



Report

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Joint report on international success factors for adoption and use of digital health in the US and NHS England

A collaboration between NHS England and
US Department of Health and Human Services



Contributors

Karen Hillier	Health and Social Care Information Centre
Lisa-Nicole Sarnowski	US Dept. of Health and Human Services
Chitra Mohla	US Dept. of Health and Human Services
Lisa Franklin	NHS England
Di Millen	NHS England
Rafael Goriwoda	NHS England

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HSCIC Benefits Realization Team
ONC Office of Programs and Engagement
ONC Office of Planning and Evaluation
ONC Office of the Chief Privacy Officer

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1. Introduction and purpose

This publication sets out the findings of a collaborative work program undertaken between the US Department of Health and Human Services, NHS England and the Health and Social Care Information Centre; to investigate ‘what good looks like’ in terms of the successful adoption and optimization of digital care records for patients. While technology is evolving, particularly in terms of usability, this report focuses on the steps providers can take to ensure successful adoption and maximize technology utility. It is hoped that this report and its supplemental materials may be used by providers of care services to accelerate the adoption process, educate the workforce, and enable provider replication of best practices in order to mitigate common challenges.

1.1. Context

The NHS in England and the United States Government have both been investing in digital health, including digital care records, as a foundational element of delivery system reform. In the US this grew from the creation of the Office of the National Coordinator for Health IT (ONC) in 2004 together with supporting investments; most notably the CMS (Centers for Medicare & Medicaid Services) Electronic Health Record (EHR) Incentive Program¹, commonly referred to as “Meaningful Use”, established under the 2009 Health Information Technology for Economic and Clinical Health (HITECH) Act. Meaningful use is using certified electronic health record (EHR) technology to:

- Improve quality, safety, efficiency, and reduce health disparities;
- Engage patients and family;
- Improve care coordination, and population and public health; and
- Maintain privacy and security of patient health information

The EHR Incentive Program was intentionally staged to enable both providers and the wider digital health market to ensure that healthcare organizations and technology were able to ‘thoughtfully adapt’ to the changing landscape, focusing on quality of care with the patient at the center. Meaningful use of interoperable digital health continues as a cornerstone in these delivery system reform efforts, and is supported by the Medicare Access and CHIP² Reauthorization Act (MACRA) of 2015³.

In the UK, the commitment to digital health transformation is overseen by the National Information Board⁴ (NIB) whose aim is to put data and technology safely to

¹ [EHR Incentive Program](#)

² Children’s Health Insurance Program; US Department of Health and Human Services, 2009.

³ [MACRA 2015](#)

⁴ [National Information Board](#)

work for the benefit of patients, service users, citizens and the caring professionals who serve them and; to help ensure that health and care in England is improving and achieves sustainability. The NIB is charged with developing the strategic priorities for data and technology in health and care in order to deliver the maximum benefit for all citizens and patients, and to make appropriate recommendations for investment and action. In November 2014, the NIB published its framework for action; 'Personalised Health and Care 2020: Using data and technology to transform outcomes for patients and citizens'⁵. Initial modelling indicates that digital transformation could contribute to potential savings in the NHS budget by 2020/21⁶.

1.2. The work program – what does good look like?

The work program comprised a literature review on good practice of digital health adoption as well as a series of case studies across both countries. This publication summarizes these findings, paying particular attention to the human and behavioral factors of adoption that determine 'what good looks like'. Specifically the aims of this program were to:

- identify factors that contribute to the successful adoption of digital care record systems including workforce competencies,
- generate learning which would be applicable across both countries, and;
- summarize a set of approaches and tools from both countries that support the adoption of digital care records.

As each country's policies and care models differ across each health system, a few points of consideration for the reading of this report are set out below:

- The term 'provider' will be used throughout the document to refer to organizations, clinicians, and non-clinicians of all levels at the point of care delivery.
- While the US uses the term 'electronic health records' and 'health IT', for the sake of consistency we have referred to these terms as "digital care records" and "digital systems", respectively.
- Irrespective of terminology and business model differences, the patient experience at the point of care holds a high level of similarity, allowing for transferable knowledge to be applied to both system workflows and practices.
- Throughout, the principles of benefits and change management are intrinsically known. Each country may indeed use different models, yet the essence of change management techniques are pre-supposed and although mentioned in brief, are not expanded in detail.

⁵ Personalised Health and Care 2020: A framework for action. National Information Board, November 2014

⁶ National Information Board: Delivering the Five Year Forward View NIB 0607-006 June 2015



- Although there are variations between market landscapes, each country is focusing on increased patient engagement and empowerment, rewarding providers for related quality and outcomes of care.
- Case study selection was taken from existing mature providers and programs in both countries. This included exemplars from the US Regional Extension Program (REC), and a selection of high performing NHS organizations. Interviews were conducted on all sites with qualitative analysis performed to uncover common areas deemed to be key in successful adoption.
- Existing work being undertaken by the US and UK as part of a European project⁷ was also considered. This addressed the workforce competencies required amongst health workers for the successful use of digital systems.
- In addition, Government schemes such as the US EHR Incentive Program and the Integrated Digital Care Records program in the NHS were examined in order to understand the push and pull factors of organizational change.

