The digital patient: transforming primary care?

Research report

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About this report

Digital technology has transformed the way we live our lives. Patient-facing health care technology is expanding fast as people become increasingly interested in using digital tools to manage their health and wellbeing. Yet the NHS has frequently been portrayed as one of the most backward industries in responding to digital technology, and policy-makers are understandably concerned to limit the growing gap between the digital experience we have as consumers and the experience we have as patients in the NHS. This report, which is partly based on research commissioned by NHS England, pulls together the evidence that exists about this rapidly evolving sector. It looks at digital services offered by the NHS (such as online appointment booking and access to records) as well as other technologies such as monitoring devices and apps. The report shows how professionals and policy-makers can make the most of the opportunities afforded by patient technology and avoid the risks. It is especially relevant to those working in general practice and community settings, since that is where much of the patient-facing technology has been deployed to date.
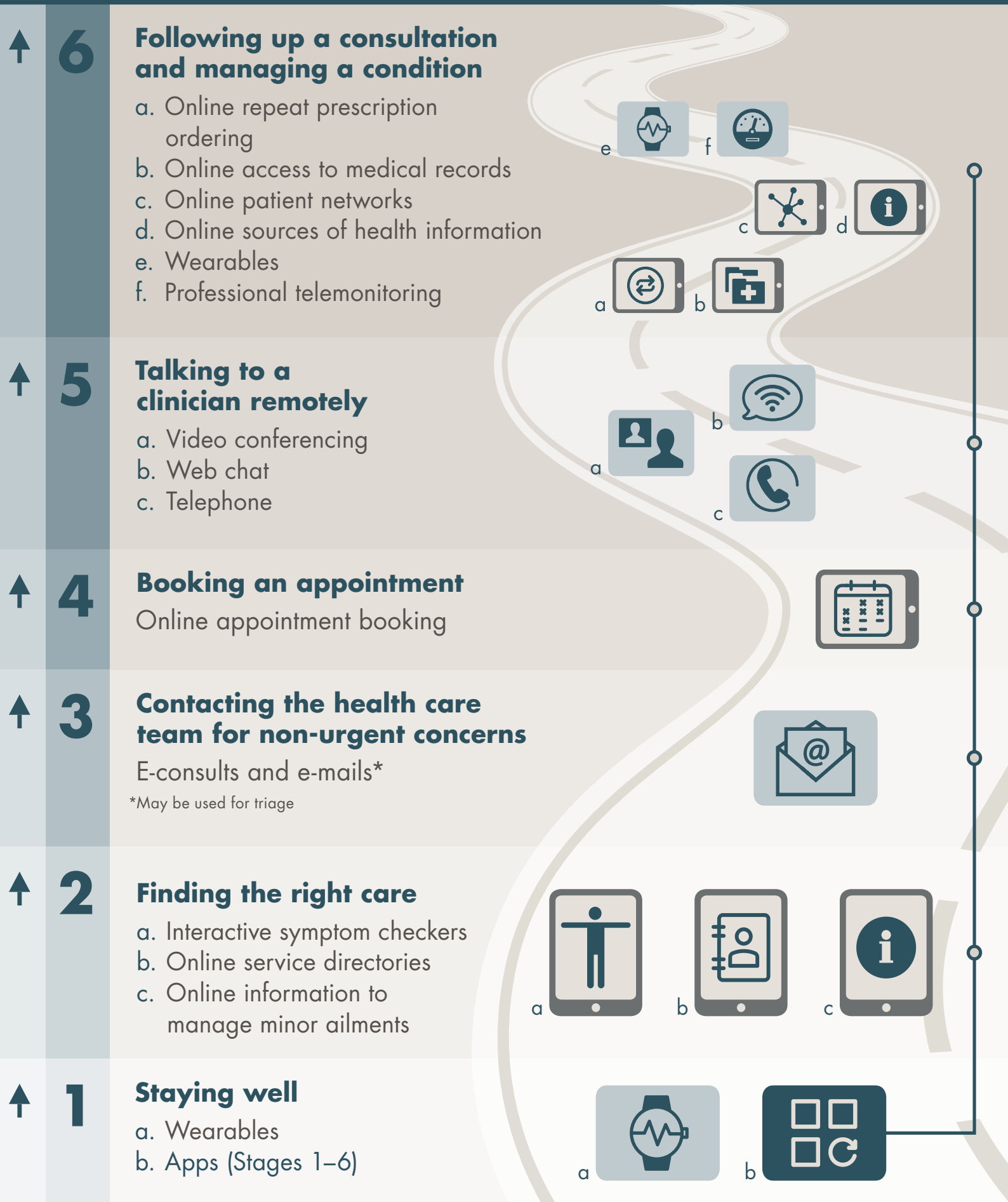
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Key points

Digital technology is transforming our lives, but its use in the NHS is still limited. There is a growing gap between the digital experience we have as consumers and as patients in the NHS. This gap is all the more pronounced given the rapid growth of commercially available health-related products – there are over 165,000 health apps on the market.

In the future, digital tools could transform our experience of care and facilitate improved self-management. It is hoped that this enhanced capacity for self-care will reduce demand on stretched services. But the impact of this new digital capability is far from certain; we are lacking evidence in a wide range of areas. Not only this, but NHS professionals could shy away from patient technology for fear of an increased workload or patients receiving inaccurate advice. Or a host of new private providers offering advanced digital services could disrupt the primary care landscape and threaten joined-up care.

Despite this significant uncertainty, health care organisations and policy-makers will need to make decisions based on the best available evidence. This report explores that evidence. We looked at seven types of patient-facing technologies, collating what the evidence tells us to date with experiences of those using the technology on the front line. From this we suggest lessons for success. Our key findings for each area are as follows.

- **Monitoring and wearable technology.** We found some evidence that monitoring can improve people's diet, exercise and medication adherence, but sustained engagement can prove challenging and not all of the studies were positive in their findings. Virtually all of the evidence comes from the use of monitoring equipment that has been professionally recommended, which is known to increase adherence and engagement. Professional monitoring interventions for chronic conditions, whereby data is sent to the health care team, have had very positive results on health outcomes and resource use.

- **Online triage.** Support for self-triage (such as service directories and interactive symptom checkers) and professionally led online triage (using emails or web consults) have the potential to reduce demand, although evidence of this is weak to date. At present, interactive symptom checkers

are risk averse and may drive unnecessary demand to the health care system. These are already used at scale, and advancements in artificial intelligence among other things mean there are opportunities to make them much more accurate. But there are concerns that the use of these tools removes the opportunity for holistic clinical assessment and people do not always follow advice – particularly when self-management has been advised. We need more research on how patients engage with these tools alongside rigorous testing and evaluation of the technology itself.

- **Online sources of health information, targeted interventions and peer support.** Online information can help patients manage their condition and have more productive conversations with their health care team. Where patients belong to a patient network, they often feel better socially supported and have improved behavioural and clinical outcomes. There are also positive results from targeted web-based interventions, particularly for mental and sexual health, but they must be effectively targeted to the appropriate audience to be successful.

- **Online appointment booking and other transactional services.** Booking appointments and ordering repeat prescriptions online can improve patient experience. Many assume online booking will also result in administrative efficiencies, but there is little evidence of this to date; in most places uptake is too low to have any discernible impact.

- **Remote consultations.** Evidence suggests email consultations improve communication with professionals, save patients time and increase overall satisfaction. Video consultations are also generally well received by those that use them, but they tend to appeal to those who struggle to access their health care team in person. This may change if video consultations are offered on demand or when a face-to-face option is not possible (for example out of hours). There is mixed evidence on their impact on demand – with various results showing they increase workload permanently or temporarily, or decrease workload. Much depends on the context and the type of patient. Focusing on those most likely to benefit, such as patients with access difficulties, may help.

- **Online access to records.** This is one of the most effective ways to engage patients, often leading to improved communication, adherence to lifestyle

advice and shared decision-making. It also tends to be highly valued by patients. Evidence about the impact on demand is generally inconclusive, but it has the potential to increase GP visits, telephone encounters, A&E visits and hospitalisations and we do not have robust evidence on its impact on health outcomes. There are also a number of governance concerns around granting record access to vulnerable patients and the potential for others to exploit their data. If full record access is granted, some worry about the extent to which third-party information is shared. There are several strategies to mitigate against these risks, including restricting access or redacting records where necessary. But this takes considerable resource and a new business model is required.

- **Apps.** There is a wide variety of apps on the market available for all of the functions set out above. But there are also a number of apps to help patients manage their condition or stay well. There is an emerging body of evidence suggesting that apps can have a positive impact on diet monitoring; physical activity; adherence to medication and chronic condition management, particularly for multiple sclerosis, Parkinson's disease and cardiovascular disease. Apps that use 'gamification' and established behaviour-change techniques such as prompting goal setting, review and feedback on performance to encourage engagement may prove increasingly important in helping to sustain behaviour change. But many apps are inaccurate and the efficacy of the majority of them is unknown. We need more robust evidence on what works and in which contexts.

So, there are a range of positive impacts to date. But the uptake of digital services offered by the NHS is low and the health system is not currently making the most of beneficial consumer devices or apps:

- Increased uptake will require significant changes in the ways professionals work: they will need new skills and expertise.

- If patients are to self-manage using apps or wearable devices, the largest gains are likely to come from professionals recommending innovations, using the data for diagnostic and treatment decisions where appropriate and actively encouraging sustained engagement with support from others in community or general practice settings.

- Benefits from online access to records are likely to be maximised by professionals moving to a model of shared decision-making and showing patients how the information in the record can support self-care. Even online appointment booking is likely to be improved by demonstrations of how it works and what the benefits are in order to improve uptake, which has been slow to develop.

- Uptake is also likely to improve with technology that is intuitive and easy to use for everyone – including those with low literacy levels and cognitive impairments. This should be part of broader efforts to reduce the risk of digital exclusion. Of course, traditional channels should also remain available.

- All of this requires resources and it is a mistake to think that the use of patient-facing technology to support healthier lifestyles and self-care will be an easy or free option. It will require funding and support at all levels of the system, at least in the short term. We make a number of recommendations about where this might be most helpful.

- This agenda needs to be considered in light of an entire health system. The potential for transformational change comes from patients using digital tools on every step of their health journey. Sustainability and Transformation Plans alongside Local Digital Roadmaps present a valuable opportunity to take a place-based approach to promoting the uptake of digital tools, rather than focusing on particular sectors or services.

- Finally, there is still so much we do not know about how this will play out. As uptake and awareness increases, it will be important to have local and national evaluations, which help to highlight best practice and avoid common pitfalls.

