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Accelerating Digital Healthcare

How the rapid uptake of digital services as a result of the pandemic can transform UK healthcare

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Foreword, Rt Hon Stephen Dorrell

We have talked for years about how digital technology creates the opportunity to reshape healthcare.

Advocates have encouraged us to anticipate improved communications linked to faster and more accurate diagnosis as well as a wide range of other benefits. They have argued that traditional care pathways are challenged by new approaches which will allow us to offer services that are more convenient, more personalised and more effective.

But realising these benefits is often a slow and frustrating business. Sometimes delay is unavoidable as technology doesn't always deliver the benefits which its supporters seek. But too often delay is not the result of a rational choice; it is the result of systemic lethargy in the face of challenges which require new ways of working and new ways of thinking.

These are familiar themes among champions of new technology in many sectors, but it has often been a particular source of frustration that the NHS, which is recognised as a global pioneer of universal healthcare, has been slow to apply digital technology to its core objective of targeting resources at need.

In this respect, as in so many others, the experience of the Covid-19 pandemic has been salutary.

Some of these experiences have demonstrated what is possible. Changes to care pathways and research protocols which would previously have taken months, if not longer, to agree have been agreed and implemented within days. The NHS has shown a capacity to respond to urgent need which its critics would previously have dismissed as fanciful.

Less positively, however, the pandemic has also shone an unforgiving spotlight on some familiar failings. Resource pressures and short-term time horizons, as well as failures of vision, have left professional staff without the support that technology could have provided, and it is the people who rely on their care who have paid the price.

This White Paper is therefore a timely call to action.

It does not set out to settle scores; its recommendations draw conclusions from its case studies and propose steps that recognise what has gone right and address the causes of the problems that have emerged.

We can all agree that we must "build back better"; this White Paper makes some clear recommendations, based on real-world evidence, about how to do that.

Executive summary

Healthcare has undergone a rapid digital progression in 2020. The unforeseen pandemic has forced primary care providers to instigate telehealth in a remarkably short period of time, while acute providers have become even more aware of the need for integration and interoperability to function efficiently in difficult circumstances.

This has opened up debate once again about the most effective way to join the dots in a fragmented health service. It is incumbent upon government and healthcare providers to create the most efficient service possible, which puts the patient first and centre. Yet more often than not there seem to be barriers to this goal, many of which lie in outdated legacy systems, lack of digital awareness and the reluctance to fund such digital transformation efficiently.

In consultation with Chief Information Officers (CIOs), digital providers and innovators, this White Paper makes a series of recommendations to maximise the potential of clinical services and healthcare provision. It begins with the acknowledgement that the patient or citizen is the data controller in charge of their own personal health record, empowering each individual to take charge of their own health and consenting to share their information with health and care providers as necessary, or for research if they choose to do so.

Effective investment and marketing of the NHS Apps Library should drive citizens to consult the Library as the first port of call. Apps on other stores should be verified by the NHS where appropriate, alongside information on wearables and other devices that can provide effective information that integrates with NHS systems and records.

But this can only happen on the necessary scale if the digital divide is lessened, or eradicated. Digital exclusion affects the poorest and most remote members of society, so measures must be put in place to improve digital access. Similarly, digital awareness needs to be highlighted in all healthcare organisations, making training a prerequisite for staff to learn how it will transform their working lives.

The value of data

The NHS is in possession of vast amounts of data that could contribute to better patient care, delivering huge savings, and could also generate billions for reinvestment in the health service if aggregated and cleansed. But there is no single standard for data sharing. While integration to drive interoperability should be the responsibility of the Department of Health and Social Care (DHSC), minimum digital functionality should be overseen by NHSX, seeking to overcome the challenges presented by a plurality of providers.

Public money can then be set against these standards, creating a cohesive system of compliant technologies that can integrate efficiently to maximise data for research and reinvestment. To achieve this outcome there has to be a co-ordinated approach at local and national level to support trusts. The remit for Integrated Care Systems (ICSs) includes digital, so it would seem logical they should have wider legal

powers to drive integration via digital investment. But overall responsibility for setting and overseeing compliance with interoperability standards should lie with NHSX.

Currently, digital health initiatives seem to be considered the province of CIOs in any organisation. For progress to be made, there has to be widespread cultural change. Services and projects should be designed in partnership with the users, and costs for change management should be taken into account and monitored.

Outcome-based procurement solutions should deliver the best value, rather than being the cheapest option. Whilst value can be difficult to analyse, best-practice solutions utilising public funds should be implemented along the lines of the Quadruple Aim framework overseen by NHSX. Free solutions should be avoided as they inevitably result in unforeseen costs and resources.

Whilst acknowledging the vast and ever-evolving choice of solutions on the market, more emphasis should be placed on Global Digital Exemplar (GDE) blueprints to avoid repetitive pilots being undertaken that delay implementation. More consultation should be undertaken with companies including Small and Medium-sized Enterprises (SMEs) to gain a greater understanding of solutions, and a national centre of procurement excellence under NHSX would be valuable in aiding organisations through this complex maze.

Up to 60 per cent of social care providers are single institutions which struggle to navigate procurement procedures. Local authorities and ICSs should help them procure digital solutions that meet the minimum standards and are also recommended.

Managed service models such as digital technology in non-patient areas such as financing and HR should be considered, as should innovative funding arrangements between trusted partners such as risk share or gain share.

Conclusion

Digital solutions offer transformative change for healthcare providers and operators. But if the NHS is to benefit from innovative solutions it has to create a cultural change that includes the workforce, implementing change management solutions to create smooth implementation of digital technology.

By recognising the importance of the citizen as data controller of their personal health record, educating them about their responsibility for their own health and supporting them with approved apps and easy-to-access information, data gathering will become more normalised and thus able to benefit research and investment in the health service.

All citizens will ultimately become digital citizens, but they must feel empowered and confident. Alongside a digitally aware workforce and innovative technology, these recommendations should enable the healthcare sector to improve patient outcomes and bring increased public health benefits.

Summary of recommendations

Recommendation 1: As we move towards the long-term objective of a "Personal Care Record" citizens should be the primary data owner and holder of information relating to their care. They can consent to share it with health and care providers, who are then controllers or processors on their behalf. They can also choose to withhold their permission to have their information – securely and anonymously – used for research.

Recommendation 2: The Government must be mindful of the digital divide and ensure that any policies to enhance the use of digital services for health and care do not exacerbate health inequalities. The Government must continue its policies around digital inclusion and invest in digital inclusion tools as set out by NHS Digital[1] as well as better broadband provision to excluded areas.

Recommendation 3: Training in digital technology needs to be included in clinical and non-clinical curricula and continued professional development programmes. This is not training on specific technologies or systems, rather a broad digital literacy, and an understanding of how digital technologies could be used to enhance patient care and enable self-management of conditions. To address digital capability among NHS staff the Government should revisit and implement the recommendations of the Topol Review[2], maintain the work begun by Health Education England and ensure that the budget for the Building a Digital Ready Workforce Programme is sufficient for the scale of the challenge.

Recommendation 4: There needs to be greater investment in the NHS Apps Library, developing it into an easy-to-access, user-friendly, first point of call for UK patients in search of digital health support. This will require a significant increase in the number of apps available, as well as increased marketing of the library to the public so they know it is an option for trusted health applications. To serve those who wish to get their apps from the Apple or Google App Stores NHS Digital should work with those providers to develop a dedicated NHS section through which people can access NHS-verified apps, easily available for free for those who are entitled.

Recommendation 5: Alongside investment in the NHS Apps Library, there should be greater support for patients in navigating the wearable devices, web-based services and tools available, and signposting people to those that can integrate with the NHS, social care systems and Personal Care Record. There should also be wider use of social prescribing of appropriate apps and digital support as part of a patient's care plan.

Recommendation 6: There is an urgent need for substantial investment in consolidating this raw data, speeding the process begun by HDR UK in order to unlock the potential of this data. This must be done in a way that is supported by patients, and within high standards of confidentiality and security.

Recommendation 7: Overall responsibility for integration should be held by the DHSC in order for them to work with the devolved nations, other departments (such as the Ministry of Housing, Communities & Local Government [MHCLG], Department for Digital, Culture, Media & Sport [DCMS]) and local authorities to drive interoperability and consistent standards.

Recommendation 8: It is no longer possible to deliver an acceptable standard of safe care without a basic digital record of the care an individual has received. Providers of health and care should not be registered by the Care Quality Commission (CQC) unless they can achieve a "minimum digital functionality".

Recommendation 9: NHSX should be responsible for setting out the "minimum digital functionality" as soon as possible, which it should be mandatory for all registered providers of health and care services to meet, ideally ahead of the current 2024 deadline. This minimum functionality should focus on capability, security and resilience, with the ability to move towards a system which allows for integration of records, support for remote monitoring, and generation of insights and analytics. Organisations must be required to maintain this minimum digital functionality, and compliance should be overseen by NHSX, ideally via CQC. To do this, they should be given flexibility across revenue and capital categorisation to allow the choice between capital purchase and software as a service to be made on the grounds of most effective solution.

