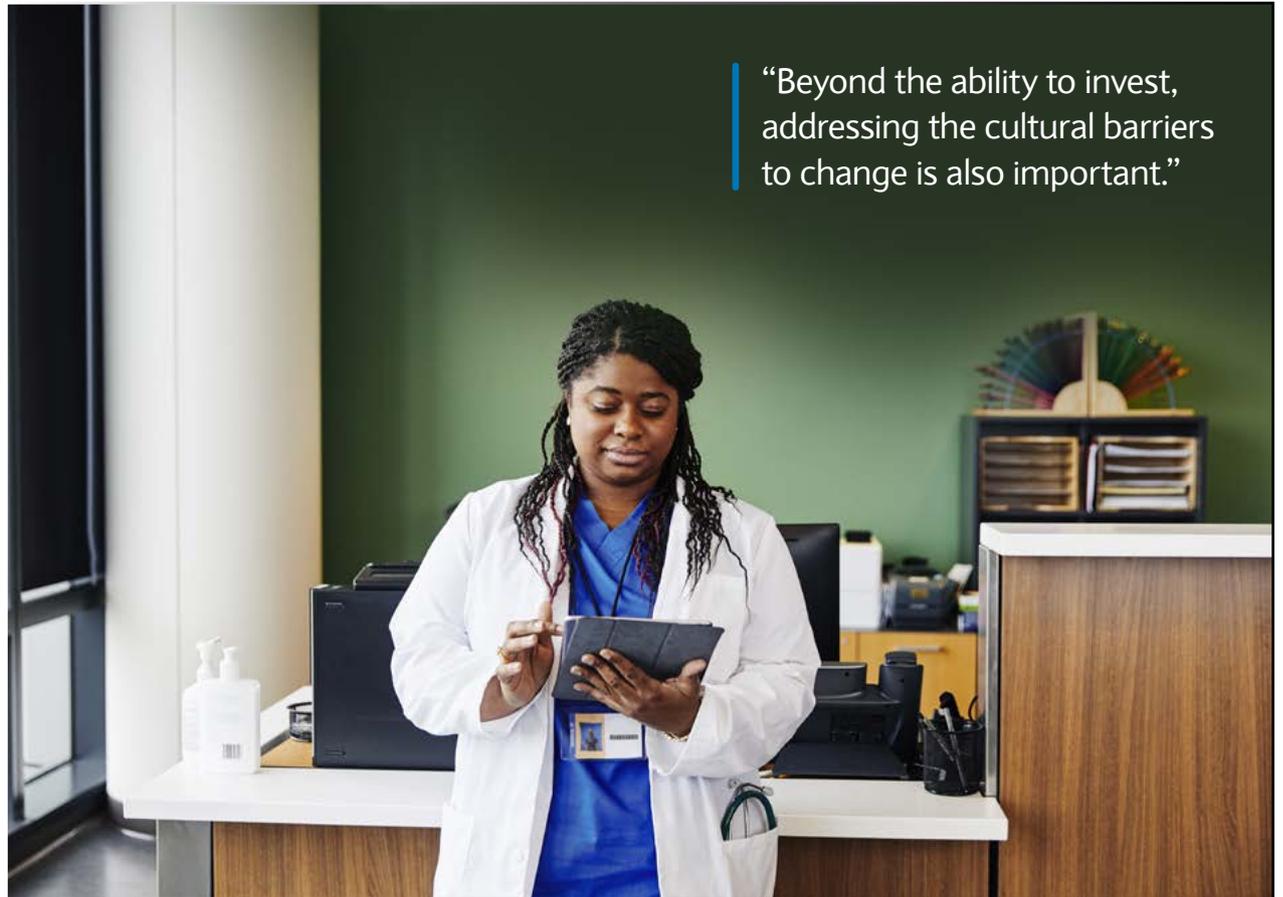
# Conclusion

The pace of technology adoption within the healthcare sector promises to be both revolutionary and evolutionary depending on which part of the sector you look at.

At a purely consumer level, technology adoption will be revolutionary. The pace of adoption across other aspects of our lives, from Alexa sitting in the corner of our homes to online banking, shows that the general population is ripe for using technology in healthcare settings.

There's already significant growth in wearable health technology and smartphone apps, and this is likely to reduce the need for face-to-face GP time. This growth will be seen particularly among younger people, who will seek to find the answer to healthcare issues via methods that don't involve queuing up at their local health centre at 8 o'clock on a Monday morning.

In terms of social care and the corporate healthcare sector, the pace of change is likely to be more evolutionary because of the financial and cultural blocks identified, as well as the sheer scale of legacy systems and fragmentation. Moving away from what is a people-led sector to being a people-and-technology-led sector will happen, but it'll happen quite slowly.



“Beyond the ability to invest, addressing the cultural barriers to change is also important.”