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Introduction

Digital technology has transformed the way we live our lives as consumers. We can manage our finances online, book flights across the world and access sources of information that seem limitless.

Patient-facing technology is expanding fast as people are becoming increasingly interested in using digital tools to manage their health and wellbeing. Seventy-five per cent of the UK population go online for health information and 50 per cent use the internet for self-diagnosis (Department of Health and UK Trade & Investment, 2015); Fitbit is now the third largest publicly traded digital health company (Wang and others, 2015); and more than 165,000 health-related apps are on the market (Aitken and Lyle, 2015).

The NHS has frequently been portrayed as one of the most backward industries in responding to digital technology, and policy-makers are understandably concerned to limit the growing gap between the digital experience we have as consumers and the experience we have as patients in the NHS. By 2016/17, all patients should be able to book appointments, order prescriptions and access their detailed medical record online (NHS England, 2016a). NHS England's aim is that at least 10 per cent of patients will be using one or more official online services by 2016/17, rising to 20 per cent by 2017/18 (Nazir, 2016). Allocations to clinical commissioning groups for the provision of general practice information technology will increase by 18 per cent and £45 million will be invested as part of a multi-year programme to support the uptake of online consultations (NHS England, 2016a). There are also plans to help the NHS make the most of apps and consumer wearables, including a four-stage evaluation process to help professionals and commissioners identify safe innovations.

There is much uncertainty about what impact health-related digital technology will have on the NHS, particularly in relation to demand for services, clinical workload and health outcomes.

In this report, we pull together the evidence that exists about this rapidly evolving sector, looking at digital services offered by the NHS (such as online appointment booking and access to records) as well as other technologies such as monitoring devices and apps. We draw out how professionals and policy-makers can make the most of the opportunities afforded by patient technology and avoid the risks. This report is especially relevant to those in general practice and community settings, as that is where much of the patient-facing technology has been deployed to date. We focus particularly on health and health care, excluding the wide range of assistive technologies in use in social care.

Methods

For this report, we conducted a literature review, interviewed 21 experts – including representatives from technology companies, policy, academia, patient organisations and health care providers – and held a workshop to test and refine four future scenarios. We also undertook four case studies comprising of desk research and one or more interviews with key people at the featured organisations.

Structure of the rest of the report

In Chapter 2, we present contrasting visions of the future, highlighting the uncertainty surrounding this area and the potential for significant transformation. In Chapter 3, we take seven technologies in turn, exploring evidenced impact to date, practical experience of deploying them on the front line and key lessons for success. In Chapter 4, we set out considerations for taking this agenda forward. Finally, Chapter 5 offers some concluding thoughts.

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A vision of the future

What promise does digital technology hold for patients? Could it fundamentally change the way the NHS works, as well as the experience and outcomes for patients? Or are the proponents of a digital future vastly overstating the potential, putting NHS staff and resources at risk at a time when the service is at its most stretched?

Our research revealed that there are multiple ways in which this could play out – and they could all happen at the same time in different geographies and population groups. Drawing on evidence from the literature and our interviews, we developed a range of future scenarios and brought together experts across the sector – including general practitioners (GPs), academics, representatives from technology companies, private sector health providers and policy-makers – to discuss them. Two primary configurations emerged, one more positive than the other.

Towards a digital utopia?

Patients, supported by an array of digital tools to track their condition and connect with advice, peer support and their health care team could better self-manage their health and care – leading to reduced demand on the health care system.

Monitoring devices could become ubiquitous, automatically sending patients self-management advice, alerting professionals before patients reach a crisis point and contributing to large datasets to enable effective risk stratification and early intervention. Apps, too, could be prescribed for the vast majority of those with a long-term condition to manage their health – improving medication and lifestyle adherence and, ultimately, clinical outcomes.

Patients could routinely use sophisticated online symptom checkers – built into primary care – to find the most appropriate care, reducing unnecessary demand and improving patient convenience.

Data sharing across settings and services could be enhanced by, for example:

- patient technology such as patient-facing apps that work with clinical systems across the health service to transfer referral letters, test results and clinical notes
- the increased use of personal health records as part of integrated health records, which give patients and all professionals involved in their care access to their clinical data.

On-demand video consultations could enable relatively healthy, time-poor patients to be dealt with quickly and easily. This has the potential to alleviate demand for face-to-face consultations and enable professionals to spend more time delivering care to others – including those with complex, ongoing needs.

Or a dystopian distraction?

But there is also the potential for patient harm and significant disruption. Apps or web-based sources of information that give patients inaccurate or harmful advice could drive unnecessary demand to the health care system. More fundamentally, a greater presence of private providers in the health care space could negatively impact on the system as a whole.

Strong marketing campaigns by the private sector may mean that the most fashionable or popular consumer technologies are used at scale, rather than those that have been proven to be effective. This is likely to concern professionals, perhaps leading to the de-prioritisation of engaging with consumer technology.

Greater use of apps, devices and providers outside of the NHS could lead to a fragmented system, where data are not appropriately shared between patients and their health care team or between private and public providers. This may result in GPs holding incomplete patient records, undermining informed decision-making and population health efforts.

Perhaps most of all, new digital providers may lead to a new world in which NHS general practice is no longer seen as the 'medical home', the main locus of health care provision, where professional continuity is prized by patient and professional.

From digital consumers to digital patients?

One of the biggest uncertainties, among the many uncertainties that surround this rapidly changing world, is the degree to which people want and expect to use digital tools when faced with the anxiety of illness (especially chronic illness) that has to be managed over years rather than days. Evidence suggests patient engagement and adherence to treatment and health care advice tends to depend on their level of motivation to comply with best-known therapies – which is directly affected by the immediate consequences of non-compliance and the extent of lifestyle change required (see Sola and others, 2015).

What is more certain is that the NHS will have to make extremely careful decisions about how staff and resources are deployed in the foreseeable future, and that decisions to invest in technologies will have to be based on the best available evidence. In the next chapter, we give an overview of the evidence relating to a range of patient-facing technologies, and draw on the experiences of NHS providers who have used some of them.

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The digitally enabled patient: technologies, evidence and lessons for success

Digital technologies for patients are wide ranging, spanning every part of the patient pathway, from staying well to managing a condition. In this chapter we describe each technology in turn, explaining what it is, what the evidence base reveals to date and key lessons for deploying the technology successfully. We focus on:

- wearables and monitoring technology
- online triage tools
- online sources of health information and advice, targeted interventions and peer support
- online appointment booking and other transactional services
- remote consultations
- online access to records and care plans
- apps.

In four of these cases, we include a case study of how the technology is being used in practice.

Wearables and monitoring technology

Monitoring technology has been developed aimed at both consumers and professionals. Consumer-oriented monitoring devices – such as Fitbit devices and intelligent scales – enable users to track their activity and health indicators (depending on the type of device). Nearly 90 per cent of consumer wearables sync wirelessly with an app to automatically provide users access to data (Aitken and Lyle, 2015).

Consumer-oriented devices tend to be used by people outside the health care system to stay healthy. Figures for the uptake of consumer wearables in the UK range from 7.9 per cent to 14 per cent (Mintel, 2016; Statista, 2016). But it is a

growing market. Wearable sales in the UK grew 118 per cent from 2014 to 2015 (Mintel, 2016) and Nasdaq (2016) expects Fitbit to grow earnings at an average annual rate of over 20 per cent.

Professional monitoring interventions are often used for patients with a chronic disease – most commonly heart failure, hypertension, chronic obstructive pulmonary disease (COPD) and diabetes. They can also be used to encourage behaviour change – for example to increase physical activity. Data are sent to a health care professional via wireless technology such as Bluetooth, or manual communication (for example, a text message). These interventions enable patients to monitor and understand patterns in their condition and take action before things get worse – for example, by increasing their medication dose. They also allow professionals to capture data over time, enabling them to spot trends and intervene proactively.

Virtually all of the evidence relates to either professional monitoring interventions or trials where the technology has been professionally recommended.

A professional monitoring system in action: Florence (Flo) – a case study

An introduction to Flo
Florence, or 'Flo', is a simple telehealth intervention originally developed within Stoke-on-Trent Clinical Commissioning Group. It works by patients monitoring their condition and texting readings directly to the Flo system. Protocols exist for a variety of conditions, including diabetes, COPD and respiratory failure. Health care organisations are also free to develop their own specialist protocols. The box below illustrates how Flo can be applied in the management of hypertension.

Application of Flo in hypertension
8.00am: 'Hi. Don't forget to take your blood pressure this morning and again this evening and text in. Text BP then your reading, for example: BP 140 80. Thanks, Flo.'

In response to a high reading: 'Your blood pressure is high today. Follow the advice in your management plan, and take the readings again at your usual time. Thanks, Flo.'

Breach message: 'Your BP is outside the safe range – so contact a doctor today, as agreed in your shared management plan. Take care, Flo.'

Using Flo: The experience of Coastal Medical Group
Flo can improve caseload management, according to the Coastal Medical Group – a group of four GP practices in Morecambe that have been using the technology with 55 patients for nearly two years. The chronic disease nurse

specialist who has spearheaded the use of Flo has found that she no longer has to phone patients repeatedly to check on their condition. This has been of particular benefit for monitoring patients who work irregular hours. It also enables the effective distribution of work, as health care assistants are able to check patients' readings and only involve the nursing team if problems arise.

To address the possibility of patient adherence deteriorating, Coastal Medical Group decided to remove educational texts from Flo, limiting texts to requests for readings. But professionals do send additional ad-hoc texts, for example informing COPD patients of a severe weather warning or giving encouragement to patients attempting to lose weight.

The lead nurse has seen increased engagement from patients in managing their health and wellbeing and patients have given very positive anecdotal feedback.

Although the experience of using Flo has generally been positive, the lead nurse feels that it is not being used to its full potential. Parts of the wider nursing team fear that Flo will increase their workload – as a result, routinely offering Flo to patients who may benefit is not yet embedded into consultations. To help overcome this, the use of Flo is a repeat item on the regular nurse team meeting.

There has also been resistance from certain community teams, some of which do not see the need for Flo and are reluctant to break from established systems. This underscores the need for strong clinical champions and concerted efforts to ensure professional buy-in across the region.

The evidence base behind Flo

Flo has been formally evaluated, with positive results. It is considered to be easy to use, convenient and reassuring for people across a wide age range (Cottrell and others, 2012; Cund and others, 2015). Both patients and professionals have found that Flo can help patients to develop a better understanding of their condition, medication and lifestyle and improve condition management (Cottrell and others, 2015a; Cund and others, 2015).