Recommendation 10: There need to be centrally mandated high-level data and technology standards on interoperability, based on the global standard of Fast Healthcare Interoperability Resources (FHIR) and the UK INTEROPen standard. These standards should mandate a common language for data acquisition to ease data flow and enable system integration.

a. DHSC should own the implementation of, and compliance with, these standards, delegated to NHSX as appropriate;
b. Public money should be invested only in technology solutions that comply with these standards;

c. CQC registration should be dependent upon compliance of technology solutions with these standards and also with achieving a minimum digital standard (see Recommendation 8);
d. There should be a roadmap and timelines for delivery of these standards and a deadline by which non-compliant technologies can no longer be commissioned or purchased.

Recommendation 11: ICSs should have a legal authority and be given a responsibility for driving integration via digital investment. To do this, they will require a minimum budget of £10m per ICS per annum to fund integration projects between NHS, social care and other bodies. Responsibility for delivering these integration projects remains with provider organisations, funded by, overseen and supported by ICSs. This will incentivise organisations to change behaviour, and enable organisations to share information and data, within the standards set out in Recommendation 9.

Recommendation 12: To fulfil these responsibilities NHSX requires ongoing funding, resources and authority, and should be given a statutory footing. It should also be encouraged to work with private and third-sector providers to augment in-house expertise. The nomenclature and reporting structure should also be reviewed, to encompass its full responsibilities and acknowledge its remit in both health and social care.

Recommendation 13: When implementing a new digital technology, budget should be allocated for change management which should be monitored as a critical part of the programme.

Recommendation 14: NHSX should work with stakeholders to develop a common benefits framework – drawn from the Quadruple Aim framework - from which purchasers and suppliers can choose those which best meet the needs of that service. These can be broadly categorised:

- Better health outcomes: measured using PRO frameworks, or the same outcome at a lower cost (i.e. better value);
- Improved patient experience: patient satisfaction, Friends and Family Test (FFT), citizen engagement
- Improved staff experience: user satisfaction, percentage of users interacting daily, use of healthcare professional (HCP) time
- Lower cost of care: delivering value or expenditure avoided, reduced DNA rate

Recommendation 15: Purchasers have a diverse marketplace, with a plurality of suppliers. To aid this, they should be discouraged from asking SMEs for "free" products, unless within certain constraints, such as an open-source licence within an overall management contract.

Recommendation 16: Purchasers should be discouraged from conducting their own pilot or proof of concept and should look to GDE blueprints and engage with fast follower replication.

Recommendation 17: To ensure procurement teams are aware of the latest innovations there should be greater use of pre-tender exercises, market-sounding events, and supplier days during which purchasers can gain a greater understanding of what is available in the market and suppliers can better understand customer needs.

Recommendation 18: The procurement specialists in this field should also have access to a national centre of digital procurement excellence, sponsored by NHSX.

Recommendation 19: The Health Systems Support Framework (HSSF) must be reviewed to ensure it is compatible with the standards on data interoperability in Recommendation 9, and not overly restrictive or complex, which could inadvertently create a barrier to entry for SMEs.

Recommendation 20: Local authorities and ICSs should have a role in supporting social care providers with the procurement of the digital technology to meet the minimum digital functionality set out in Recommendation 8.

Recommendation 21: Purchasers should explore greater use of federations or managed service models, especially in those areas which are not core to health and care provision, such as digital technology for finance or HR.

Recommendation 22: There should be further exploration of innovative funding arrangements which allow for fairness, transparency and benefits for all parties. This could be a structure in which the majority of the negotiated fee is paid, and financial benefits split between the parties, based on agreed deliverables. Agreements that put a disproportionate amount of risk on one party should be discouraged.

1. Digital technology at the heart of the NHS

"A computer health file would be required in the reorganised health service, held at area level and containing basic social and medical data about each person. It was thought that this should facilitate scheduling patients for a range of contacts with the health service; the compilation of registers; the recall of certain categories of patient; enhance the standard of record-keeping; and provide service information for the area." [3]

This was written in 1969 by a Working Party of the British Medical Association Planning Unit, and much of it has yet to be achieved. There is still no "single source of truth" about patients' health and care records, and for many it remains fragmented, bureaucratic and often still paper-based.

The day-to-day experience of most patients and HCPs is a world away from what was envisaged 50 years ago. Patients have to repeatedly provide their medical history, and the vast majority of HCPs are forced to work with antiquated IT systems, unable to access the information that could help them deliver the best possible care. There are pockets of some world-class technology, and the Health Data Research Hubs are at the forefront of maximising insights and innovations developed from health data. However, 18 months after publication of the Long Term Plan there is still no single strategy as to how to achieve the "digital" NHS which it is universally agreed will be of benefit to patients, HCPs, the health and care sector and the wider UK economy.

More positively, the Government has recognised the importance of digital technology and has allocated a budget of £4.7bn for the digital transformation strategy between 2016 and 17, and 2020 and 21, including live services.[4]

NHS Long Term Plan vision[5]

"In 10 years' time, we expect the existing model of care to look markedly different. The NHS will offer a "digital first" option for most, allowing for longer and richer face-to-face consultations with clinicians where patients want or need it. Primary care and outpatient services will have changed to a model of tiered escalation depending on need. Senior clinicians will be supported by digital tools, freeing trainees' time to learn. When ill, people will be increasingly cared for in their own homes, with the option for their physiology to be effortlessly monitored by wearable devices. People will be helped to stay well, to recognise important symptoms early, and to manage their own health, guided by digital tools."

The challenges of moving to a digital-first NHS has been repeatedly rehearsed, but a combination of constrained resources, shortage of staff with appropriate digital skills, experience of failed IT projects and lack of leadership focus has resulted in many strategies and warm words but a varied picture of implementation. The Covid-19 pandemic has both slowed down and speeded up progress, with rapid and uncoordinated adoption of some digital services based on immediate necessity rather than long-term strategy. There is also little evidence of the maturity necessary to manage the inherent tension between the clinical approach to testing, using randomised controlled trials, peer review and clinical guidelines, and the technology sector's approach of agile design and continuous iteration.

To address this problem and move towards the digital-first vision patients and HCPs will need support in developing their digital literacy. The citizen is the only common point for all services impacting their health. It therefore follows that their records should be a comprehensive log and plan of their care, whether self-care or provider-delivered.

Recommendation 1: As we move towards the long-term objective of a "Personal Care Record" citizens should be the primary data owners and holders of information relating to their care. They can consent to share it with health and care providers, who are then controllers or processors on their behalf. They can also choose to withhold their permission to have their information – securely and anonymously – used for research.

Case study: PatientSource & Brandon Centre

The Brandon Centre offers support for the psychological, sexual and social needs and challenges of young people under 25 years old. As with many charities, the Brandon Centre has had limited capital funds to spend on digital transformation projects and technology infrastructure, and in mid-2019 was still operating on an entirely paper-based system.

The Brandon Centre partnered with PatientSource to digitise the delivery of its sexual health, mental health, healthy living and parenting services. PatientSource worked with The Brandon Centre to offer staff training, bespoke forms for the new system, and ongoing virtual support. Instead of relying on the leaders at the Centre to communicate change, PatientSource worked with all the staff. This resulted in a rapid shift in staff mindset, in weeks rather than the more normal months or years for similar technology launches.

Benefits of the new system included:

- Savings in staff time due to improved workflows, and no longer retrieving archived paper files.
- Eliminating data duplication
- Managing statutory data submissions, including the Mental Health Services Data Set (MHSDS).
- Clinical information captured in a structured format within the electronic patient record (EPR), with integrated error checking and data quality procedures.
- More dynamic staff communication with accurate information to aid decision making

Only when citizens can see, share and – where appropriate – add to their personal care records will they truly be empowered to take control of their health. This should be as part of a wider move towards the development of a "single source of truth" for health and care in the form of a Personal Care Record.

However, not all citizens can use digital products and services. Some are excluded by connectivity – 12 per cent of people do not have access to a decent broadband service – and 12 million people lack the basic skills or resources to access digital services[6]. Others may be excluded as they do not have the mental or physical ability to use the technology. There is a correlation between those who are in poor health and those who are digitally excluded, and it is important that any move towards digital health and care reduces rather than exacerbates this divide.

Case study: Patients Know Best & Surrey and Sussex Healthcare NHS Trust

Patients Know Best is a social enterprise focused on improvements to care delivery built on the founding mission that citizens will understand and be able to manage their own health and wellbeing, reducing demand on healthcare systems but also facilitating better outcomes and better experiences for patients themselves.

This can only be achieved through patients being able to hold a copy of all of their information from health and social care sources and being able to interact with their entire health network (including family and friends) in an online environment and at times convenient to them. Information should travel with the person and not be limited by only those organisations that are "connected". This brings together all care providers from community care, to primary and acute care providers, as well as charities and local authorities, via the Patients Know Best (PKB) platform as a patient-held record.

