What will new technology mean for the NHS and its patients?

Four big technological trends

Sophie Castle-Clarke

The Health Foundation
Institute for Fiscal Studies
The King's Fund
nuffieldtrust

With thanks for contributions from:

Richard Murray (The King's Fund), Adam Steventon (The Health Foundation) and Matthew Honeyman (The King's Fund).

With thanks for expert advice from:

Axel Heitmueller (Imperial College Health Partners), Ruth Thorlby (The Health Foundation) and Elaine Kelly (Institute for Fiscal Studies).

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Key findings

- Technological advances offer significant opportunities to improve health care but are not a silver bullet for the pressures facing the NHS. While there are really exciting developments in areas like genomics and precision medicine, we are a long way from being able to realise their full potential.
- Technology has the potential to deliver significant savings for the NHS but the service does not have a strong track record in implementing it at scale and needs to get better at assessing the benefits, feasibility and challenges of implementing new technology.
- Patients are embracing new technology and increasingly expect their care to be supported by it. For example, the majority of people say they would use video consultations to consult their GP about minor ailments and ongoing conditions.
- New technology could fundamentally change the way that NHS staff work – in some cases requiring entirely new roles to be created. The impact of these changes should not be underestimated.
- People generally have relatively little knowledge about how the NHS and commercial organisations use data for health research, which may be responsible for mistrust in some cases. Transparent public dialogue is needed about how data is currently used; what the opportunities are for the future; and how risks can be mitigated. While it is vital to balance the benefits of sharing data with concerns about security and confidentiality, these concerns should not be used as a barrier to progress.

Introduction

It is notoriously difficult to predict how technological advances will interact with health services and the policy landscape to shape the future of health care.

This report provides numerous examples of developments that were anticipated to transform health care, but that failed to deliver – at least in the short term. Meanwhile, other key advances have been made with little fanfare or prior expectation. For these reasons, we do not attempt to predict what the 'next big thing' will be. Instead, we look at four current trends and what they might mean for health care over the next 5–10 years if they continue to progress.

All of these have the potential to improve health care:

- **Genomics and precision medicine** can target treatment interventions at specific sub-groups of patients, potentially making them more effective and opening up new therapeutic possibilities.
- **Remote care** can improve access to health care services, enabling patient needs to be addressed as early as possible and potentially making systems more efficient.
- **Technology-supported self-management** can help to empower patients to better manage and understand their condition, supporting improved behavioural and clinical outcomes.
- **Data** can provide new ways for the NHS to learn, improve and generate new research – alongside **artificial intelligence** (AI), which is providing new analytical capacity for diagnosing patients, effective triage and logistics.

While all of these offer benefits, they offer different degrees of transformative change. Remote care, for example, does not challenge the fundamental principle of health care professionals delivering care to patients – it only changes the means through which this is offered. Genomics, on the other hand, may enable entirely new treatment options and, if health care technology becomes ever-more available to consumers, our traditional understanding of 'patient' and 'professional' may be challenged.

Each of these technologies also comes with challenges and opportunity costs. In each area we ask questions about how the NHS should prepare for these technological advances. Some of the biggest relate to ethics; what we can reasonably expect technology to do; and how we can make decisions about what to prioritise in a resource-constrained system where new developments may add value but cost more.

Genomics and precision medicine

Current status

The scientific community's understanding of the human genome – complete genetic information about an individual – has improved substantially over the last 20 years. In 2003 the International Human Genome Sequencing Consortium (a collaboration between the UK, the United States, France, Germany, China and Japan) sequenced a complete human genome for the first time following years of work and investment of over £2 billion. At the time, although scientists warned not to expect immediate breakthroughs, it was likened to the moon landing or the invention of the wheel.[1]

Since then, the process has become much quicker and cheaper – a human genome can now be sequenced in a few days, and for less than £1,000.[2] These advances enabled the UK to become the first health system to introduce genomic medicine into mainstream health care in 2015. The 100,000 Genomes Project will sequence 100,000 genomes from around 70,000 people. Participants are NHS patients with rare diseases, plus their families, as well as patients with cancer. The project is already leading to patients receiving treatments that are likely to be most effective based on the genetic, lifestyle and environmental information of the individual in question – so-called 'precision medicine'. That said, progress in general has been slower than expected due to the complexity of the science involved.[3]

To date, there are very few treatments that actually aim to change genes, and the ones that do exist work on a tiny number of people. This year, the National Institute for Health and Care Excellence (NICE) gave a positive recommendation on one such treatment for the first time – Strimvelis for the rare adenosine-deaminase deficiency (ADA-SCID). Though this is a breakthrough in science, NICE estimates that only around three babies a year in England are born with ADA-SCID and the treatment is so complex that it can only be provided by one centre, which is in Milan. More treatments are on their way, but for now, they remain at the margins of mainstream medicine. Genomics is a long way from transforming health care in the way many envisaged.[4]

Future potential

If precision medicine works as intended, there is little doubt that it will improve quality of care and health outcomes. It should enhance the effectiveness of treatments, make diagnoses more accurate and, at least in theory, offer value for money.