However, its impact on professional time is less clear. Some evidence suggests that it can reduce the average number of contacts with the general practice team (Cund and others, 2015) but other work found that professionals were divided on whether Flo saved them time (Cottrell and others, 2015a).

Part of this depends on patient engagement. Studies found that engagement declined after a month (Cottrell and others, 2015a; see also Cottrell and others, 2015b), and where this was the case, Flo failed to result in improved blood pressure control for the majority of patients (Cottrell and others, 2015b).

Professionals suggested that this could be addressed by: customising reminder times (for example, for shift workers); prompting patients to send readings when

they are due rather than one message being sent in the morning asking for both morning and evening readings; ensuring that the number and type of texts required from patients are made very clear at the start so that they know the level of commitment required (Cottrell and others, 2015a). Selecting patients with the desire and capacity to actively use Flo is also important.

The benefits and challenges of using Flo

Benefits	Challenges
• Can make case load easier to manage	• Patient engagement can deteriorate
• Can improve patient experience	• There may be professional resistance
• Can improve patient engagement and self-management	
• May help to manage demand	

Evidence of impact

Patient engagement

Studies of monitoring technology have found positive impacts on behaviour change, including medication adherence, physical activity and overall responsibility – particularly when patients are empowered to adjust their own medication based on their readings (Ammenwerth and others, 2015; Fairbrother and others, 2013).

A number of short studies have also found that wearable technology improves weight loss (see Pellegrini and others, 2012; Shuger and others, 2011), but in a more recent 24-month trial of otherwise healthy young adults, those using wearable technology to monitor their diet and physical activity did not lose as much weight as those using a website (Jakicic and others, 2016). The reasons for this are not clear but could be put down to relying too much on the device or rewarding exercise with unhealthy food. Whatever the reason, weight regain is a significant issue and sustained engagement poses a challenge. Evidence is lacking on the impact of consumer devices when they have not been professionally recommended (and therefore sustained engagement is likely to be lower).

Despite this equivocal evidence, there is significant potential for apps and wearables to change behaviour and extend the reach of professionals:

"Portable works very well with behaviour change. Behaviour change is extremely difficult to scale with just face-to-face contact with a counsellor or a clinical psychologist. We just don't have enough of those people and the amount of contact that they're able to establish with each client is just insufficient, whereas mobile and apps, you know, it's there in your pocket… so you can get reminders… you can tailor to people's individual needs and wishes." (Professor Jeremy Wyatt, Director, Wessex Institute, University of Southampton)

Managing demand on professional time

Monitoring technology can help to reduce demand on hospital services, particularly when used for chronic conditions. A large evidence review found, according to the strongest evidence, that telemonitoring for heart failure can reduce heart failure-related hospitalisations by over 20 per cent and lower the risk of all-cause mortality by nearly 35 per cent, relative to usual care (Kitsiou and others, 2015). Other studies have shown similar results for COPD (although evidence is of low quality) (Pedone and Lelli, 2015). There is also evidence of positive impacts on clinical outcomes in areas such as type 2 diabetes and hypertension (see Wild and others, 2016; McKinstry and others, 2015; Welschen and others, 2005). That said, evidence suggests that professional telemonitoring does not change levels of patient contact with GPs or practice nurses (Bardsley and others, 2013).

Professional monitoring interventions tend to include some element of patient education and support – and it is not always clear whether the positive effects have come from early professional detection and intervention, improved patient control of their condition, or both. This is important when considering the likely impact of consumer monitoring devices that are not monitored by professionals. It may be that ongoing professional reassurance and encouragement (as well as professional intervention) leads to the most positive results.

Health outcomes

Professional monitoring interventions have led to a range of improved clinical outcomes, including reduced mortality for heart failure patients (Inglis and others, 2015) and improved blood pressure control in those with hypertension (McKinstry and others, 2016). As yet there is no evidence of what impact they

might have at the population level. In theory, data from monitoring technology could be used to form population-level datasets for risk stratification and early intervention, although this would require monitoring to be much more widespread than it is at present. Where patients are unwilling or unable to interact with monitoring technology, passive devices could be used, but patients' consent would be crucial.

In the future, monitoring may support effective early intervention for individuals. Microsoft is currently trialling its Microsoft band to predict the onset of an epileptic seizure.

Key lessons for using wearables and monitoring technology

- **Patient engagement will need to be sustained.** Engagement with consumer wearable devices significantly decreases over time from initial purchase (Ledger and McCaffery, 2014). Where monitoring forms part of a professional intervention, engagement is higher – although sustaining engagement in the long-term can still be challenging. To improve engagement, there are a number of things professionals can do:

    - where patients are asked to send readings, send reminders at the time the readings are due and limit all other communication
    - clearly communicate the commitment required from patients at the start of the intervention
    - carefully select patients with the capacity for (and ideally interest in) self-management – particularly as monitoring can be costly (see Slomski, 2016). See Chapter 4 for broader considerations about engaging patients.

- **Regional professional buy-in is needed.** Professionals can be resistant to break from established systems and routines, particularly if there isn't a clinical champion for using new technology in their particular organisation. Where monitoring is used to care for patients across organisations it is important to ensure that all professionals are on board. A regional approach (supported by local digital roadmaps) could help with this.

- **Patient safety needs to be assured.** Poorly calibrated monitoring devices could increase demand on professional time and lead to adverse health outcomes. If professionals are to actively recommend consumer technology, plans for NHS accreditation are welcome. Accompanying this with strong

communication that patients use unaccredited devices at their own risk may also help to protect patients from harmful apps.

• **Support is needed if professionals are to use data from consumer devices.** Professional use of data from consumer devices is likely to improve sustained patient engagement and support behaviour change. It may also help professionals to make an assessment. But before this can happen, a number of things are needed:

  – robust guidance for professionals on expected use of the data including assurance about professional accountability

  – clear communication that informs patients of the benefits of sharing their data while emphasising their right to opt out

  – intuitive data reports from the devices or accompanying software (e.g. colour-coded dashboards that highlight anomalies)

  – secure storage solutions for large amounts of patient data

  – additional training for professionals where appropriate.

Online triage tools

Digital tools offer opportunities to ensure that patients are directed to the most appropriate care for their needs. This can happen in four ways:

• online information to help people self-triage and manage minor conditions at home

• active direction to services that do not draw on professional expertise, such as interactive symptom checkers

• passive direction to services such as comprehensive service directories

• professional/person-led triage via email, e-consultations, web platforms and the telephone – patients detail their symptoms and health care professionals or receptionists triage them to an appropriate service. Examples of these systems include WebGP and askmyGP.

The first three are all examples of support for self-triage, while the last involves professional intervention.

Tools for self-triage are already used at scale. Seventy-five per cent of the UK population go online for health information and 50 per cent use the internet for self-diagnosis (Department of Health and UK Trade & Investment, 2015). Some NHS organisations are also starting to experiment with online triage. Dudley

Clinical Commissioning Group is piloting Sense.Ly – a virtual nurse avatar that directs patients to appropriate care.

The majority of self-triage tools rely on patients actively looking for them. Practice websites afford the opportunity to actively intercept patients attempting to book an appointment online or find the opening hours of their GP practice. As NHS Choices diversifies and allows patients to book appointments online as well as access an NHS 111 online service, this will also present opportunities for active patient interception.

Evidence of impact

Managing demand on professional time

Evidence on the capacity of online triage tools to manage demand is mixed, and much depends on the type of triage tool used.

There is some (albeit limited) evidence that support for self-management can reduce demand. A 2013 survey of 3,014 adults in the United States found that 59 per cent had gone online at some point in the previous year to look for health information, and 35 per cent had gone online specifically to diagnose their own (or someone else's) condition. Of the 'online diagnosers', 46 per cent concluded that they needed to see a health care professional, while 38 per cent believed that the problem could be dealt with at home (Fox, 2013).

Similarly, a small pilot study of an online triage platform found that, for every user requiring a GP response via an e-consultation, five users required online self-help only (WebGP, 2014). Furthermore, askmyGP – an online system to take information about a patient's complaint – has found that providers using the system are able to manage demand throughout the day, rather than creating pressure points first thing in the morning.

However, a trial of an email triage system found that email increased the communication burden on clinicians and staff, and did not substitute for telephone consultations (Katz and others, 2003). Recent evidence also suggests that GP telephone triage is not associated with a reduction in clinical contact time for GPs, although nurse-led telephone triage is (Holt and others, 2016).

Finally, there is significant potential for interactive symptom checkers to increase demand. Interactive symptom checkers are often risk averse, recommending professional care when self-management is appropriate (Semigran and others,

2015) and diagnosis apps are not always accurate (Bierbrier and others, 2014). This may drive patients to the health system unnecessarily.

While online triage tools have had limited success to date, several interviewees felt that online triage, if handled correctly, had a big role to play in managing demand in the future. There was a sense that being able to actively intercept patients who are about to make an appointment, potentially through the practice website, offers significant gains.

"[For] people who have actively decided to come to your practice website, usually to find your opening hours and your phone number [to] book an appointment… that's your opportunity to intercept… to walk them past a series of offers that mean self-help, signposting, symptom checking… that actually means you can pull out six per cent or seven per cent of demand right off the bat." (Anonymous interviewee)

Patient experience

There is not much evidence about how patients experience online triage tools. Much depends on the type of triage tool in question. For example, developers of WebGP and askmyGP – systems that enable triage based on e-consultations – have found that patients are satisfied with the service – perhaps because it involves professional review. But a survey of 515 people found that 40 per cent felt more anxious about their medical condition when viewing information online, prior to accessing the health care system (White and Horvitz, 2009). Furthermore, an evaluation of NHS 111 found that patients tend to be less satisfied with triage services when they have been auto-routed from another health service such as a GP out-of-hours service (O'Cathain and others, 2014), suggesting that patients may resist online interception when attempting to book an appointment via a practice website.

Online triage tools may particularly benefit certain patients. For example, those suffering from depression or anxiety may prefer online symptom checkers, rather than revealing their problems to a professional. Several studies have also found that patients are often more honest with digital tools than with a professional (see, for example, Lilford and others, 2002).

Health outcomes

Robust clinical trials are lacking in this area and we do not have hard evidence on the impact of online triage tools on health outcomes.

Key lessons for providing online triage tools

- **Improve the technology to make advice more accurate.** Self-triage advice is often risk averse, encouraging users to seek professional care for conditions where self-care is appropriate (Lupton and Jutel, 2015; Semigran and others, 2015). This is often due to medico-legal concerns. But there are significant opportunities to make it more effective by:

  – building on existing clinical decision support systems and artificial intelligence efforts in the private sector

  – connecting with patient records

  – using behavioural and environmental information

  – reconciling how patients describe their symptoms with clinical language.