In Surrey and Sussex Healthcare NHS Trust PKB allowed 4,000 patients to play an active role in managing their inflammatory bowel disease (IBD) as well as offering them greater access to clinical expertise and innovative treatments.

Supported by the Kent, Surrey and Sussex Academic Health Science Network (KSS AHSN), PKB is being used by patients to record their symptoms and communicate with their clinical team remotely, accelerating timely access to advice, clinical reviews for flare-ups, and escalation to disease-modifying therapy where appropriate. It also offers reassurance to those who are stable without the need for a face-to-face review.

The benefits of this patient-centred approach have been significant. As well as reducing the number of inpatient admissions and outpatient attendances, the time to access specialist care at the onset of a flare-up has reduced from six weeks to one week. At the start of the study 60 per cent of respondents reported that their IBD had been well controlled in the preceding

two weeks, with this figure rising to 71 per cent after four months of PKB usage. Importantly, 68 per cent said the service had a positive impact on their IBD, and 77 per cent said it helped them feel more confident in managing their own health.

Recommendation 2: The Government must be mindful of the digital divide and ensure any policies to enhance the use of digital services for health and care do not exacerbate health inequalities. The Government must continue its policies around digital inclusion and invest in digital inclusion tools as set out by NHS Digital[7] as well as better broadband provision to excluded areas.

Digital Inclusion[8]

Digital skills: Being able to use digital devices (such as computers or smart phones and the internet. This is important, but a lack of digital skills is not necessarily the only, or the biggest, barrier that people face.
Connectivity: Access to the internet through broadband, wi-fi and mobile. People need the right infrastructure but that is only the start.
Accessibility: Services need to be designed to meet all users' needs, including those dependent on assistive technology to access digital services.

Case study: WiFi SPARK & Oxford University Hospitals NHS Foundation Trust

During the Covid-19 pandemic visitors were not permitted into hospitals so patients had limited means of keeping in touch with loved ones, particularly if they did not have their own personal mobile device. The most commonly affected patients were the elderly. They were the least likely to have a tablet or laptop and the most likely to miss physical visits from people and suffer from loneliness and lack of mental stimulation.

Within a week of receiving the brief from Oxford University Hospitals NHS Foundation Trust, WiFi SPARK designed, built and deployed SPARK® Media: Unite, a virtual-visiting solution on trust-owned tablets. The solution consisted of 246 Samsung tablets which were preloaded with the SPARK® Media platform to enable inpatients to video-call friends and family. The solution included antimicrobial hardware options such as bedside mounting arms and brackets so that the tablets could be held securely in a comfortable position for patients.

The tablets are securely loaned to patients to enable them to keep in touch with their loved ones and also to use for entertainment, information and distraction. The devices are protected, meaning that only pre-agreed apps are accessible on the tablets. This means that the Trusts can be confident that they are offering patients a tablet that is secure and offers multiple options for patients to video call, get information and be entertained.

SPARK® Media has been introduced to 30 NHS Trusts since the beginning of the Covid-19 crisis. In April and May 2020, across seven trusts, 8,336 video calls were made by patients using the Visionable App. This equates to 1,308 hours of contact time with loved ones, which is nearly 55 days of continuous use.

If we are to empower patients to own their health and care record, we also have to enable HCPs to support patients in their role. To do this, HCPs must have an appropriate level of digital literacy. The Digital Transformation Portfolio (DTP) has earmarked funding for the improvement of digital skills via the Building a Digital Ready Workforce programme, however it is still in its early stages, and has funding of £17m[9], or £17 per NHS employee.

Case study: eConsult and the Devon Digital Accelerator

Total Triage has been championed by NHS England as the model for General Practice to follow during the current Covid-19 crisis. Guidance has been produced rapidly and webinars created to help practices move to this model. Total Triage predominantly relies on practices having as much information as possible

about patients' requirements so that they can be helped by clinical urgency and need, instead of first come first served. Whilst many practices have moved to this model only after encouragement from NHS England, the very first practices to develop and test iterations of this Total Triage model required much support and developed processes over a period of months. Supported by the Devon Digital Accelerator, in collaboration with eConsult, Beacon Medical Group in Plymouth developed and implemented one of the first digital Total Triage models in November 2019.

The Total Triage model allows clinicians to decide which patients need an appointment in the surgery and which can be dealt with remotely. It works better than a traditional, purely phone-based triage because online consultation allows the practice to manage a portion of work asynchronously and efficiently. The information is provided by the patient in their own time and following a consistent structure. Key red-flag questions embedded into every symptom or condition questionnaire identify and immediately navigate patients reporting serious symptoms to the appropriate care, to ensure each eConsult submitted is suitable for a primary care response by the end of the next working day.

Online consultations are generally quicker to resolve and open up more options for clinicians in terms of how to respond (text, one-way email, phone call, video consultation or inviting the patient in for a face-to-face consultation). Having a full patient history up-front has reduced the need for face-to-face appointments and improved the quality and efficiency of those that are required. Clinicians feel supported in making safe and impactful decisions that are in the best interests of their patients.

At the start of the Covid-19 crisis, Beacon Medical Practice – which by then had six months of experience with Total Triage - increased from just over 1,000 eConsults a week to over 1,400 a week.

eConsult Health has also pioneered digital triage for urgent and emergency care, with an urgent care centre that has been using its patient check-in and automated triage service, eTriage, since January 2018. In early 2020, two additional departments in West Sussex began using eTriage, which is currently being rolled out in hospital departments across England.

Recommendation 3: Training in digital technology needs to be included in clinical and non-clinical curricula and continued professional development programmes. This is not training on specific technologies or systems, rather a broad digital literacy, and an understanding of how digital technologies could be used to enhance patient care and enable self-management of conditions. To address digital capability among NHS staff the Government should revisit and implement the recommendations of the Topol Review[10], maintain the work begun by Health Education England and ensure the budget for the Building a Digital Ready Workforce is sufficient for the scale of the challenge.

However, patients and HCPs are only as digitally enabled as the quality of available tools allows. Most people have never been taught how to use Facebook, Amazon or book a flight ticket online, yet do so extensively and successfully. That is because the customer experience of these services has been prioritised, researched, funded and continuously reviewed in order to make them as user-friendly as possible.

Currently in the UK 51 per cent of people use the internet for banking and paying bills, and 46 per cent for online shopping, yet only 23 per cent go online to find health information[11]. Reasons behind this limited use of online services for healthcare are numerous, but include the small number of services available online, and the lack of usability and usefulness of what is available. As of July 2020 there were fewer than 100 apps in the NHS Apps library, compared with 45,000 healthcare related apps in the Apple App Store. This should be of significant concern to the health service as many of the apps in the Apple App Store are untested and unverified, and do not integrate with NHS services.

Recommendation 4: There needs to be greater investment in the NHS App Library, developing it into an easy-to-access, user-friendly, first point of call for UK patients in search of digital health support. This will require a significant increase in the number of apps available, as well as increased marketing of the library to the public so they know it is an option for trusted health applications. For those who wish to get their apps from

the Apple or Google App Stores, NHS Digital should work with those providers to develop a dedicated NHS section through which people can access NHS-verified apps, easily available for free for those who are entitled.

Recommendation 5: Alongside investment in the NHS Apps Library, there should be greater support for patients in navigating the wearable devices, web-based services and tools available, and signposting people to those that can integrate with the NHS, social care systems and Personal Care Record. There should also be wider use of social prescribing of appropriate apps and digital support as part of a patient's care plan.

Case study: CareRooms

Patient flow through the NHS and health and social care system is becoming increasingly difficult due to the scarcity of suitable resources. Carer vacancies are set to rise from 90,000 to 380,000 over the next five years and this, coupled with budget cuts across the system, is creating major issues for health managers. In addition, Covid-19 positive patients and the increasing amount of elective surgery has put the health system under enormous pressure. Trusts are also developing accelerated discharge pathways to reduce length of stay in hospital, yet many patients have concerns about moving to care homes due to the risk of Covid-19 infection.

CareRooms has developed a new care model and associated technology platform, which embraces the positive aspects of the sharing economy, married to the challenges of an ageing population. It uses local, community based and carefully screened "Hosts" with spare rooms, to provide safeguarded care for a range of step-up, step-down and respite capacity. Where a Host is a retired or active HCP (approximately 60 per cent of our applicants are retired nurses), CareRooms can also provide accommodation for NHS elective surgery patients. Key to this project is that the approach already has a significant proven track record of reducing readmissions and a positive impact on community health services. The side-effect of sharing income and resources is to prevent loneliness for both the Host and the Guest during the stay and, as a result, to extend their independence and wellbeing. The mental health benefits are significant, as are the savings to the health system. CareRooms guests are often a net contributor to the local health system, rather than an increasing consumer of them.