It also has the potential to enable the development of entirely new treatment options. For example, the discovery of genetic mutations involved in melanomas means precision medicine is available in some cases, reducing the need for chemotherapy[5] and thereby transforming the treatment pathway.

So far, genomic research has not been very helpful in predicting the common forms of many diseases – the science shows us there is no straightforward 'gene for Alzheimer's', for example. But scientific advances do have the potential to lead to a better understanding of propensity for disease – and enable the health care system to intervene to prevent or delay onset – if certain questions can be answered.

Questions for the NHS

Precision medicine can be expensive. Treatments are usually developed for relatively small groups of people. The price-per-patient, then, has to be high to recoup the original development costs, which can make them appear poor value. Drug companies have tried developing tests to understand patient amenability for treatments alongside the treatments themselves – but the high failure rate in drug discovery makes this difficult.[6]

All of this raises questions for how to assess the value of precision medicine. This is a global issue. Experts have suggested it should be value-based and flexible, depending on commissioner priorities.[7, 8]

The NHS needs to decide how to assess precision medicine and the feasibility of making it available for everyone that could benefit. Given the substantial difference it could make to health care delivery and patients' lives, should public funding subsidise the development of precision medicine and treatments for rare diseases more generally? Funding could perhaps be offered in return for knowledge exchange between pharmaceutical companies during the early stages of drug development in order to accelerate progress.

Remote care

Current status

Increasingly, technology is enabling professionals to deliver care remotely – and this is happening in all parts of the health service.

In primary care, NHS England has allocated £45 million over five years to support the uptake of online consultations. In the main, uptake has been low to date but advancements in intuitive, reliable technology and changing expectations may mean this is about to change. Private companies have offered fee- or insurance-based video consultations for a few years already, emphasising quick access to services as their primary selling point. Now, though, GP at Hand offers a similar service in London on the NHS – and patients have been registering at a rate of 4,000 per month.[9]

In hospital and community care, remote care is much less widespread, although there are a few examples across the NHS. In some areas, systems are in place to connect GPs with consultants in their area, usually via phone.[10] In some specialties, there is also a growing number of 'virtual clinics', where GPs email consultants and ask for advice. This is particularly common in dermatology, where photographs of skin lesions are sent to consultant dermatologists who make an assessment and either suggest a management plan or make a referral.[11]

Trusts are increasingly experimenting with virtual clinics for outpatient services – for example, asking technicians or nurses to collect patient information for consultants to review later, particularly for follow-up care.[12] In the United States, intensive care units in smaller and remote hospitals are often supported by electronic systems that allow a team of clinicians to review patients' vital signs remotely in a control centre, with positive results.[13, 14, 15] The NHS has experimented with these kinds of models – Guy's and St Thomas' NHS Foundation Trust announced the first pilot in 2013 – but they are far from widespread.

In social care there are examples of connecting care homes to monitoring hubs staffed by clinicians, who can make an assessment and offer advice in order to reduce A&E attendances.[16]

Future potential

While video consultations and more asynchronous (that is, not in real time) forms of communication such as email do not challenge the fundamental principle of health care being delivered by a health care professional to a patient, they do have the potential to lead to new models of care. If things work as intended, these models will likely consist of increased digital interaction and fewer face-to-face appointments – which, if they did take place, would be enhanced by ensuring clinicians have all the relevant information and support they need at the point of care.

They could:

- Improve access between patients and GPs as well as between GPs and consultants.
- Reduce unnecessary referrals to secondary care, outpatient follow-up appointments and A&E attendances.

But there remain outstanding questions about how and where remote care is best deployed.