- **Align with other sources of help.** This would have an even greater impact if combined with an increase in alternatives to GP care – for example, pharmacists and nurse clinics with access to the patient record.

- **Ensure that sound regulation processes are in place.** Developing sound regulation procedures around self-triage tools will need attention – particularly where they are offered to patients by regulated health care organisations.

- **Ensure the technology is subject to robust evaluations.** In relation to self-triage, some interviewees expressed concern about the extent to which effective triage can take place without direct clinical intervention and holistic assessment. Robust evaluations will give a sense of whether online triage is safe and meets all patient needs.

- **More research on how these tools are used is needed.** Patients do not always comply with advice, and an evaluation of the NHS 111 service found that patients were less likely to comply with advice for self-care compared with re-direction to a health service (O'Cathain and others, 2014).This means that even if the lessons above are taken on board, it is not guaranteed that these tools will be effective. A better understanding of how people use online triage and how patient compliance with advice can be improved will shed light on the likely impacts.

See also the key lessons in the next section.

Online sources of health information and advice, targeted interventions and peer support

In addition to directing patients to the most appropriate source of care, the internet is playing an increasingly large role in every step of the patient journey. This includes providing formal information and advice through NHS Choices or disease-specific sites such as Cancer UK, as well as helping patients connect online and share resources for managing their condition via social media or official peer support networks.

It is also enabling professionally led interventions to encourage healthy behaviours, ranging from videos to educational games. Computerised cognitive behavioural therapy – an online programme delivering the tenets of cognitive behavioural therapy to help overcome anxiety and depression – is a common online intervention in mental health. In addition, simple text-messaging interventions are being employed to reduce the number of missed appointments.

NHS Choices receives about 40 million page visits per month, and provides 20,000 articles, 1,000 videos and 120 health tools (Department of Health and UK Trade & Investment, 2015).

Evidence of impact

Patient engagement

People with chronic conditions use the internet to help manage their condition; to clarify and check information given by a health care professional; to seek alternative or additional treatments; and to understand their condition more effectively (Gowen, 2013; Kauer and others, 2014; Tsai and Rosenheck, 2012; Lacey and others, 2014; Lee and others, 2014).

Patients who access health information online report having more productive conversations with their GP, having a better understanding of their GP's prognosis and saving time by accessing information rather than making a GP appointment (Briones, 2015; Shah and others, 2015; Wyatt and others, 2015).

Online patient networks can also be very effective in engaging patients. Evidence suggests that, for a range of conditions, patients belonging to online communities become more knowledgeable; feel more socially supported and empowered; and

have improved behavioural and clinical outcomes, compared with non-users (see Van der Eijk and others, 2013). For rare diseases where established groups do not exist, social media is playing an increasingly large role (see Armstrong, 2016). Social media sites are also becoming increasingly prominent sources of health information among adolescents (Briones, 2015; Fergie and others, 2013).

Managing demand on professional time

Where preventative interventions are successful, there is potential to relieve pressure on the health system (see 'Health outcomes' below). There are also simple ways to improve efficiencies. Text-message appointment reminders can reduce missed appointments by up to 34 per cent (Hasvold and Wootton, 2011; see also Car and others, 2012), enabling professionals to use their time effectively.

Health outcomes

In mental health, a number of online programmes – including those involving stress management, interactive educational games and computerised cognitive behavioural therapy – have resulted in improved psychological wellbeing (Clarke and others, 2015). However, the evidence on the benefits of app-based interventions to support those with mental health needs is much weaker (Leigh and Flatt, 2015). A minority, however, such as 'Big White Wall', report positive results.

Big White Wall is an online community for those with depression or anxiety. It allows users to connect with each other, undertake clinical tests, access guided support programmes and track their progress. Available online and via an app, it boasts recovery rates of 58 per cent (Leigh, 2015).

Web-based interventions have also proved helpful in reducing sexual risk-taking behaviour (Guse and others, 2012). Such interventions are particularly successful for young people, given that they search for sexual health information online more frequently than for other health topics (Buhi and others, 2009), and more frequently than their older counterparts (Fox, 2006).

Overall, the most promising preventative interventions require effective targeting and professional recommendation.

It should be noted that there is also the potential to negatively impact on health outcomes. Evidence shows that Google searches often return inaccurate diagnostic results (Black, 2008) and there is a risk that patients may follow harmful advice.

Key lessons for using online sources of health information and advice, targeted interventions and peer support

- **Professionals should actively recommend online patient networks and trusted sources of information.** Given the positive results online patient networks and accurate online advice can have, there may be a role for professionals in actively signposting patients to appropriate websites.

- **User-centred design should be the norm.** Sixty per cent of England's working-age population find health materials containing both text and numbers too complex (see Rowland and others, 2014). NHS Choices is overwhelming for some (Tinder Foundation, 2015a). Given the large number of people who struggle to use online tools, they should be accessible in a range of formats – including visual images and diagrams where possible. Where this is not prioritised, online information may be misunderstood, cause anxiety and drive people to the health care system unnecessarily.

- **Target patients effectively.** It is important that online preventative interventions are well targeted and exploit 'teachable moments' – for example, actively offer preventative sexual health advice when people are searching for sexual health information (see Bailey and others, 2011). Interviewees suggested there may be learning from advertising and the retail sector to actively target patients when they are most receptive.

Online appointment booking and other transactional services

This dimension of patient-facing technology has seen significant effort and input from both policy-makers and providers. In primary care, digital channels allow patients to book appointments and order repeat prescriptions online, usually through their GP practice's website. Practices have been contractually obliged to offer patients these services since April 2015. Historically, email and other web-based messaging services have also been used to facilitate transactional services, as well as professionally led triage.

The government plans to go further, and transform NHS Choices into 'nhs.uk' – a central website allowing patients to register with a GP, book appointments and order prescriptions online (among other things) (National Information Board, 2015).

The NHS e-referral service (formerly 'Choose and Book') enables patients to book some secondary care services online. Patients can book while they are with their GP at the time of referral or at their own convenience online or over the telephone. Figures for August 2016 show that around half of all outpatient referrals were made using the e-referral service (NHS Digital, 2016), but it is not clear whether they were initiated by a GP during a consultation or by a patient at home.

The government plans to enable all patients to book and manage their secondary care appointments online (following a GP referral), receive digital appointment reminders and receive digital status updates on Accident & Emergency (A&E) waiting times (see National Information Board, 2015).

Online appointment booking – a case study

We spoke to three primary care organisations about their approach to triaging patients and offering online appointments: one that makes all appointments available online, one that restricts online appointments and one that only offers a call-back service online.

The experience of AT Medics: an online model (with non-digital options)

AT Medics is a multi-practice organisation consisting of 30 sites in London. It serves 200,000 patients, employs 400 members of staff and has six GP directors. AT Medics makes 100 per cent of its appointments available to book online, as well as via the telephone and in person. It found that this approach was easier to audit than making only a proportion available online; it does not require continuous monitoring of available appointments via different channels, and swapping how particular appointments can be booked during the day.

At present, around 20 per cent of appointments are booked online, which is significantly higher than national uptake. A senior manager felt that once 50 per cent of all appointments are booked online, they may need to reduce the proportion available for online booking to avoid disadvantaging patients who are not online.

The organisation has put measures in place to continuously encourage patients to use digital tools. Following the 'Make Every Contact Count' (MECC) philosophy, receptionists and health care professionals remind patients of online tools whenever they contact the practice. Three practices have digital tablets in waiting rooms and receptionists demonstrate to patients how they can book appointments or order repeat prescriptions online. This has been particularly successful in communities where English is not the primary language, especially when supported by employees who speak the patient's preferred language.

One challenge is the need to balance actively directing patients to online channels with patient choice. AT Medics has left all of its channels open. In the future, as patients become more aware of online services, the organisation would like to work with technology suppliers to support firmer online redirection and triage, while maintaining patients' right to choose.

Impact

The organisation has seen a positive impact of digital services on patient experience. Internal patient surveys show that a significant proportion of patients prefer booking appointments online over other means – with online booking being the preferred method of arranging an appointment for over half of registered patients at some sites.

The organisation has not systematically measured whether demand for appointments has increased as a result of these services, but a GP director did not feel this was the case.

The experience of Peverell Park Surgery: a hybrid model

Peverell Park Surgery is a GP practice located in Plymouth on the south coast of Devon. It serves 14,600 patients, 40 per cent of whom are students who attend a branch site of the surgery at the University of Plymouth. Across both sites, it employs 45 members of staff, including 10 GPs and two nurse practitioners. The organisation has used an online appointment booking system since early 2015.

Around 60 per cent of all appointments are available to book online, although patients are only offered slots three days hence and beyond. Same-day appointments cannot be booked online except during very quiet periods.

The practice decided to introduce the three-day lag after a year of testing its triage and booking systems. Careful monitoring and evaluation found that about half of the appointments were booked by patients who did not need a same-day appointment. On the other hand, acutely unwell patients would occasionally book appointments online instead of allowing the duty doctor to arrange urgent care. The lag has reduced inappropriate use of the system and helped to secure professional buy-in.

The main challenge for the practice has been getting the right balance between the availability of timely routine appointments and meeting same-day demand for acutely unwell patients. To address this, the practice employs a telephone triage system staffed by a duty doctor.

While the practice has no data on the proportion of patients who book appointments online, it does know that 25 per cent of adults on its registered list have live online access – which means that they have logged on to the system at least once within the past three months.

To increase awareness of online services, the practice has created an easy-to-use guide and gives this to every new patient. It also offers face-to-face training sessions to local nursing home staff in the area on how to access online services.

Impact

Patient feedback on online appointment booking and the practice overall has been positive – with overall patient satisfaction rates of over 90 per cent.

GPs at the practice have reported anecdotally that patients who book online are more likely to attend their appointments, although there are no systematic data on this.

The practice has not seen any increase in overall demand for appointments since introducing online appointment booking, but this is being monitored. Furthermore, to date, it has not impacted on administrative efficiency.

The experience of St Levan Surgery: a GP access model

Like Peverell Park Surgery, St Levan Surgery is located in Plymouth but serves 7,000 patients in an area with considerably higher levels of deprivation. It employs 23 people, including five GP partners, three practice nurses, a clinical practitioner and a pharmacist. The practice employs a 'GP Access' system, and has done for the past eight years. This means that when a patient contacts the surgery to book an appointment, they receive a telephone call from a GP – usually within two hours. Either issues are resolved over the telephone or an appointment is made for a consultation, often for later the same day.