CareRooms has built a platform that includes the utilisation of world-leading technology to offer remote vital-signs monitoring, falls detection, remote room metrics collection (for both comfort and security), video GP and remote consultations. This results in an environment that feels like home, with the added security of a host and the latest technology. With the possibility of a second wave of Covid-19, and the next winter flu season, the aim is to develop this model in a local authority context to provide resilience and flexibility to the health and social care system for later this year and beyond.

The NHS is the single largest integrated health provider in the world, serving a large and diverse population. It holds trillions of data points, which will continue to grow at an unprecedented rate as more data sets, including user-generated data from sensors or wearables, are incorporated. The patient records held by the NHS offer a unique proposition for research, even more so if combined with the health elements of social care. If pseudonymised, aggregated, cleansed and curated this data could generate up to £5bn[12] per annum, which could be reinvested in the health service. Additionally, this data could be used to deliver better patient care, improved outcomes and operational savings worth around £4.6bn annually[13].

Health Data Research UK (HDR UK) – funded by 10 organisations including the UK and devolved nations Governments – works with a wide range of health data from the NHS, universities, research institutes, charities, wearables and private companies and aims to bring these data streams together to make it available for research.

Recommendation 6: There is an urgent need for substantial investment in consolidating this raw data, speeding the process begun by HDR UK in order to unlock the potential of this data. This must be done in a way that is supported by patients, and within high standards of confidentiality and security.

2. Minimum digital functionality & interoperability

For the aspirations set out in Section 1 to be achieved, and for there to be a patient-centric "digital-first" NHS there remains a significant amount of "behind-the-scenes" work to be done. Most NHS Trusts run multiple computer systems – which do not always talk to one another – and GPs have their own IT framework. Social care is still at the start of its digital transformation with an estimate that only 28-30 per cent of the sector use any form of electronic records system.[14]

- Typically, upward of 400 systems may exist within a complex health organisation.[15]
- Only 29 per cent of social care professionals told a recent survey that they have digital access to the information they need from health and care providers, with 52 per cent of social care managers reporting that their staff lack basic online skills and knowledge of assisted living technologies.[16]
- 16 per cent of trusts assess their ability to use technology to deliver care as "low".[17]

Despite the 2015 Government commitment that "all patient and care records will be digital, interoperable and real-time by 2020"[18] there remains a lack of integration and interoperability, and the health and care sector is a long way from achieving that target. Rapid progress needs to be made on the "plumbing" of the digital infrastructure, to allow interoperability and data sharing in a secure and compliant manner.

The DHSC has overall responsibility for improving health and social care outcomes and reducing health inequalities[19]. Delivery of health and care services is fragmented and undertaken by a multiplicity of suppliers, including NHS organisations, local authorities, independent contractors, third sector, unpaid carers and patients themselves. Responsibility for interoperability currently sits between NHS England and NHSX, but this makes collaboration with other Government Departments and devolved nations more challenging.

Case study: Open Medical & London North West University Healthcare NHS Trust

At the onset of the Covid-19 pandemic, it became clear to all providers that intensive care capacity across the country required rapid upscaling. The intensive care triage pathway was going to be tested on an unprecedented scale and a robust digital system that could refer, track and review cohorts of critically unwell patients would be essential.

Open Medical developed Pathpoint ICU, a cloud-based patient management platform, to simplify ground-level clinical processes and supply the valuable data to coordinate effective service planning. It enabled:

- Real-time accurate reporting of patient numbers pertaining to Covid-19 status, location, ventilation status, prone/supine positioning, renal replacement therapy, among other parameters.
- Prioritised capacity planning by allocating digital 'tags' to patients; filterable and categorised according to level of required clinical input. These tags form the components of bespoke clinical lists for clinical prioritisation or transfer to appropriate clinical area.

Reports are generated from Pathpoint ICU, either as ad-hoc reports, or as regular standing extractions that are emailed directly to named recipients at set times during the day. These reports contain the high-level clinical information gathered through the clinical tags into aggregate non-patient identifiable reports of key metrics, including: number of ventilated patients, number of CPAP patients, number of transfers in the last 24 hours, and number of admissions in the last 24 hours. The reports also have the flexibility for users to access the direct patient information and see the latest updates for individual patients if required.

Recommendation 7: Overall responsibility for integration should be held by the DHSC in order for them to work with the devolved nations, other departments (such as MHCLG, DCMS) and local authorities to drive interoperability and consistent standards.

It has become apparent during the Covid pandemic that some of the UK's health and care providers – particularly in social care – are digitally naive and have little or no technology infrastructure. Progress is being made to drive connectivity, digital records and basic technology; however these programmes need to be coordinated. The NHS Long Term Plan set out an aspiration of a "core level of digitisation

by 2024"[20] although there is little detail as to what this encompasses and which providers would be obligated to comply.

According to the National Audit Office, Trusts' expenditure on IT varies widely, and collectively they spend around two per cent of their expenditure on technology, compared with a recommendation from Lord Darzi that they should aim to spend around five per cent of their turnover on IT by 2022.[21]

Recommendation 8: It is no longer possible to deliver an acceptable standard of safe care without a basic digital record of the care an individual has received. Providers of health and care should not be registered by the CQC unless they can achieve a "minimum digital functionality".

Recommendation 9: NHSX should be responsible for setting out the "minimum digital functionality" as soon as possible, which it should be mandatory for all registered providers of health and care services to meet, ideally ahead of the current 2024 deadline. This minimum functionality should focus on capability, security and resilience, with the ability to move towards a system which allows for integration of records, support for remote monitoring, and generation of insights and analytics. Organisations must be required to maintain this minimum digital functionality, and compliance should be overseen by NHSX, ideally via CQC. To do this, they should be given flexibility across revenue and capital categorisation to allow the choice between capital purchase and software as a service to be made on the grounds of most effective solution.

Case study: Spirit Digital & Leicester Partnership NHS Trust

During the Covid-19 pandemic the Leicestershire Partnership NHS Trust anticipated a significant increase in the number of patients who would require intensive management by its respiratory and heart failure teams. Yet these patients were particularly vulnerable to Covid-19. To minimise the risks of infection, these patients would no longer be able to attend outpatient clinics, but still needed to receive care and monitoring from the clinical team.

Spirit Digital developed CliniTouch Vie designed to keep patients with long-term conditions out of hospital and reduce the frequency with which clinicians need to make home visits to these patients. CliniTouch Vie is an app-based, CE-marked medical device enabling patients to learn about their condition and monitor themselves at home. Dynamic monitoring via quantitative biometric data inputs (from additional peripheral medical devices) coupled with self-reported health and wellbeing scores combines to give a rich data set. CliniTouch Vie uses sophisticated algorithms to detect any deterioration in a patient's condition. All quantitative and qualitative data uploaded by the patient is automatically analysed and coded according to a "red-amber-green" (RAG) alert system.

CliniTouch Vie connects remote healthcare teams to patients through secure in-built messaging, video consultations and reporting systems, helping clinicians to effectively prioritise their workload based on intelligent triaging algorithms. All data collected by the system can feed into the EPR, as well as being recorded within the CliniTouch Vie database.

As a result of deploying CliniTouch Vie Leicester Partnership NHS Trust was able to:

- Discharge a significant number of patients from the community hospital and monitor them remotely from the safety of their homes.
- Reduce the number of home visits by 35.1 per cent, making more efficient use of clinical resource, and reducing the need for face-to-face contact between patients and their clinical team. This equates to £80,000 of projected savings over six months.
- Empower patients to self-manage their conditions at home, with 85 per cent of users not having to visit their GP during the six-week period studied.

There is currently no single standard for data sharing, which makes interoperability between systems complex, costly, and prone to error or incompleteness. This is despite the Department of Health and Social Care highlighting as early as 1998 the importance of national standards for sharing information, with a target to achieve comprehensive electronic and patient health records by 2005.[22]

NHSE&I have a presumption towards information sharing[23], within a robust governance framework. This was first set out in the Caldicott Review which specified, "the duty to share information can be as important as the duty to protect patient confidentiality."[24] Despite this permissive policy framework there are often technical barriers to data sharing.

The Local Health and Care Record (LHCR) programme aims to make patient data ready for interoperability. But the programme only covers around 40 per cent of the population and is only at the start of the journey towards full interoperability, with different LHCRs choosing different methods of achieving the goal. According to the National Audit Office, "performance of the localities was mixed, and localised work had not yet been brought together to ensure there was sufficient standardisation to allow data sharing between the five localities."[25]

But the LHCR programme is not enough to solve all the issues of interoperability as it is focused only on the patient record. NHSX has set out an aspiration for "developing, agreeing and mandating clear standards for the use of technology in the NHS...making sure that NHS systems become interoperable."[26] They aim to do this by building a data layer, using Application Programming Interfaces (APIs), which will allow a plurality of providers. This approach is welcome, but not without challenges, and requires a clear data architecture and proper standards to be maintained.