Questions for the NHS

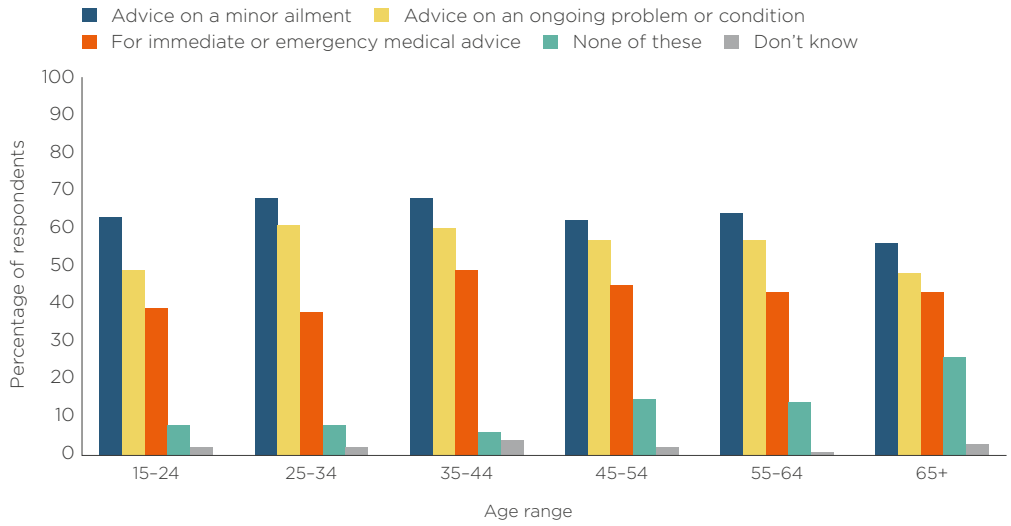
Will patients engage with online consultations?

One of the biggest questions for the NHS is how far patients are willing to engage with online consultations. Historically, uptake has been low in traditional general practice, but this appears to be changing. In polling of over 2,000 UK adults (aged 15 and over) conducted by Ipsos MORI for this project:

- 63% of respondents would be willing to have a video consultation with their GP for advice on a minor ailment.
- 55% of respondents would be willing to have a video consultation with their GP for advice on an ongoing problem or condition.
- 43% of respondents would be willing to have a video consultation with their GP for immediate or emergency medical advice.

And there was relatively little variation across age groups – with 63% of 15–24 year olds being willing to consult with their GP via video for a minor ailment compared to 56% of over 65s. That said, over a quarter of respondents over 65 said they would not want a video consultation with their GP for any of the scenarios we tested (see Figure 1).

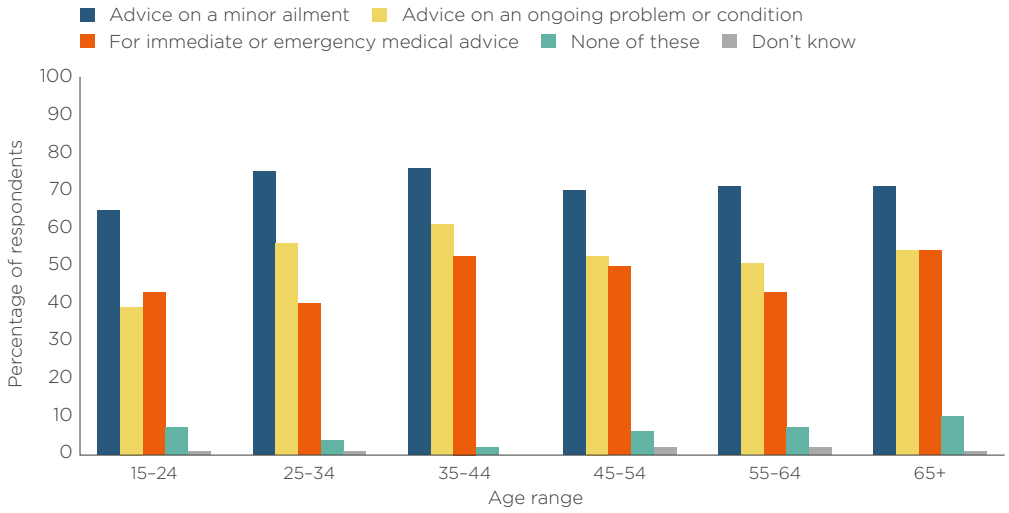
Figure 1: Public willingness to use video consultations with own GP



Question asked: "In which, if any, of the following circumstances would you be willing to use a video consultation with your GP". n=2,083 (UK adults aged 15 and over).
Source: Ipsos MORI polling commissioned by The Health Foundation.

The use of video consultations in general practice raises questions about continuity of relationships. While video can be used to ensure patients see their preferred GP,[17] it can also be used to promote access to services over 'relational continuity' – and this is certainly the case with models like GP at Hand. Given that research has shown that people with ongoing health needs highly value continuity,[18] it might be fair to assume video consultations with an unknown GP would be unappealing to this group. But our poll found that, of the people open to using video, over half would use it to consult a GP they didn't know for an ongoing issue. Again, there was little variation across age groups – with 56% of 25–34 year olds being willing to do this compared to 54% of over 65s.