The practice only offers the option for patients to book a GP call-back online, and they are not able to select the time of the telephone call. For the managing partner, online appointment booking is not considered an overly useful tool, given the GP Access model they have in place.

Receptionists receive training to signpost patients to other services, and the practice is considering re-introducing algorithms to help with this.

The practice does not actively encourage online appointment booking, favouring the GP Access system. However, it accepts that patients being able to book their appointments online may reduce pressure on reception.

Impact

For the managing partner at the surgery, the GP Access system is essential to ensure a sustainable service. Ultimately, the practice believes that clinically led telephone or in-person triage is the only way to ensure that patients do not have a GP appointment when they do not need one. This may be more significant for St Levan Surgery than others, given the high level of deprivation in the local area, and the volume of patients with health needs.

St Levan Surgery has not formally evaluated the impact of the GP Access system. But where this system has been used elsewhere, impacts have included reduced emergency admissions, reduced out-of-hours presentations and increased weekly patient contacts (see Ware and Mawby, 2015).

The benefits and challenges of online appointment booking

Benefits	Challenges
• Improves patient choice and experience	• Encouraging uptake
• May reduce DNAs (did not attend)	• Establishing the proportion of appointments to make available and aligning with triage systems
	• Balancing effective triage with patient choice

Evidence of impact

Managing demand on professional time

Many interviewees felt that online transactional services would improve administrative efficiencies, particularly for reception staff. There is no concrete evidence of this to date, although some evidence suggests that email can be used for appointment booking, prescription ordering, managing patients' administrative concerns and answering non-urgent medical questions, without adverse time implications (Hanna and others, 2012; Neville and others, 2004).

Some professionals are concerned that direct patient access to appointments, without any form of triage, will inflate demand. In most places, the uptake of online appointment booking is too low to have any discernible effect. This should be monitored as uptake increases. In the longer term, there are opportunities to make online booking services more flexible by combining them with sophisticated triage services to determine the length of the appointment needed. This has the potential to improve time management.

Patient experience

The ability to book appointments and order repeat prescriptions online can increase convenience for patients.

A Patient Online programme survey of 196 people found that 78 per cent had booked appointments online and 76 per cent found it easy to do so. It also found that around half thought that booking appointments online helped them to remember when their appointment was and 57 per cent said that it provided them with more choices of times and dates (see Wyatt and others, 2015).

Similarly, a survey of 150 patients found that 35 had used email to order a repeat prescription and all had a positive experience. Participants consistently welcomed the ability to order a repeat prescription online rather than over the telephone (Neville and others, 2004).

Key lessons for providing online appointment booking and other transactional services

- **Many patients will need encouragement and support.** While recent figures show that 8.5 million patients have signed up to book appointments online in primary care (NHS England, 2016c), the GP Patient Survey found that only 10.5 per cent of patients had ordered a repeat prescription online in the previous six months, and only 7 per cent had booked an appointment online (Ipsos MORI, 2016). Uptake of the NHS e-referral service for secondary care is much higher, but given the low uptake of these services in primary care, this probably reflects usage by GPs rather than patients. Organisations can encourage uptake by:

    - demonstrating how to book online – AT Medics uses digital tablets to educate patients, tailoring support to their preferred language where possible
    - reminding patients of online channels every time they contact the surgery
    - providing easy-to-read guides on online services
    - highlighting the benefits
    - ensuring that the technology is easy to use – including by simplifying complex login procedures where possible.

- **Services need thorough testing and auditing.** Establishing how many appointments should be available online, and how they interface with other triage systems, can be difficult. It is important to ensure that timely routine appointments are available while balancing same-day demand; appointments are used appropriately; and those who use digital channels are not at an unfair advantage. As per our case study sites, professionals may benefit from testing different configurations and monitoring use.

- **Ideally, combine with sophisticated self-triage.** Online booking systems usually restrict patients to booking appointments of a pre-specified length. In the longer term, combining online appointment booking with online self-triage systems provides the opportunity to make them more dynamic – allowing appointments to be booked for the right length of time depending on patient need.

Remote consultations

Consultations via video, email and telephone allow patients to contact their health care team from their own home. While video is exclusively used for consultations, email is also used for dealing with patients' administrative and non-medical queries, allowing patients to order repeat prescriptions and book appointments and triage (see 'Online appointment booking and other transactional services' on p. 25).

Remote consultations are a cornerstone of NHS England's digital vision. A multi-year investment of £45 million is intended to increase uptake (NHS England, 2016a). They are increasingly offered by GP practices, although uptake remains low.

Private organisations are also emerging that allow patients to connect with a health care professional on demand via mobile video technology. They charge a fee, which can be paid through private medical insurance, through an employer or directly by the consumer. There are also a few examples of these services being commissioned by clinical commissioning groups.

Video consultations – a case study

Relatively few GP practices in the UK offer video consultations to patients. And those that do have had mixed experiences. But Moss Side Health Centre in Manchester has offered Skype consultations to its patients for over three years.

Skype consultations at Moss Side Health Centre, Manchester

Moss Side Health Centre is a single practice in inner-city Manchester. It employs six GPs, one nurse, two practice pharmacists, a practice manager and an administrative team. The practice used Skype for the first time in January 2013 – which was suggested by a patient. The patient had difficulty accessing the surgery due to back pain and suggested a Skype call instead. Both the patient and the doctor realised the benefits immediately.

"It was brilliant, I could see him, I could see what kind of movements he could do and as a consequence I was able to give him better advice… and it also saved me a home visit as I was able to make a good assessment, which I felt comfortable with." (Dr Sirfraz Hussain)

After this initial success, Dr Sirfraz Hussain sought to offer Skype consultations to all patients as an alternative to face-to-face appointments. This took approximately

six months. He had to convince the partners who had concerns about the safety of using Skype – particularly in relation to privacy and data security. A review by the Quality, Innovation, Productivity and Prevention (QIPP) programme assured the partners and the local clinical commissioning group's information technology lead that it was safe, with a few caveats – including that doctors should always initiate the video consultation. Without this review, video consultations would not have got off the ground.

The practice also consulted medico-legal professionals, who advised that as long as Skype is part of a wider service offer alongside face-to-face appointments and telephone calls, it can be offered as an alternative access channel.

The practice promoted the service via posters in the waiting room and in a message that patients heard when they were put on hold while contacting the practice via telephone. GPs also tell patients during consultations that Skype is available – particularly for follow-up appointments or medication reviews.

From the outset, the use of Skype at the practice has been driven by one dedicated individual, and relied on an investment of personal time.

Impact

When Skype consultations were initially introduced in 2013, they were received very positively by patients, who reported high levels of satisfaction. They were used by approximately 10 to 15 per cent of registered patients (which at the time totalled 6–7,000). But since then, the practice has put significant investment into improving patient access generally. It now offers a walk-in clinic between 8.30am and 9.30am – guaranteeing access to a GP.

As a result, the number of patients using Skype has declined to around 5 per cent of registered patients – which translates to one to two Skype appointments a week. As a result, the practice has concluded that the gold standard for patients is a face-to-face appointment when it comes to clinical assessment.

The practice has found that Skype consultations are of most benefit to particular patient groups with additional needs – for example, those with mobility problems who are unable to access the practice and parents of autistic children who find that taking their child to the practice to see a GP can be very distressing.

Skype also works well for those who are not in the local area – such as students who have gone home outside of term time but are receiving ongoing care – particularly as Skype is free to use.

When Skype consultations were first introduced, they increased demand. The same number of face-to-face appointments was being provided on top of a growing number of Skype consultations. Now there is greater access to face-

to-face appointments, the vast majority of patients choose them; and uptake of Skype is too low to have a noticeable impact on demand. Part of this may be to do with the demography of the area, given that it is relatively deprived and has a high unemployment rate.

However, GPs do feel that Skype and e-consultations have helped the practice to manage its workload better, due to the flexibility and choice in how to consult with the patient.

The benefits and challenges of video consultations

Benefits	Challenges
• Improves clinical assessment compared with the telephone	• Low uptake – although viewed as another tool to offer patients greater choice
• Improves patient experience and choice	• Can increase demand initially
• Flexibility in managing workload	• Implementation relies on one individual's vision and personal time – with rising workload and increasing time pressure, this is less likely to happen in future
	• May require external assessment for remote consultations to be considered for use

Evidence of impact

Managing demand on professional time

Remote consultations have variously been found to increase workload, increase workload temporarily and decrease workload (see Mold and de Lusignan, 2015) – although remote consultations are usually quicker than face-to-face visits (Caffery and Smith, 2010).

Much depends on the context, the type of patient and the problem they need to address. Effective triage systems that make sure that remote consultations are only offered to patients most likely to benefit are essential.

Patient experience

Email and secure messaging can improve communication with professionals, save patients' time and increase overall satisfaction. Patients can feel more comfortable to ask questions and welcome the ability to save the clinician's

message and return to it at a later time (Ye and others, 2010; see also Car and Sheikh, 2004; Mold and de Lusignan, 2015). Patient satisfaction tends to improve when professionals respond to their queries quickly (Mold and de Lusignan, 2015).

Video consultations can be well received in the right context. They can offer improved convenience and flexibility (Fatehi and others, 2015; Johnston and others, 2000), although our case study suggests they tend to be most valued by those who struggle to access care in person. A study in the United States of newly injured spinal cord patients found that they had improved quality of life one year after hospital discharge when using video and telephone consultations, compared with those not using them (Phillips and others, 2001). But the low uptake of video consultations has led many to believe that patients prefer face-to-face consultations.

Health outcomes

Evidence on the clinical outcomes of remote consultations is generally inconclusive due to low-quality evidence (Atherton and others, 2012). A review of the clinical use of Skype found no hard evidence in favour of it or against it (Armfield and others, 2012), although in some cases professionals may be better able to make clinical assessments when face to face (Fatehi and others, 2013).

Key lessons for using remote consultations

- **Ensure that the technology meets the users' needs.** At present, bespoke clinical video conferencing technology can be cumbersome and difficult to use. Things like removing the need for patients to download specific software could help with this. Professionals may wish to experiment with mainstream technology such as Skype. Another option is to work with private providers offering video consultations, as several companies have developed secure, intuitive apps for this purpose. This is already happening in places.