NHSX has openly acknowledged that it has had challenges in the past when trying to enforce standards based on the NHS number as the unique identifier of patients. To address this challenge, NHSX is now considering a system of spend thresholds, but financial controls alone may not be enough.[27]

Recommendation 10: There need to be centrally mandated high-level data and technology standards on interoperability, based on the global standard of FHIR and the UK INTEROPen standard. These standards should mandate a common language for data acquisition to ease data flow and enable system integration.

e. DHSC should own the implementation of, and compliance with, these standards, delegated to NHSX as appropriate;
f. Public money should be invested only in technology solutions that comply with these standards;
g. CQC registration should be dependent upon compliance of technology solutions with these standards and also with achieving a minimum digital standard (see Recommendation 8);
h. There should be a roadmap and timelines for delivery of these standards and a deadline by which non-compliant technologies can no longer be commissioned or purchased.

Case study: Kooth

Kooth's purpose is to improve the emotional wellbeing and mental health of Children and Young People (CYP) and adults by providing an early response to emotional wellbeing and/or emerging mental health needs. It aims to increase early detection of mental health problems so they can be addressed promptly, thus preventing problems from getting worse and requiring a more specialist response.

The Kooth and Qwell platforms do this by creating access to the provision of self-care tools and resources which support CYPs and adults to help themselves and build resilience, whilst also providing treatment and therapeutic intervention accessed for free and with immediacy. This can support a reduction in the demand for specialist services, particularly Child and Adolescent Mental Health Services (CAMHS), Improving Access to Psychological Therapies (IAPT), and social care interventions as well as providing a step-down model of support.

The impacts of Covid-19 are vast and change on a weekly basis. Young people now more than ever are looking to Kooth for support with a 58 per cent increase in Kooth logins compared to this time last year. In addition, users report a 128 per cent increase in sadness and 63 per cent increase in loneliness, reflecting isolation at home, compared to last year. There has also been an increased need for therapeutic support which is demonstrated through increased chat queues and presentation of Covid-19 related issues. Additionally, there has been an increase in peer support on the site with more young people responding to and posting articles and discussions.

In addition to our national CYP insights, Kooth have focused specifically on BAME users to understand

how the ongoing pandemic is affecting black, Asian and minority ethnic communities, as research has identified that Covid-19 deaths have been highest amongst those from BAME backgrounds. There has been a 44 per cent increase in BAME users logging onto Kooth during Covid-19 with a 27 per cent rise in suicidal thoughts and 30 per cent increase in self harm, both higher than those seen by white users.

Early prevention is a critical part of the mental health response to Covid-19, and Kooth offers both treatment and prevention. These platforms provide flexible, anonymised support to those not seeking support from CAMHS or specialist services, to create capacity to alleviate pressures on CAMHS teams struggling to provide therapeutic intervention to current waiting lists, and to provide interactive self-help and early intervention to promote de-escalation of emerging mental health needs. These services are accessible, digital, and free, targeting those vulnerable CYPs in the community that are unable to reach other services due to Government social-distancing guidelines.

In ICSs – and existing Sustainability and Transformation Partnerships – NHS organisations, in partnership with local councils and others, take collective responsibility for managing resources, delivering NHS standards, and improving the health of the population they serve[28]. ICSs are responsible for service changes as set out in the Long Term Plan, including implementing digitally enabled primary and outpatient care[29]. They are also expected to prepare digital plans as part of their wider planning. By working cross-functionally with local authorities, third sector and other providers ICSs are well placed to have a role in digital integration.

Currently, very few trusts have the technical capability or resources to take on any integration work. For it to happen at the scale and pace required there will need to be a coordinated approach utilising support from other organisations within the healthcare ecosystem.

Recommendation 11: ICSs should have a legal authority and be given a responsibility for driving integration via digital investment. To do this, they will require a minimum budget of £10m per ICS per annum to fund integration projects between NHS, social care and other bodies. Responsibility for delivering these integration projects remains with provider organisations, funded by, overseen and supported by ICSs. This will incentivise organisations to change behaviour, and enable organisations to share information and data, within the standards set out in Recommendation 9.

Case study: Tunstall & Bolton

Care home residents are at particularly high risk during the Covid-19 pandemic. Bolton NHS Foundation Trust and Bolton Clinical Commissioning Group worked with Tunstall to use technology to protect residents, care home staff and clinicians.

Tunstall's myKiosk is a multi-user remote health monitoring solution, which enables multiple patients to be supported by telehealth in grouped living environments, such as care homes. In Bolton, 36 care homes have been provided with myKiosk systems, along with medical devices such as thermometers, pulse oximeters and blood pressure monitors. The Tunstall team worked with staff in the homes to train them on the system, and where required staff were also educated on how to take vital signs observations. Where care staff have concerns about the health of a resident, a member of care/nursing staff will use the myKiosk tablet to record their vital signs and help them to answer questions about their health and symptoms using the touchscreen. The information is then securely transmitted to Tunstall's ICP triagemanager patient management software which is based at the Community Services Hub. Results that breach the parameters set for that patient will raise an alert on the system, prioritising them on the triage screen using colour coding relating to the level of risk. This data can then be accessed and reviewed by Advanced Nurse Practitioners at the Hub, enabling them to make an informed decision regarding next steps in the patient's care.

The triagemanager and myKiosk system enables closer monitoring of vulnerable residents, whilst reducing the need for clinical staff attendance thus reducing

the risk of cross-infection. It can also help clinicians to effectively prioritise residents' care, as the system clearly identifies those most in need of interventions. myKiosk provides objective insight into a patient's health status which enables more proactive and preventative care. For example, residents with dementia may find it more difficult to communicate if they feel unwell, meaning their condition may not be identified until it has advanced. Triagemanager alerts clinicians to symptoms such as rising temperature at an early stage, enabling faster interventions. This can help to avoid the need for more complex care, improving outcomes and for Covid-19 patients, enabling them to be isolated and treated as soon as possible. The system is not solely being used where Covid-19 is suspected; any resident feeling unwell can be monitored using the system. This can be particularly useful for patients with long-term respiratory or heart conditions, whose signs and symptoms can be monitored over time to detect any deterioration at an early stage. The success of the programme will be measured over time, with metrics such as reduced ambulance call-outs being assessed, as well as resident outcomes and the impact on caseload management.

In just six weeks over 1,100 residents were registered on the system and in one month – June 2020 – 479 observations have been recorded on 104 residents. It has reduced the need for face-to-face visits, helped prioritise residents' care and supported early detection of symptoms to enable timely interventions and improved outcomes. It has also accelerated the transformation of the model of care, changing working practices for the long term.

NHSX has a critical role in overseeing and delivering many of these recommendations, some of which already fall within its remit. It has set out an ambitious vision which aims to use technology to overcome the challenges of rising expectations, demand and costs[30]. In order to achieve this, the remit and resources of the organisation will need to be reviewed and almost certainly increased. NHSX should have overall responsibility for driving interoperability, including setting and enforcing the data and interoperability standards. It should also be responsible for setting a minimum digital functionality – with a focus on capability, security and resilience – for all registered providers of health and care (Section 2). NHSX should work with providers and purchasers to develop a common benefits framework for procurement and oversee the development of a National Digital Procurement Academy. (Section 3)

Recommendation 12: To fulfil these responsibilities NHSX requires ongoing funding, resources and authority, and should be given a statutory footing. It should also be encouraged to work with private and third-sector providers to augment in-house expertise. The nomenclature and reporting structure should also be reviewed, to encompass its full responsibilities and acknowledge its remit in both health and social care.

NHSX Tech Plan Vision[31]

"The NHS could become a truly data-driven system, in which everyone is treated as an individual, given the tools to stay healthy and drive their own care when they need it; every clinician is able to operate at the top of their licence, with the time they need to care for patients and people; and the system can constantly optimise the care it gives through data, analytics and research. In social care, better use of technology and data has the potential to support people to live in their own homes for longer, enabling providers to deliver better, smarter care, and local authorities to plan and commission services more efficiently."

Case study: Bradford Teaching Hospitals NHS Foundation Trust

Bradford Teaching Hospitals NHS Foundation Trust (BTHFT) is one of the most digitally mature trusts in England. The Trust's digital strategy several years ago called for the implementation of an Electronic Patient Record (EPR) at scale. The whole Trust would change from predominantly paper-based working to a nearly complete digital one simultaneously. This was a massive change, requiring the transformation of services, workflows, staff cultures and behaviours.

The EPR required some carefully planned interventions and techniques to ensure that all the staff engaged,

interacted and believed in the change EPR would bring, and so would adopt the new ways of working to realise the significant patient quality and safety benefits. Given the scale of the deployment, the previous poor experiences with digital adoption and the need to deploy safely, the Trust used a multi-method approach to change. This approach has since enabled successful, rapid adoption of technology during Covid-19.

Subject matter experts: all clinical and operational teams work within the digital delivery team and are involved in the design and build sessions.

Communication: all stakeholders in the local health economy were included, however minimally impacted by the programme.

Roadshows: for those clinical staff who could not leave their work areas, the teams demonstrate the new technology they would be using.

Passports: including actions and checklists for each clinical and operational team to carry out, such as staff training and agreeing their own new processes, for which they received a stamp when completed.