Figure 2: Public willingness to use video consultations with a previously unknown GP



Question asked: "In which, if any, of the following circumstances would you be willing to use a video consultation with a GP who you do not already know". n=1,726 (UK adults aged 15 and over).
Source: Ipsos MORI polling commissioned by The Health Foundation.

It is worth noting, though, that the poll did reveal variation across income groups. More people in higher-income households were willing to use a video consultation in every scenario: 71% of those in households earning over £25,000 per annum were willing to use a video consultation with a GP they knew for advice on a minor ailment, compared with 54% of those in households earning less than £11,500 and 60% of those earning between £11,500 and £24,999.

What will the impact on cost be?

Where remote consultations reduce unnecessary referrals or outpatient appointments, they have the potential to save money. But, so far, evidence on cost is unclear. Where remote interactions subsequently require a face-to-face appointment, costs are likely to increase.[19] There is also evidence that remote consultations can increase demand. After implementing remote care, leaders at Kaiser Permanente found that virtual visits via telephone and email increased from under 5 million in 2008 to over 10 million in 2013, while face-to-face visits remained largely the same.[20]

What are the workforce implications?

Working remotely has the potential to fundamentally change the nature of clinician roles. Historically, part of the resistance to remote consultations in primary care came from GPs viewing face-to-face consultations as the gold standard of care – and remote consultations a poor alternative.[21]

The importance of ensuring that remote consultations can be used safely with patients who are most likely to benefit, alongside acknowledgement of significant changes to clinical roles (which may require additional training), cannot be underestimated.

Patient self-management

Current status

Digital technology is increasingly supporting patients to better manage and understand their condition. Online health communities enable patients to share their experiences, swap management tips and exchange resources; apps support medication adherence, symptom tracking and peer support; and there are a host of websites providing health information.

At present, much of this is happening outside of the NHS, driven by patient demand and technology supply. But the NHS is increasingly attempting to make better use of patient technology. For example, the NHS Apps Library lists approved health apps and the Innovation and Technology Tariff reimburses GPs for prescribing an app designed for people with chronic obstructive pulmonary disease (COPD). But none of this is happening at scale.

One technology that has been in use in some parts of the country for some time and has a positive impact on people's ability to manage their condition is remote monitoring.[22] This is the term used for patients collecting information such as their blood pressure or blood glucose levels and sending that information (either automatically or manually) to their health care team.[23] The benefit of remote monitoring is being able to spot when a patient is becoming ill, and either direct them to their care plan or intervene professionally.[24]

Future potential

While remote monitoring is not new, a notable development is the wide range of patient-facing apps that are able to interact with monitoring equipment and provide an easy-to-use interface for patients to collect and store their data. Crucially, this means technology companies are able to target both consumers and the health care system.

Patients are therefore increasingly able to collect and store detailed information about their condition and how it is changing over time. If the NHS can make the most of this data, it can improve short consultations by drawing on reliable information about how the illness is progressing or how a patient is responding to interventions. Not only this, but it also has the potential to produce a longitudinal data repository for research (see 'Data and artificial intelligence' below).

In the longer term, we may see consumer health care products start to blur the lines between patient and professional – particularly if smart monitoring devices are built into everyday appliances such as toilets, and are able to detect illness or warning signs before the patient is aware anything is wrong. However, it is unclear whether this would need to be market-driven – with individuals investing in these devices for themselves – or whether the NHS would see a worthwhile return on investment by helping to foster this sort of approach, in order to better manage population health.

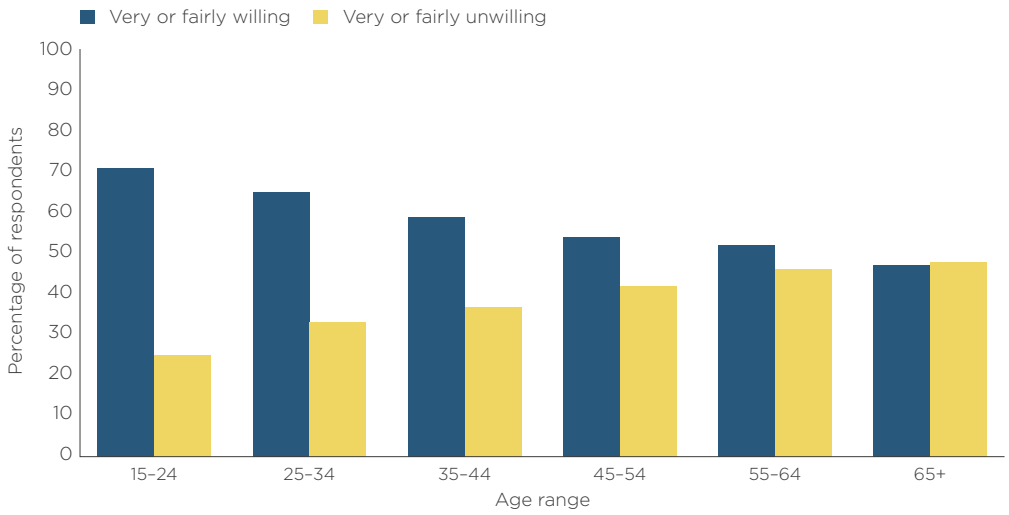
Questions for the NHS

In the shorter term, the biggest questions for the NHS are:

- How comfortable are patients with using consumer health technology such as apps, and sharing data with their health care team?
- How can patient-facing technology be used effectively in the NHS, ensuring that it is reliable and effective, and professionals are able to act on the data?
- How can the NHS create a system that embraces patients taking more responsibility while simultaneously supporting people who are unable to self-manage, and what does this mean for professionals' role and training requirements?

Our poll found that more than half (57%) of respondents would be willing to share data with the NHS via a lifestyle app or fitness tracker. As Figure 3 shows, while support was certainly higher among younger age groups, just under half of over 65s were open to the idea. That said, a third of those over 65 say they would be very unwilling to do so.

Figure 3: Public willingness to allow NHS organisations access to self-collected lifestyle data from an app or fitness tracker



Question asked: "How willing or unwilling would you be to allow NHS organisations access to lifestyle data you have collected yourself via an app or fitness tracker for the purposes of delivering care". n=2,083 (UK adults aged 15 and over).
Source: Ipsos MORI polling commissioned by The Health Foundation.

While self-management via apps and wearables may not be suitable for everyone, it is certainly not the case that older patients are unwilling to use digital tools for health care and self-management.

Perhaps a bigger problem is how to put the infrastructure in place to use consumer technology effectively. Professionals often do not know what exists, whether it is safe to use and how to make the best use of large amounts of data. The NHS Apps Library, which requires developers to undergo some form of quality control, (the first stage of which is a self-assessment for low-risk apps) addresses this to some extent. But it puts the onus on developers to apply – and there is a risk that less functional apps will enter the library, while more effective apps are used by patients outside of the health care system, without NHS support or professional willingness to draw on the data that is subsequently produced.

Finally, not all patients are capable of using digital tools for self-management. One of the preconditions of helping patients to become engaged with managing their own conditions is the presence of highly skilled staff to educate and support them.[25] What's more, over 12 million people in the UK lack basic digital skills[26] and this group is made up of people vulnerable to social exclusion.[27] How far should the NHS invest in health coaches and specially trained nurses to encourage activation and self-management? And if the NHS does put infrastructure in place to better support patient engagement, would this become the expectation of most patients? Might those who lack the skills to manage their health care through digital means be left behind?

Data and artificial intelligence

Data

Current status

The NHS generates billions of data items every single week – both clinical (for example, symptoms, diagnoses and treatments) and administrative (for example, how resources are used). Increasingly, data is also being collected from patients (see 'Patient self-management' above) and this, along with data from pharmaceutical companies and clinical research, has the potential to significantly transform health care.

A key finding from a recent major review of digital opportunities in the NHS[28] was that Chief Clinical Information Officers should be developed and employed in health care trusts, alongside a team of analysts to harness the full potential of data collected by digital systems. A digital academy has been established in response to this to develop health informatics skills for the NHS. Theresa May and Jeremy Hunt have consistently emphasised the importance of making better use of data and the analytical capacity AI affords.[29]

At the moment, though, big gaps in NHS data remain. It is not routinely available at national level for community, social or primary care and the data that we do collect is not linked together to create national datasets. This means there are important questions we are unable to answer. Several countries in Europe, such as Sweden and Denmark, have collected comprehensive data and linked it successfully,[30] and the NHS could learn from this international experience.

Future potential

The abundance of data is a driver of several other developments discussed above – particularly genomics, which relies on better data and advanced analytical tools alongside scientific discovery. Linking and analysing comprehensive health care data presents four major opportunities, which are discussed in turn below.

1. To reduce variation in clinical practice and become a learning system

Digital technology provides the opportunity for health care providers to embed best practice protocols. For example, if a patient attends hospital with a suspected stroke, the electronic health record can prompt clinicians to undertake each task in the protocol. This approach can be taken a step further by automating protocols. At digitally advanced health care organisatons in the United States, the admitting clinician can trigger the entire stroke workflow at the click of a button, organising laboratory tests, the CT scan, administration of intravenous medication, and so on.[31] Aside from streamlining the system and supporting clinicians to make the right decision at the right time, in this approach data can be collected on how clinicians' actions vary from protocol – and what impact that has on outcomes. In theory, if variation leads to better outcomes, the organisation can think about updating its protocols – although appropriate evidence standards would need to be met.