- **Target those most likely to benefit in the short term.** Uptake of remote (and particularly video) consultations is low. Studies in the United States have found that patients place relatively little value on online communication (see Mold and others, 2015). Professionals are also often resistant, as many believe that face-to-face consultations are crucial for good-quality care and job satisfaction (Hanna and others, 2012). But there are segments of the patient population that stand to benefit significantly, such as those with access issues. It may be most effective to target these patients using sound triage processes alongside

strong communication strategies to increase patient awareness. This should limit increased demand and help professionals to realise the real benefits. However, if NHS services begin to offer on-demand video consultations as organisations have done in the private sector, or video consultations are offered as part of an out-of-hours service, they are likely to appeal to a wider patient population.

• **Reassure patients and professionals about information governance.** Many professionals have legal concerns about the confidentiality and security of patient information in emails – although some evidence suggests that patients are willing to trade off concerns about privacy and security for ease of access (see Mold and de Lusignan, 2015). Communicating robust information governance mechanisms to patients and professionals can help to alleviate concerns. Where new technology such as Skype is used, the Health & Social Care Information Centre (2013) (now NHS Digital) recommends carrying out a risk assessment first.

Online access to records and care plans

In primary care, GPs have been required to give patients online access to detailed coded information held in their patient records since 31 March 2016. This includes diagnoses, medications and treatments, immunisations and test results – but not free text entered by clinicians. The technology is now available to allow patients to see information in their record beyond primary care and is slowly being rolled out.

Personal health records – that is, records owned by the patient rather than a health care organisation – are becoming increasingly common and have the potential to transform the patient experience. They mean that patients can share their health data with all health providers delivering their care, facilitating seamless care provision across community, primary, secondary and tertiary care. Patients are also able to add in their own data from wearables and apps as well as record their symptoms. In many cases they can also be used to contact the health care team.

Official figures reveal that over 95 per cent of GP practices are now set up to offer online access to detailed GP records (NHS England, 2016c). This means that over 55 million patients should be able to access their records, although frequent use is only likely to appeal to those in poor health or with long-term conditions (see Bhavnani and others, 2011; Wyatt and others, 2015). A recent survey found just 0.6 per cent of respondents had accessed their medical record online in the previous six months (Ipsos MORI, 2016).

Patient access to records – a case study

As already noted, every practice in the country is contractually obliged to give patients access to their full coded record. This does not, however, include any free text entered by clinicians or letters from other health care organisations. Haughton Thornley Medical Centres, though, offers patients full electronic health record access – and has done since 2004.

Online record access at Haughton Thornley Medical Centres, Manchester

Haughton Thornley Medical Centres (HTMC) is made up of two GP practices in Manchester. Serving nearly 12,000 patients, it employs three full-time GPs, five part-time GPs, four nurses and a team of support staff. Around half of registered patients have access to their record at the practice.

HTMC has put several processes in place to support patients to use and understand their records.

First, professionals are encouraged to offer online access to patients in a consultation. This takes approximately two minutes per patient and has helped to increase uptake.

Second, patients are asked to complete an online questionnaire[1] that the organisation developed in-house. It asks questions such as 'what do you do if you read upsetting information and you cannot speak to your doctor/nurse immediately?'. The idea is to ensure that patients know what to do if they see third-party information, or a test result, that worries them. The questionnaire is available for patients to complete online at any time, although in reality the vast majority of patients complete the questionnaire with a clinician. This takes more clinician time, but helps with shared decision-making and educating patients on how to overcome concerns. If patients give a concerning answer, the clinician is then able to educate them on the right thing to do and alternative sources of care such as NHS 111.

Third, when introducing patients to online record access, clinicians signpost patients to a number of educational resources to help them understand the information. These include Lab Tests Online for help interpreting test results, and other resources that help patients put their condition in context. The HTMC website also has a wide range of self-care resources and links to other websites, which is considered critical for success.

Finally, trained reception staff check the patient's completed questionnaire and their record to ensure that they are suitable to share. Complex patients are referred to GPs for final approval. In general, HTMC's approach is to educate patients on how to handle third-party information or results that concern them rather than restrict access.

1. The full questionnaire can be accessed at: https://www.surveymonkey.com/r/recordsaccess?sm=ACfewxF69rGGgBGFfbeArFqlTcpi1h3HjHEXARehyao%3d

That said, HTMC has had to face very difficult decisions about when record access should be granted. GPs have overcome these difficulties by having open conversations with patients, and in some cases other service providers, to take a decision on whether record access is in the patient's best interests. Of course, this takes additional time, and could raise new issues. Where record access has been denied, it has generally been for patients under secondary care mental health services, where record access may cause harm.

To date, HTMC has not had any problems with patients seeing their records. Where patients have identified mistakes or inaccuracies, they have been resolved with GPs and resulted in more accurate records.

HTMC has invested significant time and resource in making full record access viable. Much of the initial work was done in the evenings or at weekends by dedicated individuals with a stake in the business. This approach is perhaps less feasible for salaried GPs.

HTMC monitors who signs up for record access, enabling it to reach out to unengaged groups. Recently, its patient participation group worked in collaboration with Hyde Community Action – an organisation to help people improve their health and wellbeing through education – to provide a course for the local female Bangladeshi community. Six months after the course, over 92 per cent of the women reported increased confidence in their ability to speak everyday English and to use online services for their health and health care.

Impact

Online access at HTMC has not been formally evaluated. However, anecdotal evidence suggests that there is a range of positive impacts for both clinicians and patients.

One of the most positive impacts is changing the nature of the relationship between patients and clinicians to an equal partnership, supporting patients to self-manage. It has improved the quality of consultations, allowing patients to prepare in advance.

Patient access to records also enables data sharing across settings and services. Patients can choose to show their medical record to anyone dealing with their care – from care home staff to social workers – avoiding the ongoing challenges around interoperability and information governance caused by organisational data sharing.

There are also significant benefits for patient experience. HTMC has collected a range of patient testimonials – for example:

"During a [secondary care health assessment] the health worker asked my wife for a list of her current medication. We did not have this information with us. However, I was able to use the hospital computer, and bring up my wife's repeat prescription. The health worker was quite amazed that this could be done [and] she was able to print off the medication list." (Patient testimonial)

However, a combination of meeting previously unmet need and the administrative burden caused by granting record access according to HTMC governance procedures means that the record access has not reduced demand on professional time.

The benefits and challenges of online access to records and care plans

Benefits	Challenges
• Empowers patients to self-manage	• Takes significant time and effort to implement meaningfully (encouraging use with sound governance processes)
• Changes nature of the relationship between patient and GP to one of partnership	• Needs additional effort for professional and patient buy-in
• Data sharing across multiple settings	
• Improves patient experience	

Evidence of impact

Patient engagement

"I think every patient should really have the right to at least access their record… That's the only way that we can ensure that health is being managed correctly, by individual control and responsibility."
(Mindy Daeschner, Non-executive Director, psHEALTH and Managing Partner, Daeschner Consulting)

Online access to medical records and care plans is one of the most effective ways to engage patients. Evidence shows that it can improve patient understanding,

confidence, communication, adherence to lifestyle advice and a sense of patient involvement in their own care (Bhavnani and others, 2011; Fonda and others, 2010; Hess and others, 2007). Some evidence also shows that patients using online records are better at keeping practice appointments and updating records (Tobacman and others, 2004). Professionals too have found that it facilitates shared decision-making (Pagliari and others, 2012).

Record access is often used to check past activity – so patients can understand their condition better, and prepare for future consultations. This often involves using the record as a starting point to search for further information online, leading to more productive health care consultations (Briones, 2015; Shah and others, 2015).

Similarly, online access to care plans means that patients can refer to self-management information when they need it – an important benefit given that only 5.4 per cent of people with a long-term condition have a written care plan (NHS England, undated). Users of VitruCare, a self-help platform that provides access to care plans as well as self-help strategies, report very positive results:

"An 81-year-old lady… decided that she just wanted to do exercise – because VitruCare [took]… all of her information and presented it back to her… to say if you concentrated on your exercise, you would have the greatest impact on your particular long-term conditions… . Without any additional medication intervention, she managed to improve her all-round [health]…" (Professor Shahid Ali, GP and Professor of Digital Health, University of Salford)

Managing demand on professional time

While patients benefit from online access to records, published evidence on demand for professional time is inconclusive. Some have suggested that granting patients direct access to test results and other medical information reduces the need for telephone calls to the practice or unnecessary consultations (see Fisher, 2013). But one large two-year study found that online access to records and clinicians via email increased GP visits, telephone encounters, A&E visits and hospitalisations (Palen and others, 2012). What is more, our case study on HTMC's experience of giving patients full record access suggests that a significant time and resource investment is needed to ensure that appropriate governance processes are in place.

Patient experience

Evidence shows that patient access to medical records is highly valued, leading to improved satisfaction and perceived savings in time and money (through savings on transport costs and telephone calls) (Fisher, 2013; Shah and others, 2015). A recent systematic review found that patients were more satisfied with the automatic communication of test results and with online information about their treatment or condition compared with those who accessed this information in person or by telephone (Mold and others, 2015). Access to records can also help patients to self-manage and keep everyone involved in their care informed. Increasingly, the records are being developed as part of integrated digital records between primary and secondary care, facilitating joined-up care. This is also a benefit of personal health records such as Patients Know Best.

"[A patient told me]: 'The GP called me in a panic saying get yourself to A&E, it's four o'clock in the afternoon, your results have come back and they're bad', and I said, 'What's the problem?' and he said… 'Just get to A&E and wait'. So I wait for three hours in A&E and only after that did they tell me your haemoglobin is low and I wish the GP had told me that because I know my haemoglobin is low because I have leukaemia, but my oncologist told me to worry when it's really low and [he told me the specific number]. The GP doesn't know that." (Dr Mohammad Al-Ubaydli, founder and Chief Executive Officer, Patients Know Best)

Health outcomes

Online record access can improve patient safety by allowing patients to identify errors in their medical records (Bhavnani and others, 2011; Delbanco and others, 2012; Schnipper and others, 2012). In one study, patients given access to their medication list online corrected more than twice as many medication discrepancies with potential for severe harm than those without online access (Schnipper and others, 2012).

Key lessons for granting patients online access to their records

- **Appropriate governance is needed.** Giving vulnerable patients access to their records has the potential to cause unnecessary harm. Some professionals are also concerned about the potential of others to exploit vulnerable patients, and the subsequent negative impact this could have on patients' willingness to disclose information (Mold and de Lusignan, 2015). In addition, making free text in records available may mean that third-party data are shared. There are a number of things that organisations can do to mitigate against these risks:

    - review all records to check for potentially harmful information and talk to the patient about their history

    - restrict and/or redact information where necessary – to make this manageable, the Patient Online roadmap suggests restricting retrospective access, with free text and consultation notes only available to view after an agreed date (Rafi and others, 2013)

    - retain the capacity to switch off record access at any time and be aware of patients who may require this (for example, those with challenging family circumstances at risk of exploitation).