⁷ Memorandum of Understanding between US and European Commission on Health IT, 2010

2. The evidence: processes, systems and people

2.1. What does good look like – international evidence

Using digital care record systems in a meaningful way has the potential to help providers offer higher quality, safer care as also outlined in the World Health Organization's six dimensions of quality⁸, and create tangible improvements to care delivery, allowing them to:

- Make better clinical decisions with more comprehensive information readily and securely available
- Provide more effective, coordinated care across multiple provider settings
- Increase efficiency through enhanced practice management and communication

These principles also align with the 2013 ONC funded Urban Institute report: Lessons from the Literature on Electronic Record Implementation⁹ which draw on traditional change management practices, and indicate the following;

“To promote the EHR implementation and optimization process, planning and modifications are continually needed to address technological, professional, and organizational perspectives. While this review included optimization as a step in the implementation process, one important lesson is that optimization is an ongoing process that needs to be incorporated into each organization's structure and culture. Practically, organizations that successfully implemented EHRs did a number of things early on, such as:

- Engage staff at all levels
- Invest in workflow analysis and careful redesign in order to customize and effectively integrate new technology among users
- Design systems for quality improvement and implementation and information exchange
- Allocate resources for ongoing maintenance and technical support of the system, system adjustments, and continual staff training and engagement

Providers can face significant issues in implementing an EHR system, including cultural, administrative, financial, operational, technical, and infrastructure challenges. Design strategies to mitigate these challenges should be made right at the start of the program. An unprecedented window of opportunity exists at

⁸ [Six dimension of quality of care: WHO](#)

⁹ Urban Institute report: Lessons from the Literature on Electronic Record Implementation, August 1, 2013. [A systematic review of literature on health IT implementation](#)

these early stages to address challenges to implement and meaningfully use electronic records for our patients.”

International studies^{10,11} have also looked at a number of high-performing providers and their success criteria. These have included providers that have had access to applications that were tailored to business and clinical needs, with patient care as the central focus. The current push points towards person-centred care in an effort to reduce cost and improve quality, targeting areas such as readmission prevention and self-care, with digital technologies being an enabler for transforming care delivery. Studies also suggest that the design phase of digital health systems, particularly for those that provide common purposes (i.e. administrative and clinical, emergency care and management of long-term conditions etc.) are often the most challenging. When we look at usage and design, it is clear that adoption needs to be driven by clinicians where significant benefits can be articulated for themselves, their clinical and administrative teams and for patients.

This evidence^{12,13} initially suggests that successful adoption is more likely to be achieved under a number of conditions and key pre-requisites including the following:

2.2. Key learning points

2.2.1. Conditions

- Where digital systems were designed for specific clinical areas, or to improve clinical practice in the treatment of a given condition;
- Where digital systems provided sufficient, correct and appropriate data for departmental applications (e.g. level of completeness and detail); and
- Where digital systems supported clinical workflow, offering ease of use and increasing administrative efficiency (freeing up more time for direct care).

2.2.2. Pre requisites

- Financial incentives to invest in digital systems: providers may be reluctant to invest or continue investing in systems unless they are convinced that the financial and non financial benefits to themselves or their performance outweigh the costs. A benefits plan should be drawn up at the outset and regularly tracked;

¹⁰ DesRoches et al 2010: Electronic Health Records' Limited Successes Suggest More Targeted Uses, *Health Affairs* 29(4), p639-646

¹¹ Coiera 2011: Do we need a national electronic summary care record? In *Medical Journal of Australia* 194, p 90-92

¹² Al-Shorbaji 2013: Is there and do we need evidence on eHealth interventions? *IRBM* 34, p24-27

¹³ Angst, Deveraj and D'Arcy 2012: Dual role of IT-assisted communication in patient care: a validated structure-process-outcome framework, *Journal of Management Information Systems* 29(2), p257-292



- Organizational capacity to implement common standards and share expertise – this may be easier for larger and more integrated systems;
- Time for clinicians to familiarize themselves with the system and its applications, coupled with the availability of easily accessible on-going training and learning support;
- Meaningful engagement with clinicians and practice staff through different channels throughout development and deployment; setting out and communicating a clear vision of the goals and benefits;
- Specification of the digital system to be driven by clinicians (where possible with input from patients) and their need for applications, rather than by what is technically possible, but not being overly prescriptive initially so as to allow for local innovation and ensure that the system can adapt to future improvements.