2. To understand how and why diseases arise and therefore how they can be detected early or prevented altogether

Root causes are sometimes hereditary, but often relate to the broader circumstances in which people live, including the opportunities available to them. Combining social data with clinical data on diagnoses, treatment and lifestyle has the potential to help the NHS better understand the likelihood of disease within different populations. This means support and screening programmes could be put in place to prevent illness or intervene as early as possible.

3. To use linked data to evaluate treatment outcomes, develop targeted approaches to treatment and make clinical decisions in real time

As set out above (see 'Genomics and precision medicine'), it is often unclear which treatments are best suited to particular patients. By linking data on a patient's profile, medical history and genome, it may be possible to examine which of the available treatments is most effective and for whom.

This kind of approach could also be used to complement evidence from randomised controlled trials (RCTs) conducted during the development stages of new drugs. The Salford Lung Study[32] draws on clinical data in electronic health records to study the safety and effectiveness of treatment options for COPD and asthma. If this type of approach is increasingly used to complement RCTs, it means treatments and interventions can be tested in a real-world environment on a typical patient population (rather than only those that have been specifically selected for inclusion in a RCT). This may lead to more personalised approaches to medicine, whereby treatments are targeted more closely to specific characteristics and the medical history of the patient.

4. To use consumer devices to monitor the whole population in order to form population-level datasets and enable early intervention for at-risk patients

See remote monitoring in 'Patient self-management' above.

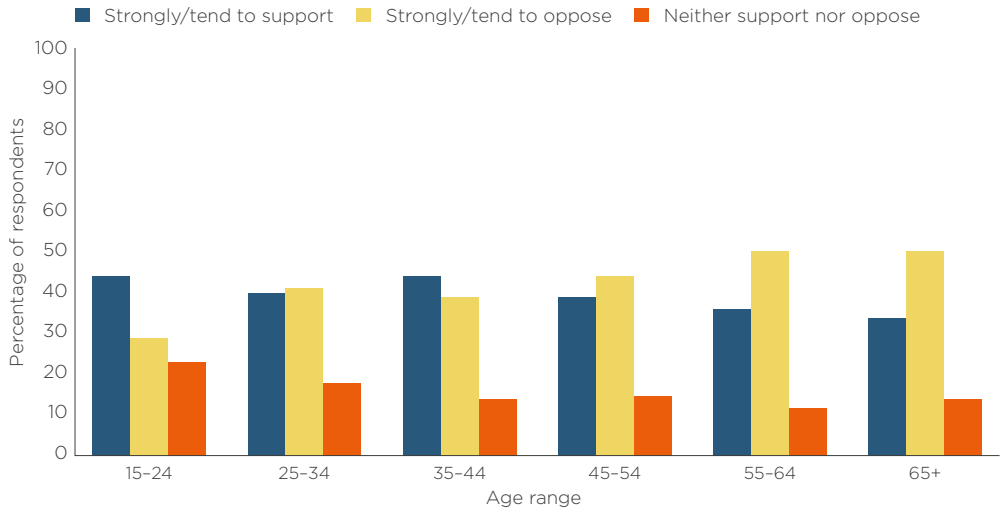
Questions for the NHS

There are a number of significant barriers to using data for these purposes. These include the fragmented nature of the health care system, electronic data repositories that are not able to interface with one another, and regulatory restrictions designed to safeguard privacy.

Perhaps more significant, though, are public attitudes towards data sharing – which evidence suggests is fairly mixed. People are generally happy for their data to be shared between professionals who are caring for them – and indeed many assume that this is already the case.[33] However, previous work suggests that when asked about their level of willingness to share their own health information for research and planning, views are very mixed.[34]

Our poll asked respondents whether they would support their health data being accessed by commercial organisations if they are undertaking health research (see Figure 4 below).