    Despite this potential for harm, no studies indicate that harm or privacy breech has occurred through patient record access (see Mold and de Lusignan, 2015).

- **Patients will need support with record interpretation.** Many professionals are concerned about the inability of patients to interpret clinical information correctly without a professional on hand. One way to address this is to signpost patients to appropriate resources to interpret test results – for example, Lab Tests Online. Educating patients about alternative sources of care and the best time to view their record – that is, when a health care professional is easily contactable – may also help.

- **A new business model is needed.** Granting record access (particularly where patients can read free text) can require significant time and resource, as demonstrated by our case study. A new business model is required to support this, given the current constraints on the workforce. To gain the full benefits, professionals need to use the record to support self-care and patient empowerment (also see Mold and de Lusignan, 2015).

- **Organisations need robust evidence on demand.** Online records have the potential to increase demand – not only in primary care but also in secondary care and emergency services. Health care organisations need more robust research on why this is and how to manage it effectively.

- **Encourage uptake.** The same strategies for encouraging the uptake of online appointment booking and other transactional services can be applied here (see p. 30).

Apps

Smartphone apps are increasingly being used to help people manage their health and wellbeing. There are over 165,000 health apps for download (Aitken and Lyle, 2015), covering all of the areas set out above – from making an appointment online to having a video consultation and beyond (see Table 1). In that sense, all of the impacts set out above also apply here.

But there are also a number of apps specifically designed to help patients stay well. Consumer apps targeting wellness (including those related to fitness, lifestyle, stress, diet and nutrition) comprise two-thirds of all health apps. Disease and treatment management apps comprise approximately a quarter, with only a small share specific to a particular disease (Aitken and Lyle, 2015).

In 2012, NHS Choices launched a health apps library, although it was withdrawn in 2015 following the realisation that many of the approved apps sent unencrypted data (see Huckvale and others, 2015). There are plans to launch another apps library in 2017 alongside an innovation and technology tariff. The tariff will provide automatic reimbursement when an approved medtech innovation (including an app) is used – removing the need for local price negotiations. 'Approved apps' will need to complete a four-stage evaluation process, as follows.

Stage one: Self-assessment against a set of questions around quality dimensions such as safety, privacy, data sharing, accessibility and interoperability. If the app is identified as 'high risk' or is classified as a medical device, it will need to go through other regulatory procedures (for example, gain a Conformité Européene (CE) mark).

Stage two: Community evaluation through an engaged group of professionals, commissioners or end-users, giving opinions on usability, functionality and any early stories around impact.

Stage three: Preparing a benefit case for a robust evaluation of evidence to support the app's claims.

Stage four: Independent impact evaluation by an NHS body.

Very few apps are expected to complete all stages and those that do represent a very small percentage of available apps on the market. But it is hoped that passing any stage will be a positive indicator for commissioners (see Monitor Deloitte, 2016).

Table 1: An overview of the app landscape

Actions or services supported by apps	Example of an app providing this
Supporting behaviour change through rewards	'Wellcoin' is a new health currency that rewards consumers for healthy behaviours. Users earn points for exercise, eating healthily and even making sure their children eat healthily. Activity is verified in a number of ways - e.g. through activity trackers or photographs. Wellcoins can be exchanged for goods and services (currently limited toNew England and New York).
Enabling communication with others	The 'Now GP' app allows users to video-conference with a GP on demand (see Now GP box above). Similar apps include Push Doctor and Babylon Health.
Providing guidance based on information entered by user	'My Cancer Manager' helps cancer patients to track and manage their stress levels. It asks patients to rate how they experience e.g. exercise, family, dealing with financial issues and then provides resources with advice and tips on how to improve their stress levels and wellbeing. It also serves as a 'mood diary' that can be shared with clinicians.
Recording, tracking and summarising health information	'Glooko' allows users to sync their diabetes devices (e.g. glucose monitors) with their mobile. They can then add lifestyle context, tracking nutritional intake via Glooko's large food database, insulin intake and exercise activity (syncing with fitness trackers such as Fitbit or Jawbone).
Reminders or alerts	'Medisafe Meds and Pill' reminder allows patients to enter the medication they are taking; how often they need to take it; and how many they have left, to receive reminders for every dose.
Providing support through social networks	'7 Cups of Tea' connects users with mental health needs to a network of trained, active volunteer listeners. Users can also talk to a trained therapist and connect with a community via group support rooms.
One-off transactions	'My GP' is an app that simplifies the GP registration process, allows patients to book and cancel appointments, receive medication reminders, and permits access to self-care tools.
Providing educational information	'Micromedix' is a pharmaceutical reference app. Users can search the name of a drug to find out how it should be taken and any side effects.

There are also new plans in England to allow data from approved health apps to feed directly into personal records – allowing professionals to draw on patient-generated data during consultations.

Evidence of impact

Patient engagement

There is an emerging body of evidence that apps can have a positive impact on diet monitoring (DiFilippo and others, 2015); physical activity (Casey and others, 2014); adherence to medication (Dicianno and others, 2016; Choi and others, 2015); and chronic condition management – particularly for multiple sclerosis, Parkinson's disease and cardiovascular disease (see Aitken and Lyle, 2015). One study found that an app for tracking daily COPD symptoms facilitated early intervention and timely treatment – although it did rely on professional monitoring (Smith and others, 2016).

NHS leaders hope that these benefits will be significant enough to reduce the NHS deficit. Simon Stevens, Chief Executive of NHS England, recently said:

"We have health apps being used for the million patients with COPD, 90 per cent of whom struggle to administer their treatments. So when we talk about the £22 billion savings and we talk about demand management… it is things like atrial fibrillation and COPD".
(Stevens, 2016)

But the efficacy of most apps is unknown. We need more robust evidence on what works and in which contexts. Studies that compare several apps to identify which components are effective may help.

Key lessons for using health apps

- **Patient safety will need to be assured.** The efficacy of the majority of apps is unknown and some are inaccurate (see, for example, Bierbrier and others, 2014; Firth and Torous, 2015). Even apps that are certified as clinically effective do not always subscribe to sound data protection procedures (see Huckvale and others, 2015). As noted above, if professionals are to actively recommend apps, plans for NHS app accreditation are welcome. Accompanying this with strong communication that patients use unaccredited apps at their own risk may also help to protect patients from harmful apps.

- **Patients will need support.** Where apps are prescribed, estimates suggest patient engagement post 30 days is 10 per cent higher – and over 30 per cent higher for fitness apps (Aitken and Lyle, 2015). Therefore, professional recommendation and encouragement, alongside use of patient-generated data, can play an important role. The Accelerated Access Review (2016) recommends a generic framework for prescribing apps which would help professionals fulfil this role.

- **Apps should encourage engagement.** Apps that use 'gamification' and established behaviour-change techniques such as prompting goal setting, review and feedback on performance (see Michie and others, 2009) to encourage engagement are likely to play an increasingly large role in future. Emerging evidence suggests that gamification can have positive results, particularly in relation to encouraging physical activity (see Allam and others, 2015) although there are few scientific studies to date.

- **Complex patients will need additional support and ideally bespoke technology.** Disease-specific apps are usually developed for single conditions. This means that if patients with multiple long-term conditions are to self-manage with disease-specific apps (as opposed to, for example, generic medication reminders), they are likely to need more than one – making sustained engagement even more difficult. Developing specific technological solutions for complex patients, alongside tailored efforts by professionals to support patients to identify and use apps, would make the high hopes placed in self-management via apps more viable. The innovation and technology tariff may provide incentives for developers to focus on this market, which they have historically shied away from. Failing that, a digital health technology catalyst that provides matched public sector funding alongside private investment to address market failure, as suggested in the Accelerated Access Review (2016), may be needed.

- **Apps will need to be easy to use.** A recent review of the usability of commercially available apps for diabetes, depression and caregiving found that patients struggled with data entry and felt hampered by the need to navigate through various screens (Sarkar and others, 2016). Although patients were enthusiastic about using apps, they found them nearly useless. User-centred design is essential for any technology, but it is particularly pertinent where vulnerable patients are using recommended apps to manage their health. Where possible, these patients should be involved in the design and development process.

A summary

Perhaps the most positive evidence to date on health-related digital technology comes from the impact it has on patient engagement and patient experience. In both cases, online access to records plays a fundamental role, simultaneously supporting self-management and improving convenience. However, concerns remain about ensuring patient privacy, developing a business model to support the additional time and resource that granting record access requires and the potential to inflate demand. Online patient networks have also had very positive results and can result in improved behavioural and clinical outcomes.

There is emerging evidence that apps are increasingly encouraging patient engagement with diet, exercise, medication adherence and chronic disease management. However, we need more evidence on the quality and efficacy of the majority of apps. In addition, some evidence suggests that monitoring devices can improve physical activity and diet – but most of this comes from short, professional interventions. This is an area that needs further research.

The overall impact of health-related digital technology on demand and health outcomes is not clear. In terms of demand, while there are some quick wins – such as improving appointment attendance through text-message reminders – there is also the potential to increase demand via remote consultations, risk-averse triage and access to records. We need a better understanding of how demand is affected and why. And we still do not know how the majority of these tools impact on health outcomes.

But new (and not so new) technologies can support patients along the entire patient pathway – transforming how they stay well, find the care they need, interact with the health care system and manage a condition (see 'Technology and the health care journey' graphic on p. 2). And apps are increasingly the vehicle that brings these new capabilities together, providing neatly packaged, user-friendly solutions to patients and consumers through the touch of a button. Patients now have a whole suite of new ways to manage their health and health care in their pocket, via their smartphone.

This has to be a good thing. The challenge for the NHS is making the best use of digital services for those who stand to benefit the most.

④

Towards an action plan

In the previous chapter, we set out the evidence on digital tools and drew out the lessons from both the evidence and the experience of those who have used them. But there are a number of broader, overarching themes that might be important for both professionals and policy-makers to bear in mind to maximise the benefits and minimise the risks of patient-facing digital tools.

Ensure patient engagement and digital uptake

One clear message from the evidence and the experience of practitioners is that patient uptake of digital services offered by the NHS requires effort on the part of health care professionals and other staff. At present, the uptake of official online services is low, with the exception of NHS Choices and other sources of online health information. When former digital champion Baroness Martha Lane Fox was asked to find ways to increase patient usage of digital tools, she suggested the introduction of targets for GP organisations, but targets remain a controversial tool in encouraging change within the NHS.