Friends: a champion who supports the areas prior to go-live and at go-live by promoting the benefits and highlighting the changes. These staff receive additional training and are supported by the Change Team and the Chief Nursing Information Officer.

Simulations: using a dedicated mock ward for all specialities which they were mandated to participate in as teams at different stages. These simulations helped teams imagine and talk/walk through the new way of working.

Play Domains: across all computers in the Trust which allow anyone to log in and "play" with the new software.

The benefits of EPR have been both service improvements and more importantly patient safety benefits. The availability of EPR remotely has improved treatment times as the clinician can review the patient and order and/or prescribe interventions and allowing clinicians to work remotely during Covid-19. The digital record is now always legible, reducing errors and enabling better communication with the patient/service user. Allergies are always recorded so that when medication is prescribed 100 per cent of the time the EPR checks it against the documented allergy – this has reduced prescription errors and speeded up the delivery of antibiotics for over 80 per cent within the ideal timeframe.

This adoption-ready approach has enabled the Trust to quickly roll out other advancements during Covid-19, that included:

- Covid-19 "tiles" in our Command Centre – which focus specifically on managing Trust-wide Covid-19 patients, both to streamline the pathway and manage the quickly changing situation. This has enabled the Trust to manage an increase in ICU beds and wards with Covid-19 patients.

- Family and patient communication tools - that allow patients to communication with families given visiting restrictions. These were deployed with no training needed and solutions were initiated by frontline staff.

Video and phone consultations for patients and for staff working – was deployed with quick user guides only and was widely adopted with very minimal issues. These allowed any staff to work remotely and any clinically appropriate patient to be seen remotely, keeping patients and staff safe.

3. Transformational procurement

A digital revolution in healthcare is going to require the commissioning, purchase and implementation of a range of new services, systems and software. Yet procuring the right ones, which meet patient and user needs, which are cost effective and achieve the standards set out in Section 2 is a daunting task.

The variability in execution of technology projects can be detrimental to citizens, staff, providers, suppliers and the taxpayer. Instead of viewing the introduction of digital health initiatives as an IT project, it should be viewed from the perspective of cultural change, engaging all stakeholders from the outset. This should include – where appropriate – both citizens and HCPs, in order that services and projects can be co-designed with those who will ultimately be the users. When reviewing the failures of the National Programme for IT (NPfIT) Dr Robert Wachter concluded that "from the outset, the programme lacked clinical engagement." [32]

There is a separate, intangible cost to implement and deliver change, yet it is rarely accounted for when projects are planned. As a result, the implementation of digital health and social care projects often fails, which has implications in terms of direct financial cost or reduced activity. The Building a Digital Ready Workforce programme has acknowledged that cultural change is an essential component of supporting organisations to be digitally ready and has launched a tool for Board development[33]. However, this alone may not be sufficient, and specific funding and resources should be committed to change management and process redesign.

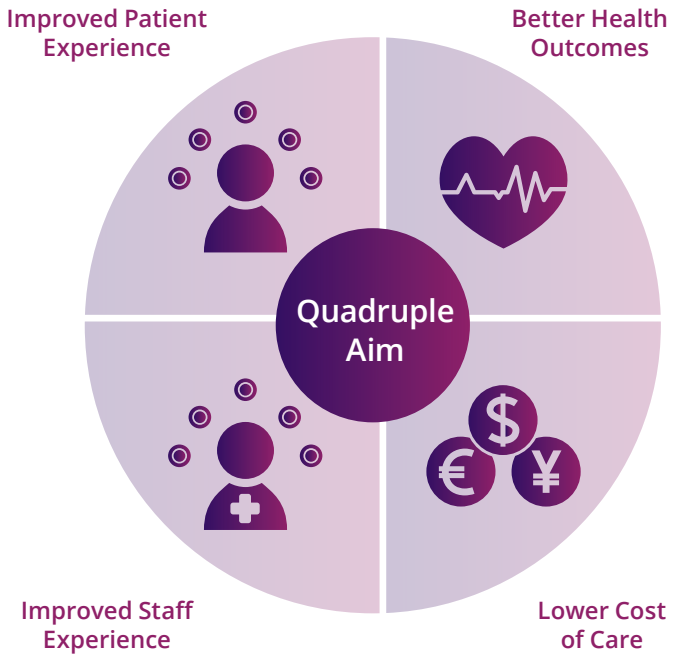
Recommendation 13: When implementing a new digital technology budget should be allocated for change management which should be monitored as a critical part of the programme.

Too often tender processes are too heavily weighted towards cost and not value. As a result of this overemphasis on price, both supplier and purchaser focus on the cheapest solution rather than the solution delivering the best value. There needs to be a move towards outcome-based procurement with the patient at the centre, to identify the solutions delivering the greatest value. The identification and analysis of value is a more complex task and an evolving one as the technology changes. To address this, best practice standards should be mandated for any technology solution financed out of public funds.

Recommendation 14: NHSX should work with stakeholders to develop a common benefits framework – drawn from the Quadruple Aim framework – from which purchasers and suppliers can choose those which best meet the needs of that service. These can be broadly categorised:

- Better health outcomes: measured using PRO frameworks, or the same outcome at a lower cost (i.e. better value);
- Improved patient experience: patient satisfaction, FFT, citizen engagement
- Improved staff experience: user satisfaction, percentage of users interacting daily, use of HCP time
- Lower cost of care: delivering value or expenditure avoided, reduced DNA rate

Quadruple Aim Framework



It has become commonplace – particularly during the Covid pandemic – for NHS organisations to ask suppliers to provide goods and services for free. In reality "free" services are never free; there are always resource requirements. They also often do not get the focus they require and can place an undue burden on SMEs. "Free" services also do not allow purchasers to apply suitable cost-effectiveness assessments.

Recommendation 15: Purchasers have a diverse marketplace, with a plurality of suppliers. To aid this, they should be discouraged from asking SMEs for "free" products, unless within certain constraints, such as an open-source licence within an overall management contract.

Case study: AdviseInc

AdviseInc is a leading health and social care analytics business, specialising in spend and supply chain analytics for the health and social care market.

During the Covid-19 crisis, public sector organisations had limited support in tracking core PPE product lines. Ensuring that frontline staff had the equipment they needed was a top priority, yet existing inventory management systems struggled to cope outside"business as usual" conditions. To address this AdviseInc developed a product called StockWatch. This tool provides full visibility of what PPE an organisation has and where it is located, and forecasts how long it will last, using Artificial Intelligence. This has enabled more effective mutual aid across regions and in turn helped protect frontline workers during the crisis.

StockWatch is a simple web form that captured the stock levels of critical lines of PPE and developed some real-time analytics to visualise where it was located. AdviseInc took it from initial requirement to a live solution in an afternoon.

Demand for the tool grew, and so AdviseInc partnered with an Artificial Intelligence business, Clear AI, to deliver forecasts based on aggregated clinical data, epidemiological data and organisational capacity data. It enabled 18-day forecasts of what PPE any organisation would need based on where they sat on the curve and used PHE guidelines. The tool was further developed to include "stock issues" to departments so an organisation could see who was consuming the PPE.

The tool was particularly well received in Greater Manchester which has said there was no doubt that StockWatch has saved the lives of frontline workers. It has helped prevent stock-outs, where organisations would have run out and through visibility has enabled quick and effective mutual aid to ensure no one ran out of vital PPE. It has also reduced a lot of manual process from the system. It has also removed all the errors from using Excel and emails flying around the system, resulting in clean data for analysis.

AdviseInc worked closely with regional Local Resilience Forums and with NHSE/I regional teams. The tool was quickly used to provide the much-needed intelligence to regional Gold Commands and was used from the early days by the Army to help co-ordinate efforts.

Two hundred public sector organisations now use the tool daily across healthcare, social care, local authorities, blue-light services and charities. The tool has saved in excess of 3,000 FTE hours per month across the system. It has also enabled organisation to share resources by organising PPE swaps, where excess can be swapped with others.

Despite the Health Secretary's dislike of "pilot projects", preferring "agile iteration"[34], organisations often insist on their own "pilot" or "proof of concept" even when something has been proven in another locality. This is often because procurement processes, contracts and support structures do not lend themselves to learning from one another or sharing ideas. The GDEs have a responsibility to achieve digital excellence and promote the wider uptake and optimisation of technologies across the NHS in England, by developing "blueprints" to capture excellence and disseminate these across the system. A recent, independent assessment by the University of Edinburgh concluded "overall, GDE Programme policy has been strikingly successful in achieving its key strategic goals."[35]

Recommendation 16: Purchasers should be discouraged from conducting their own pilot or proof of concept, and should look to GDE blueprints and engage with fast follower replication.

The NHS needs to be a leader at category management in procurement. Yet with the fast pace of change in the health technology space it can be challenging to stay abreast of all the developments.

Recommendation 17: To ensure procurement teams are aware of the latest innovations there should be greater use of pre-tender exercises, market-sounding events, and supplier days during which purchasers can gain a greater understanding of what is available in the market and suppliers can better understand customer needs.