Figure 4: Public support for health data being accessed by commercial organisations undertaking health research

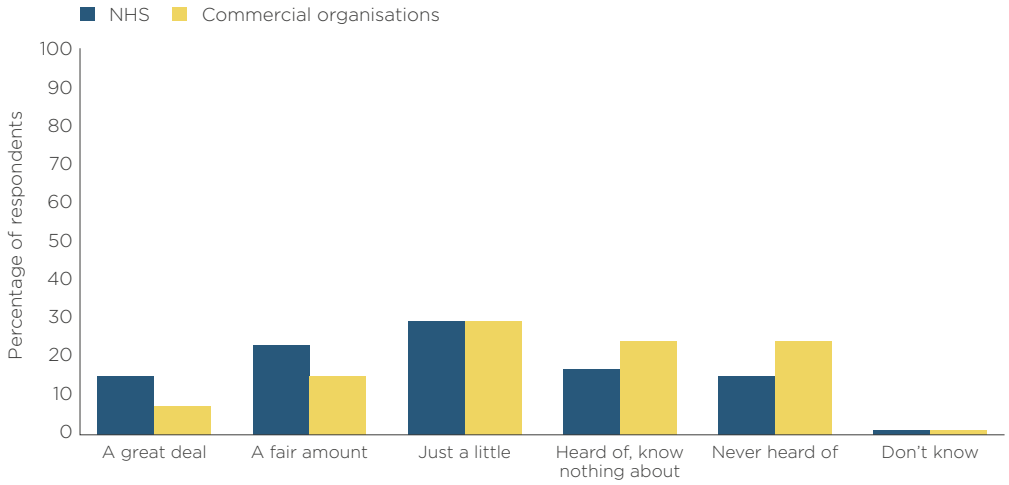


Question asked: "To what extent, if at all, would you support your health data being accessed by commercial organisations if they are undertaking health research". n=2,083 (UK adults aged 15 and over).
Source: Ipsos MORI polling commissioned by The Health Foundation.

There was not a strong level of support across any of the age groups – although older age groups were much more resistant.[35]

The general lack of support may, at least in part, be explained by a lack of understanding about what commercial organisations do with health data. We asked respondents how much they know about the use of their data by the NHS and commercial research organisations (see Figure 5 below).

Figure 5: Public knowledge about how NHS and commercial organisations use health data



Question asked: "How much, if anything, would you say you know about how the following organisations use health data for these purposes". n=2,083 (UK adults aged 15 and over).
Source: Ipsos MORI polling commissioned by The Health Foundation.

Results show that, compared with understanding of the NHS's use of data, relatively few people know much about how commercial research organisations use data – although knowledge was fairly poor in both contexts. A national opt-out has now been implemented alongside the General Data Protection Regulation (GDPR), which means patients can choose not to share identifiable data for purposes other than individual care. If high volumes opt out, the validity of available data to conduct research and improve services could be undermined.[36] This suggests transparent public dialogue is needed over how data is used currently; what the opportunities are for the future; and how risks can be mitigated.

There are also questions about how far the NHS can use data to take action for at-risk groups. Given capacity and resource constraints in the system, it is unclear what the implications of doing this would be.

Artificial intelligence

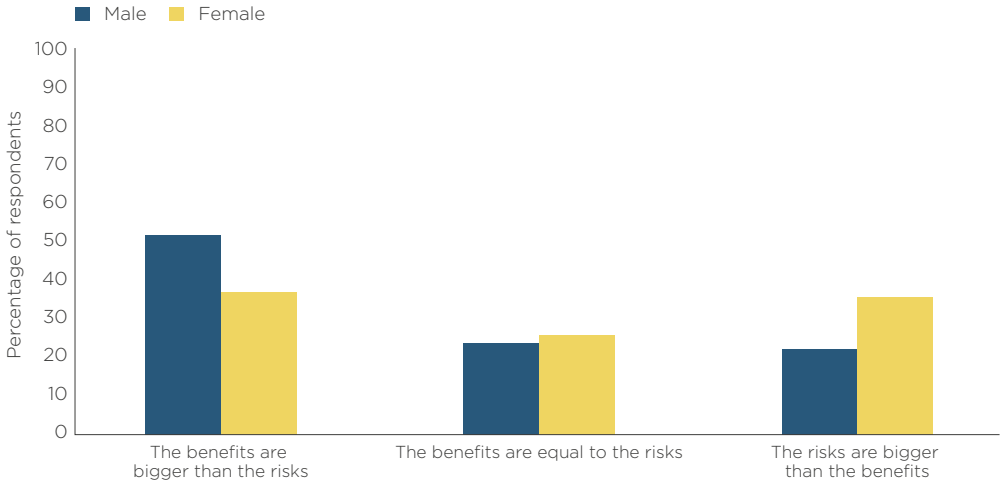
Current status

Artificial intelligence (AI) – defined as "a branch of computer science dealing with the simulation of intelligent behaviour in computers"[37] – is beginning to play a role in analysing health care data. AI is likely to become much more prominent in the future, although at the moment it is not clear how effective it will be or where it is best deployed. The techniques are being used in a wide range of applications from supporting scientific research into genomics and drug discovery, to diagnosis and patient triage – but at the moment it is not used routinely in the NHS.