Sharing information about the potential of technology and the opportunities it offers to organisations, from acute services to social care, as well as supporting investment in new technology will be important in overcoming many of these barriers. Increasing customer expectations around services and the delivery of those services will encourage organisations to explore the potential of technology to meet those opportunities. The growth of competition within the sector will also be a motivating factor in its adoption.

The fragmented nature of the sector makes information sharing particularly challenging. Many organisations are so focused on delivering great care that they don't have the time or resource to review the wider picture and understand what's available in technology terms.

Beyond the ability to invest, addressing the cultural barriers to change is also important. Ensuring staff and patients are not only trained to use the technology, but also engaged with the benefits it can offer, can make a difference when it comes to successfully implementing technology and affecting the outcomes.

### **Supporting investment**

Among the other barriers preventing wider adoption of technology, the availability of cash is a key feature. The ability to invest for the future can be hard to meet when servicing current needs is a priority. At the moment, many providers find that any surplus cash is allocated to the human labour force, and staffing challenges mean many are reliant on expensive agency staff. This all ties up cash that could be used to invest in future technology.

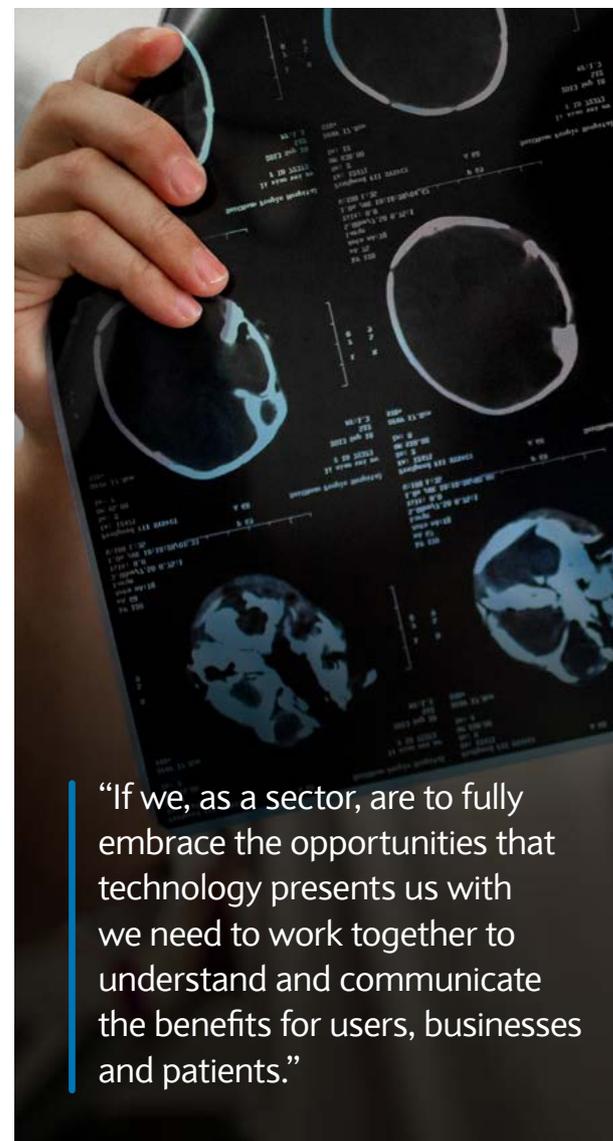
Our Healthcare team works closely with clients and, as part of the wider Group, with technology providers to ensure that we stay abreast of industry-wide opportunities. By taking the time to understand the availability of new solutions and how that could support our clients, we can play a vital role both in supporting investment and in sharing information.

Connecting clients with one another and with technology providers means that we can address both the financial and cultural barriers preventing the broader uptake of technology within the sector. Sharing sector insight through reports like this and our healthcare industry day plays a big part in opening conversations about technology and the future of healthcare.

### **Seizing the opportunities of technology**

As we have heard from our experts, the stars are aligned to create a bright future for healthcare technology in the UK. A willingness to address the challenges and embrace the technology that could revolutionise the sector will ensure we can all benefit.

If we, as a sector, are to fully embrace the opportunities that technology presents us with, and then tackle the challenges we face today and in the future, we need to work together to understand and communicate the benefits for users, businesses and patients. This will require strong leadership, fully informed and engaged staff and stakeholders and an ability to regularly review and evolve systems and technology. Only then can we hope to realise the many opportunities that technology offers to revolutionise healthcare in the UK.



“If we, as a sector, are to fully embrace the opportunities that technology presents us with we need to work together to understand and communicate the benefits for users, businesses and patients.”

# Connecting you to possibility

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*\*Developed in collaboration with Hitachi, the new device will be available to Corporate Banking and Business Banking clients who use the bank's Barclays.Net and iPortal digital channels from early 2020.*

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