Recommendation 18: The procurement specialists in this field should also have access to a national centre of digital procurement excellence, sponsored by NHSX.

The HSSF was developed to provide NHS organisations with a list of suppliers that NHS England and NHS Improvement considers to be financially stable providers of suitable products and services[36]. Whilst this has significant merit there may also be a risk that innovative solutions are excluded.

Case study: Imprivata & Coventry and Warwickshire Partnership Trust

In March 2020, with Covid-19 pandemic cases increasing, and with a national lockdown of the population imminent, Coventry & Warwickshire Partnership Trust sought to get ahead of events and prepare for staff to work safely from home – in a way that would enable them to continue to deliver their vital services to the public without interruption.

Remote access to all the systems, folders, and documents staff needed to do their jobs was required, including all clinical, finance, and office systems. As employees would be working from home, they needed to be able to access systems via their own laptops and devices. Given the sensitive nature of systems and data, robust security had to be guaranteed.

The Trust utilised Imprivata Confirm ID® for Remote Access and was able to implement home working capabilities for more than 4,000 staff over the weekend before lockdown was enforced. Staff were able to use their own laptops, tablets or mobile devices, using two-factor authentication for remote access to the entire enterprise. This meant employees were ready to begin remote working immediately, without the need to go back to their places of work and without interruption to the services they could provide to the public.

Documentation and YouTube training videos were made available to explain how working from home would be enabled and what each staff member needed to do to access systems via their NHS laptop or own personal devices. Primary care providers now have access from home to all the key systems which they would normally use including:

- Carenotes
- EMIS
- Vision
- AccurRX
- Docman
- A full desktop of what would normally be used in a practice with access to all files and folders

The simplicity of the solution and the way it was implemented resulted in minimal workload for the Trust's IT support desk. Over 94 per cent of staff enrolled with the service which worked seamlessly with the Citrix solution that the Trust had implemented.

The feedback from clinicians is that they can successfully conduct surgeries, hold online consultation sessions, and prescribe and have prescriptions printed. There have been no breaks in service to the public.

Recommendation 19: The HSSF must be reviewed to ensure it is compatible with the standards on data interoperability in Recommendation 9, and not overly restrictive or complex, which could inadvertently create a barrier to entry for SMEs.

The social care market is very fragmented, with approximately 15,000 care homes in the UK[37], only 15 per cent of which are owned by the four largest groups[38] and 60 per cent of which are single-site operations[39]. To date, there is limited use of digital technology in the social care market with only 28-30 per cent of the sector using any sort of digital patient record[40]. Many of the smaller, independent social care providers have little or no support with procurement, and may struggle with purchasing the basic digital technology to meet the minimum digital functionality set out above.

Recommendation 20: Local authorities and ICSs should have a role in supporting social care providers with the procurement of the digital technology to meet the minimum digital functionality set out in Recommendation 8.

The core responsibilities of the NHS and social care sector are those which have a direct impact on patient care. Yet, inevitably, the NHS has to use digital services for other, non-core services, such as finance, HR or procurement. Healthcare organisations should distinguish between digital technology which is essential for patient care, and that which is used for non-core services. A variety of contractual models could be considered for non-core services. This adds to the talent available as well as delivering contractually maintained standards for those key elements impacting patient safety, reducing patient-facing staff time on inefficient bureaucracy and accessing value for money for the taxpayer arising from scale.

Recommendation 21: Purchasers should explore greater use of federations or managed service models, especially in those areas which are not core to health and care provision, such as digital technology for finance or HR.

There are some purchasing decisions that are best conducted as a win-loss procurement against a detailed specification, and others – particularly in the digital space – whereby partnership is required to achieve the best solution for patients and the taxpayer. Where there is true partnership and a clear common objective, flexible commercial models, such as risk share or gain share, could be considered. However, all too often these agreements have failed when one of the parties has not fulfilled their responsibilities.

Recommendation 22: There should be further exploration of innovative funding arrangements which allow for fairness, transparency and benefits for all parties. This could be a structure in which the majority of the negotiated fee is paid, and financial benefits split between the parties, based on agreed deliverables. Agreements that put a disproportionate amount of risk on one party should be discouraged.

Case study: Difrent Covid-19 Home Testing Kits

When the UK went into lockdown in response to Covid-19, NHS organisations were under immense pressure with 30-40 per cent of their staff in isolation due to key workers or members of their households displaying unconfirmed Covid-19 symptoms.

A testing solution was therefore required to help validate whether or not key worker households had Covid-19. This would allow key workers to return to work if they tested negative or follow appropriate isolation guidance should they test positive.

Together with NHSX, AWS, NHSBSA, Amazon Logistics, The Government Digital Service, NHS Digital, Office for Life Sciences, DHSC, and many other organisations, Difrent delivered the Coronavirus Home Test Ordering Service: https://coronavirus-home-testing.service.gov.uk/.

Difrent used a daily build, test, learn cycle, iterating the service through a series of private beta tests, until the service went live. The national Key Worker home testing service was launched within one month of the first conversations, and the service was soon scaled to allow members of the public to order home testing kits.

This also included the setup of an assisted digital service for users with access needs and a dedicated call centre with a feedback mechanism to help iterate the service around real user feedback.

What was achieved:

- 67 per cent of key workers could safely return to the frontline following negative test results.
- Key workers without access to a car could be tested from home.
- A robust, scalable home testing service in an agile way, with over 1 million users to date.
- A national service, including an assisted digital channel.
- Distribution of over 850,000 kits for over half a million orders.

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NHS Partners

Our thanks go to the following Chief Information Officers and Chief Financial Officers of NHS Foundations Trusts and NHS Trusts for their valuable input.

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Partner Directory

Angus Honeysett
Market Access Lead
Tunstall Healthcare

For over 60 years we have pioneered the development of technology that enables independent living and new models of care delivery, supporting more than five million people worldwide. We empower people, including those living with dementia, learning disabilities, physical disabilities, and long-term conditions, to live as independently, happily and healthily as they can.

As technology advances, we have the capability to not just react to events, but to predict and even prevent them using data-driven insights. This Cognitive Care approach provides an intelligent solution which connects services, helping to transform the way health and care is delivered.

Annie Meharg
Chief Commercial Officer
Kooth

Kooth is an innovator and the largest platform for digital mental health provision in the UK. Our mission is to make personalised mental healthcare available to all, by giving users access to therapeutic interventions such as content, activities, peer to peer functions and immediate access to qualified therapists. Our technology and clinical models allow users to direct their own way to mental health in a fully safeguarded environment. Today, Kooth products are free at the point of access to more than 6 million people, and is available as a Saas plus product to overseas organisations and governments.

Dom Raban
Chief Executive Officer and Co-Founder
Xploro

Xploro® is an award winning and clinically validated health information platform that uses augmented reality, gameplay and artificial intelligence to deliver health information to young patients, in a way which makes them feel empowered, engaged and informed, whilst having fun at the same time.

By putting health information in the hands of children, using language they understand and interaction paradigms that they are familiar with, we aim to reduce their stress and anxiety and improve their clinical outcomes.

Dr Guy Gross
Founder
Seacole Digital

Seacole Digital is focussed on enabling people who use care services to lead healthier, fulfilling and independent lives with dignity. We enable the digitisation of care homes and home care providers. We advise on a curated range of technologies that are proven to be interoperable, capturing the exhaust data to provide primary and secondary services.

Primary services directly impact the individual, such as AI driven alerts and safety monitoring. Secondary includes safety & efficiency reporting for providers of care, contract monitoring for commissioners, licencing requirements for regulators etc. We also provide a portal so family members are involved and assured.

Ian Spark
Head of Healthcare
WiFi SPARK

WiFi SPARK is the leading provider of patient-access WiFi in the UK. The company is the owner and developer of the unique SPARK® Platform which delivers the most flexible, feature-rich and scalable solution for guest-access WiFi on the market today. WiFi SPARK specialises in WiFi in the healthcare sector and provides services to over 50% of the NHS Acute Trusts. WiFi SPARK recently launched SPARK® Media, a revolution in patient entertainment, delivering TV, radio, educational content and more, directly to the patients' device of their choice. No other wireless network provider offers the same adaptability, span of features and return on investment.

Lee Francis
International Sales and Marketing Director
PatientSource Ltd

PatientSource is a whole hospital modular Electronic Medical Record hosted in the Cloud that is incredibly intuitive to use. The lead software developer is a still practicing Dr, our strap line is 'Designed by clinicians for clinicians'.

PatientSource is being used to run entire countries health provision such is its versatility. It is also being used by small but very specialised service providers in North London, PatientSource is the highly configurable solution for all use cases. Custom and bespoke modules developed to exacting client specification.

Able to be deployed 100% fully remotely, PatientSource is ideal for International implementations.

Partner Directory

Mat Oram
Chief Executive Officer and Co-founder
AdviseInc

AdviseInc is a leading health and social care analytics company, specialising in spend and supply chain analytics & insight for the health and social care market.