Future potential

One of the most exciting opportunities is for AI to improve the diagnostics process: for example, using algorithms to interpret images obtained from CT or MRI scans to detect tumours. Numerous companies are already developing algorithms to analyse different types of imaging data. A handful have had deep-learning algorithms, which are able to learn and evolve as they gather more information about the task at hand, approved for use in the United States in the past year. Our poll shows that the public is broadly supportive of machine learning (an enabler of AI) to improve diagnosis, with the majority believing the benefits either outweigh or are equal to the risks. This was true across all age groups, although men were generally more positive than women (see Figure 6).

Figure 6: Public opinions on the risks and benefits of using machine learning for diagnosis



Question asked: "Which of the following is closest to your view about the balance of risks and benefits with computers analysing medical records to help diagnose patients". n=2,083 (UK adults aged 15 and over).
Source: Ipsos MORI polling commissioned by The Health Foundation.

AI also holds some promise for supporting triage, and some private primary care providers have already developed online triage processes that draw on AI algorithms. Patients enter their symptoms and are guided towards self-care, the GP, an out-of-hours clinic or A&E. They have the potential to be more accurate than current online triage based on non-learning algorithms, which tends to be overly risk-averse, and drives patients to the health care system unnecessarily rather than diverting them to a pharmacy or self-care.[38]

Another use of AI is improving 'back office' functions for the NHS. Scheduling is a complex task, whether that means making sure all members of a surgical team are in the operating theatre at the right time, or arranging the schedule of a community nurse. AI may be able to solve these problems more swiftly than humans, and could potentially improve patient care in the process. AI may also offer productivity gains through automating basic administrative tasks.

Questions for the NHS

While such systems might outperform clinicians for some tasks in the future, their use raises numerous ethical questions, which the Wellcome Trust recently committed funding to explore.[39] The most fundamental question that the NHS will need to answer is how the development and then deployment of these technologies should be governed.

For example, at the moment it is not clear who should be responsible if something goes wrong with an AI application and a patient is harmed. AI developers have aspirations to develop and deploy real-time learning systems that update according to near-real-time data flows, which would bring a new challenge to an already complex set of regulatory questions. We support the House of Lords AI Committee's recommendation for urgent action on clarifying NHS data governance and how to commission these systems.

Final reflections

If the trends outlined here continue to progress, they have the potential to completely transform health care. Personalised treatments based on patient characteristics; improved access to specialist advice for both patients and professionals via video or other modalities; tools and support for patients to become real experts in their health and care; and a data-driven system able to continuously learn and improve. There is also significant potential to realise financial efficiencies, although difficult decisions will need to be made about where to invest, particularly where significant upfront resource is needed to see benefits much further down the line.

But substantial barriers also exist which slow the implementation of these new technologies. Many require large changes to the workforce – professionals learning to work in new ways or, in some cases, even entirely new roles. The impact of such change has been extensively studied[40] and should not be underestimated. Similarly, implementing new technology effectively often entails new workflows which require clinician buy-in, effective leadership and adaptability.

And when it comes to technology that has the potential to fundamentally change the prevailing narrative of health care, such as smart appliances to detect illness, much depends on legislation, NHS infrastructure, the political context and public expectations. Technology, then, may only be the secondary driver of significant change in the long term.

While there is no doubt technology offers sizable benefits to the NHS (and is often hailed as the saviour of health services by politicians),[41] the NHS needs to be aware of the challenges and opportunity costs that new advances present, as well as the policy questions that need answering in order to make the most of future potential.

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To mark the BBC's coverage of the NHS's 70th birthday in July 2018, researchers from the Health Foundation, Institute for Fiscal Studies, The King's Fund and the Nuffield Trust have joined forces for the first time, using combined expertise to shed light on some of the big questions on the NHS.

The Health Foundation

The Health Foundation is an independent charity committed to bringing about better health and health care for people in the UK. Our aim is a healthier population, supported by high quality health care.

Nuffield Trust

The Nuffield Trust is an independent health think tank. We aim to improve the quality of health care in the UK by providing evidence-based research and policy analysis and informing and generating debate.

Institute for Fiscal Studies

The Institute for Fiscal Studies is Britain's leading independent microeconomic research institute. The goal of the IFS is to promote effective economic and social policies by better understanding how policies affect individuals, families, businesses and the government's finances.

The King's Fund

The King's Fund is an independent charity working to improve health and care in England. We help to shape policy and practice through research and analysis; develop individuals, teams and organisations; promote understanding of the health and social care system; and bring people together to learn, share knowledge and debate. Our vision is that the best possible health and care is available to all.

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