The NHS differs from other industries that have had success with moving consumers almost exclusively onto online channels – such as budget airlines – because it cannot remove traditional channels or make them more expensive or less convenient. This means that concerted effort is needed to increase uptake – and policy-makers must be aware of the additional resource this requires. The most effective initiatives include:

- actively showing patients how to use these online services – and in their first language if they are not native English speakers
- clearly demonstrating the benefits
- when it comes on online records, explaining what the record contains, providing resources to aid interpretation and promoting it as a tool to actively support self-management.

The first two points may only be needed in the short term.

Digitally skilled consumers do not automatically convert into digitally engaged patients

There is a longstanding body of research that has aimed to understand what factors enable those with long-term conditions to be 'activated' – that is, have the knowledge, skills and confidence to manage their health and health care (see Hibbard and others, 2005). 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: it is not simply a matter of having access to digital tools (see Hibbard, 2014). Even where patients are engaged, peer support is likely to be needed in addition to digital tools for those with a high disease burden. Finally, evidence shows that adherence to apps or monitoring devices tends to deteriorate over time, but may be higher when recommended by a professional (see Aitken and Lyle, 2015; Ledger and McCaffery, 2014).

All of this suggests that we need organisational structures and a workforce that can:

- actively support engagement
- identify and recommend appropriate self-management tools, including apps
- employ shared decision-making
- help patients understand data and information
- encourage sustained adherence, including by drawing on patient-generated data.

The scale of change cannot be underestimated. This may have big implications for how primary care is staffed, and the role of GPs within that.

Employing health coaches, public health nurses, administrative staff and volunteers to support patients to use and understand various digital tools in community and/or general practice settings may help. A range of self-care initiatives are already in place throughout the country (see Local Government Association, 2016) and there are good opportunities to build on existing efforts. A significant shift in GP behaviour is likely to take time and culture change – particularly given how stretched the primary care workforce is. For policy-makers, it may be worth considering incentives (rather than targets alone) to support this new way of working. Additional training may also be required.

Where patients are both engaged and digitally savvy, industry has a role in developing new ways of maintaining enthusiasm for self-management. Incorporating 'gamification' and established behaviour change techniques such as prompting goal setting, review and feedback on performance (see Michie and others, 2009) in apps and other patient-facing innovation may prove increasingly important.

Reduce digital exclusion

Over 12 million people in the UK lack basic digital skills (Commons Select Committee, 2015). This group is made up of people vulnerable to social exclusion: 60 per cent have no qualifications, 57 per cent are over 65 years old and 49 per cent are disabled (Tinder Foundation, 2015b). Recent figures show that almost two-thirds of people aged over 75 and a third of 65- to 74-year-olds say they do not use the internet at all, compared with 17 per cent of 55- to 64-year-olds and 5 per cent or less of people aged under 55 (Ofcom, 2016).

There is also a relatively high 'drop-out rate' of internet use among the older population (West, 2015). Reasons for older people's disengagement from internet use include:

- a lack of skills and knowledge of the internet
- a feeling that the internet is not useful to them
- cost
- disability
- social isolation
- a concern that the internet could take away social interactions (Olphert and Damodaran, 2013; West, 2015).

It is often a combination of factors that leads to disengagement rather than a single cause (Olphert and Damodaran, 2013). This means that engaging the older population requires sophisticated, multi-pronged strategies, particularly professional support and encouragement.

Given that people in this age group are high users of health care services, significant and sustained effort should be made to support them to use digital tools, regardless of their health status. As noted above, greater use of health coaches and others will help.

In addition, appropriate technologies and support should be available for those with disabilities and cognitive impairments. And digital technology should always be part of a wider service offer, improving patient choice rather than excluding those who are not online.

At the same time, concern over widening inequalities should not act as a barrier to developing and promoting patient-facing digital tools in general. In recent years, digital divides have narrowed, with a rise in internet access across the board, and this is likely to continue (Dutton and Blank, 2013).

Focusing on achieving widespread use of patient technology may play an important role in persuading late adopters – and in creating a social movement led by enthusiasts and volunteers.

Take a whole-system approach

This agenda needs to be considered in light of an entire health system. The potential for transformational change comes from patients using digital tools on every step of their health journey – such as access to their entire health record containing secondary and community care information, apps that interface with that record and integrated data sharing across health and social care.

To date, policy initiatives have tended to focus on primary care. But that is not to say that innovation in secondary care is not happening, particularly where consultants have the freedom to develop bespoke apps or specialist innovations. Furthermore, most patients should be able to access information in their medical record from interactions beyond primary care either now or in the very near future.

Sustainability and Transformation Plans alongside Local Digital Roadmaps present a very valuable opportunity to take a place-based approach to digital tools, rather than focusing on particular sectors or services. This needs to be supported by all those involved, including government.

Coordinate regulatory efforts

Much of this requires new regulatory approaches. At present, regulatory efforts across national bodies do not appear to be coordinated. Some organisations are establishing regulatory frameworks for consumer technologies, while others are

attempting to regulate new digital providers. Taking a more joined-up approach may reduce duplication and help produce a cohesive strategy.

Develop a strong communication strategy

The impact of the private sector and market forces mean that everything is moving very quickly. New apps and consumer devices are being developed at pace, often supported by strong marketing campaigns. The NHS may struggle to keep up – and the reality is that patients will find and use whatever they find beneficial, whether it has been officially approved or not. This means that the NHS needs a strong communication strategy to promote accredited digital options in the NHS and warn patients that unaccredited apps or devices are used at their own risk.

Evaluate impact and progress

There is still a lot we do not know about the impact of many patient-facing technologies – in part because uptake is so low. But as uptake increases, it will be particularly important to understand the impact on professionals and service provision more broadly, given the serious financial constraints facing the NHS.

Supporting professionals to monitor and evaluate the impact of patient-facing tools as uptake increases will be important to fill the considerable gaps in the existing evidence base. New innovations will also need to be tested at a local level.

Central bodies should also commission large evaluations and disseminate the results nationally – including how to avoid common pitfalls. Here, the Accelerated Access Review suggests Academic Health Science Networks should identify, test and disseminate digital technologies that are showing promise locally (Accelerated Access Review, 2016). Bodies such as the National Institute of Health Research (NIHR) also have a role to play in commissioning evaluative research.

Nevertheless, it is important to recognise that the speed with which innovations are entering the marketplace means that the evidence will always lag behind the current reality.

5

Conclusion

The patient technology landscape is changing rapidly. Not only are new innovations entering the market at pace, these innovations are accompanied by new policies, funding arrangements and business models.

Despite all the pitfalls and risks, patient-facing digital technology is one of the brightest hopes on the NHS horizon, particularly for those with long-term conditions. People with these conditions have long argued that traditional services leave them with little support to manage their often-complex conditions. Technology offers the opportunity to provide that ongoing support. And we are already seeing positive impacts on patient engagement and self-care. For those with more episodic needs, it offers the opportunity for rapid access to advice and support to resolve self-limiting problems.

The evidence suggests that patients tend to use tools for self-management more effectively when they are supported by professionals, particularly when they have complex care needs. Services to support patient engagement and effective self-care, such as better use of health coaches and others, are likely to improve effective uptake in the long term, particularly in those with specific health needs.

There are also implications for more established roles in primary care. Professionals can support this agenda by:

- promoting shared decision-making
- helping patients to understand data and information
- actively recommending and encouraging the use of digital services
- engaging with accredited consumer devices
- using the patient record to support self-care.

There may also be extended roles for administrative staff in showing patients how to book an appointment online, for example.

Given the resource constraints facing the health care system, policy-makers will need to consider ways to support this at scale – including via incentives and contractual levers to improve professional buy-in.

At the moment, we are lacking robust evidence on the impact that many technologies will have, and in which contexts. In particular, the potential impact on health outcomes and, to a lesser extent, demand remains somewhat unclear for a range of technologies. While there is much we still do not know, there are many promising areas and a number that urgently require further research. In our view, some of the most important areas are:

- digital tools for self-triage, which are often inaccurate, but are being used at scale. These should be prioritised for further development and testing

- online access to records, which offers important patient benefits, but can increase demand and take significant time and investment to ensure it is offered safely. This has not been financially resourced to date

- remote (particularly video) consultations, which hold much hope for many but which lack evidence regarding the best ways to use them and encourage uptake.

Finding innovative ways to evaluate new innovations in a real-world context will help to improve the evidence base and allow commissioners and professionals to make more informed decisions. This is essential to secure patient and professional trust. But it is important to recognise that the speed of technological innovation means the evidence will always lag behind the range of digital tools on the market.

The technological landscape is moving rapidly and the NHS may struggle to keep up. Fostering effective partnerships with the private sector could help. For example, technology used for remote consultations in NHS services is often cumbersome and difficult to use, while private providers have developed effective apps for video-conferencing. Rather than investing in improving existing technologies, it may be more effective to develop partnerships that enable NHS organisations to use private provider services.

While we have particularly focused on primary care, this agenda needs to be considered in light of an entire health system, maximising the opportunities afforded by the Sustainability and Transformation Plans and the Local Digital Roadmaps.

There are a number of things central bodies can do to create the right environment for digitally enabled patients to flourish. There were several suggestions in the Accelerated Access Review (2016) that are relevant here and which we support:

- Create a competitive and simple process for procuring digital products from small and medium-sized enterprises

- Create a generic framework for prescribing apps

- Recommend how the apps should be adopted by the system and delivered to patients

- Find innovative ways to evaluate new innovations in a real-world context to improve the evidence base.

We also suggest the following:

- Commission work to obtain a much deeper understanding of how the public are using digital tools, their needs and how the NHS could better meet them

- Invest in engaging patients with their health and wellbeing and the use of digital tools to manage their health and care – including initiatives to improve health literacy

- Support professionals to engage meaningfully with patient-facing technology and consumer devices – for example by (in addition to the Accelerated Access Review recommendations above) by:

    - using incentives or contractual levers to encourage greater professional buy-in

    - providing additional training where appropriate (this may need to be identified at a local level).

- Incentivise the development of digital services that are accessible and intuitive for those at risk of digital exclusion and those with multiple long-term conditions

- Coordinate regulatory efforts.

Above all, it is vital that NHS leaders and technology suppliers listen to the experience of patients and professionals as they use digital tools. This will increase the chances of delivering real improvements to the lives of patients and staff.

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