AdviseInc's Spend Analytics service is used across the UK, and our Product Price Benchmarking service covers 80% of the UK & growing internationally. We assist health and social care buyers around the world #MakeSense of £ billions in spend.

During the Covid-19 pandemic, we enabled over 200 Public Sector organisations to better understand their PPE in a product we developed early in the crisis called StockWatch, providing full visibility of demand and forecasts, enabling transparency and effective regional mutual aid.

Dr Murray Ellender MRCEM, MRCGP
GP, Chief Executive Officer and Co-Founder
eConsult Health Ltd

eConsult Health Ltd is the NHS's leading digital triage provider, founded in 2013 by GPs for fellow clinicians and NHS colleagues. eConsult facilitates triage in over 3,000 GP surgeries and to 28 million patients as well as internationally to the Ministry of Defence. In urgent and emergency care, eTriage has been enabling patient check-in, ECDS collection and automated digital triage within 5 minutes since January 2018 and across multiple UK hospital departments. Further triage services are currently being developed.

Oliver Wylie
Chief Executive Officer
Piper Health Ltd

Piper Health was set up to bring together a small team of highly experienced professionals, investors and entrepreneurs who have a consistent history of delivery and high growth in health services, medtech, insurtech, plus Locum and recruitment innovation. The combination of learned knowledge and expansive networks build unique strategies and relationships that deliver lasting value to all stakeholders. Piper Health uses extensive experience, a heritage of success, and proven formula to de-risk investment whilst supporting rapid growth of healthcare companies (Partners). Maximising returns for all parties.

Paul Gaudin
Founder and Chief Executive Officer
CareRooms

CareRooms provide a national network of carefully selected rooms with 1:1 care and optional Nursing/IV services. The homes are typically owned by retired healthcare professionals and are empty annexes or large spare rooms with bathrooms. CareRooms add their makeover and equipment.

After surgery, or simply a need for some respite care, our guests typically stay for 7 to 14 days before we settle them back at home. We then invite them to our local support groups to ensure they connect with their communities and reduce the risk of social isolation.

CareRooms, "building safe local communities who care".

Piyush Mahapatra
Director of Innovation
Open Medical

Open Medical is a clinically-led UK healthtech company developing cloud-based clinical pathway management solutions. We have disrupted- and enhanced- traditional Electronic Patient Records using bespoke agile software since 2013. Our mission is to provide responsive user-centric tech that reimagines the delivery of healthcare services. NHS Trusts chose us during COVID-19 to iterate our leading products at a critical time for healthcare coordination. We are partnered with 20 NHS trusts, facilitating 50,000 care pathways every month throughout the UK. Our products are recognised for thoughtful user interfaces and quality data inputs, serving the progress of patients through myriad care pathways to deliver excellent outcomes.

Rachel Murphy
Chief Executive Officer
Difrent

Difrent strive to make a positive impact on society. Our work affects the lives of millions of people across the world in a good way.

The secret to our success is within our talented team of experts, our proven agile delivery approach we've refined over time, and the tools we've chosen.

From transforming the recruitment experience across the NHS through a centralised, user-centred jobs platform used by millions of people, to fighting COVID-19 by getting key workers across the UK tested and back to the frontline quickly - Difrent enable organisations to solve complex problems and achieve big positive outcomes that meet the needs of their users.

Richard Cantlay
Global Head of Healthcare Facilities
Mott MacDonald

Mott MacDonald is a £1.3bn development, management, and engineering consultancy with a proven track record in the health sector. We use our ingenuity to create lasting value for all we work with. Our global business is multisector and multi-disciplinary delivering excellence in 150 countries, through over 16,000 local experts in 180 principal offices. We work with our customers to plan, design, procure and deliver projects on any scale; provide management consultancy built on technical know-how, shape and implement development policies and programmes; and advance sustainability. Our primary services centre around public health, healthcare consulting and delivery of healthcare infrastructure, all with a digital foundation.

Richard Jones
President and Chief Strategy Officer
C2-A1

C2-AI demonstrably improves COVID19 outcomes – reducing mortality/ complications. Mortality percentages ignore each hospital's case-mix. C2-Ai systems report patient-level, risk-adjusted outcomes in hospital care, identifying best practice, problems, root causes and solutions. The system is highly sensitive: standard hospital reporting typically provides visibility on only 10% of the issues tracked by C2-Ai.

This, with our systems for evidence-based surgical list triage and prevention of avoidable conditions, would save at least 70,000 lives, £1bn and [up to] 2m bed-days annually in the NHS (Digital Lead – DIT)

Ronnen Brunner
Vice President, EMEA
ExtraHop

ExtraHop's industry-leading analysis throughput and cloud support make Reveal(x) the only NDR solution that can credibly analyze all network interactions across the enterprise. The breadth of ExtraHop's analytic capabilities is matched by its depth and unparalleled in the market: each network interaction's complete transaction details are mined by our cloud-scale machine learning to produce high-fidelity detections and alerts. Going beyond detection, ExtraHop's investigations capabilities will allow the NHS Security teams to deliver far quicker time to resolution. ExtraHop Reveal(x) transforms the network into a comprehensive source of truth that takes you from insight to answers in a matter of seconds.

Sally Rennison
Vice President of Sales
Patients Know Best

Patients Know Best (PKB) is Europe's largest personal health record platform, enabling patients and healthcare professionals to access real-time health information - anytime, anywhere.

As the world's first patient-controlled personal health records system, PKB facilitates borderless, integrated care wherever the patient needs it. That means any healthcare provider, whether in another area of the country or another part of the world, can immediately access all the information they need to support improved clinical decision making and the best patient care.

Sean Kelly, MD
Chief Medical Officer
Imprivata

Imprivata®, the digital identity company for healthcare, provides identity, authentication, and access management solutions that are purpose-built to solve healthcare's unique workflow, security, and compliance challenges. Imprivata enables healthcare securely by establishing trust between people, technology, and information across the increasingly complex healthcare ecosystem. For more information, please visit www.imprivata.com

Simon Applebaum
Managing Director
Spirit Digital Limited

Spirit Digital are a Leicester based SME that are supporting healthcare providers to keep patients out of hospital with deployment of their award-winning flagship product, CliniTouch Vie.

Using CliniTouch Vie, patients record an array of vital signs and complete condition-specific question sets which are automatically fed through our algorithms to generate a risk score that enables clinicians to prioritise their caseload and manage increased patient numbers. The platform can support an array of long term conditions and offers video conferencing, messaging, education and rehabilitation as part of a complete remote monitoring solution.

Partner Directory

Simon Swift
Managing Director
Methods Analytics Ltd

Methods Analytics is an end to end data services company with recognised success across public and private healthcare using analytics to enhance effective clinical decision making.

We start by understanding the problem, what data is available to inform and what data science/ML/AI approaches are available to develop intelligence to help a decision maker choose this way, instead of that way. We build enterprise environments, data pipelines and pretty data visualisations so the insight is intuitive. Then we sit down with you and work out what it means in the context of the requirement and therefore what to do.

Dr Stan Shepherd
Chief Executive Officer
Instant Access Medical Ltd

MyPCR, is our citizen-held, life-long, comprehensive, multilingual, personal care record in the Cloud and mobile devices.

MyPCR enables the best healthcare outcomes for citizens, at the lowest costs for providers, insurers, and employers.

MyPCR is updated directly by citizens and clinicians, and automatically from electronic record systems, remote devices, wearables and IoT.

MyPCR creates unique, evidence-based personal care pathways with personalised interactive alerts and reminders for actions to take to get your best health outcomes, including long term conditions, immunisations, and cancer screening.

Vincent Buscemi
Partner and Head of Independent Health and Social Care
Bevan Brittan LLP

Bevan Brittan is a UK-Top 100 national law firm providing a comprehensive range of legal and advisory services as well as being a market-leading firm within health and social care, housing and local and central government.

Our Digital Health legal and regulatory team are experts in supporting clients in the delivery of new technology within health and social care. We provide a comprehensive range of legal and regulatory support across health and social care including corporate and commercial, property and construction, healthcare and regulatory law, employment and business immigration, health & safety and information governance.

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Tech4CV19

Tech4CV19

Tech4CV19 is an open and growing community with over 1000 change agents who have united under a common ethos, vision and mission to harness their collective ability to accelerate responses to the challenges and transformation of health and social care through the application of technology.

The community is highly diverse covering all aspects of health and social care from commissioners, providers, experts, vendors and innovators across the public, private and voluntary sectors.

The Tech4CV19 mission is to help direct health and social care tech offers to where they are most needed, ensuring that they are professional and trusted offers.

We believe that:

- The whole can be greater than the sum of the parties. We can achieve greater parity and eliminate duplication of effort by coming together collaboratively to solve a problem and produce a holistic solution, rather than working independently or overtly competitively.
- A balanced ecosystem optimises benefit for all. We seek to create the opportunity for all to contribute and play their part, large and small, in our social and economic recovery.

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