3. Case study findings

As part of this work program several interviews were undertaken with organizations who had achieved a significant degree of success with digital health record adoption, albeit through taking different approaches. The case studies spanned both acute and community systems with the focus being on ‘user-adoption’; identifying the means to be able to actively use the system effectively and efficiently; as opposed to initial success in deployment. This work therefore examined behavioral and business aspects, which helped to describe a range of factors of what it was that made certain providers experience successful implementation and optimization of digital health technology. The case study evidence found that effective adoption of digital systems required a certain level of adaptation and integration to serve local needs. As identified in both US and UK case studies and from wider research, the main purpose of deployment was to initially improve processes and workflow (and thus delivery of care). However, the providers often found that they required much optimization or customisation to deliver the benefits originally planned for and implementation was a smoother process when front line staff were involved throughout but particularly when involved early in the initial design process.

Reduction in wasted time and effort in the delivery of care, through to having improved access to information, remained a common desired outcome across all sites. Specifically, the UK providers reported that instant access to digital care records had reduced the number of unnecessary duplicated tests and assessments, and negated the need to re-do tests or ask the same questions from within the team. It was felt important by a number of sites to break down their implementation strategy into a set of clear objectives and milestones that could be communicated and achieved within a given timeframe and to engage with staff early on to agree specific benefits, and understand who the benefit owners were.

A number of UK case study providers noted that they expected to reduce wasteful and disruptive patient movements throughout the hospital. Digital systems that updated all relevant patient information in real-time allowed practitioners to spend more time on direct patient care, with locally configured systems facilitating more efficient handover of information between shifts.

The digital systems at most of the UK sites were often typically designed to give clinicians a ‘one-page overview’ of the most relevant information about the patient. Clinicians also stressed the importance of visual reminders (flags) on-screen which summarized information that required their attention. For instance, such ‘flags’ could:

- point to abnormal test results that require action
- provide information about drug-regimes
- provide a quick overview of essential patient characteristics (e.g. whether or not a woman on the maternity ward is deemed high-risk)
- remind nurses in the Emergency Department of who was waiting for a test or where results were being awaited.

Together with the option to access background information such as clinical guidelines and professional evidence, it was felt that a well-designed system should be able to organize relevant information for clinicians and through the use of visual flags, help them to prioritize and coordinate care pathways.

All of the UK case study providers interviewed agreed that clinicians were more ready to engage with new systems if they believed they had the potential to improve patient care and were presented with a clear business case and studies that provide solid evidence and benefits.

In the US, similar evidence was collated via an existing program of work comprising 62 Regional Extension Centers¹⁴ (RECs) established by ONC. The RECs, located in every state of the US, offer support to providers as they navigate the adoption and meaningful use of interoperable digital health systems to improve the delivery of patient care. Within these cases a number of stories were uncovered where interoperable digital health solutions were used to improve patient care:

- In continuing to help patients with diabetes, ischemic vascular disease, and coronary artery disease lower their LDL cholesterol levels, a hospital developed a digital tool which enabled providers to create lists of patients with high LDL cholesterol levels who were due for a cholesterol check. Providers can use these lists to implement targeted LDL lowering interventions. The utilization of the digital health record system therefore allowed the hospital to access the information it needed to improve provider performance and health care quality.
- A one-physician family practice implemented e-Prescribing to generate, submit, and manage prescriptions electronically. The application of e-Prescribing enabled the practice to efficiently track its patients' prescriptions and the practice's digital record system allowed providers to query insurance formularies to ensure prescribed medications were covered by insurance. These changes helped the practice reduce costs for its patients and increase medication adherence. Due in large part to e-Prescribing and leveraging meaningful use to improve care, the practice has seen a 47% increase in diabetes medication adherence and a decrease in hospital readmissions amongst its patients.
- A community hospital developed and built the Million Hearts¹⁵ application into their digital health record system which is focused on the "ABCS" guidelines of clinical prevention (**A**spirin when appropriate, **B**lood pressure control, **C**holesterol management, and **S**moking cessation). Now, when one of the hospital's providers enters a diagnosis related to heart disease or stroke, the system's clinical decision support rules automatically bring up the Million Hearts application. With the Million Hearts guidelines on the computer screen, the practice is also better equipped to educate its patients and can quickly show them how their own health data compares to the Million Hearts data for

¹⁴ [Regional Extension Centers](#)

¹⁵ [Million Hearts® initiative](#)

blood pressure, cholesterol, and smoking status. Physicians now use their digital health systems as interactive tools to bring patients into the care delivery process as active participants where they can easily view the screen and see their measures in real time along with other providers.

Practice in both countries suggests that successful adoption also depended on a number of change management approaches including that of effective leadership, communication of the vision, a clear strategy, capability development, benefits planning and management, and training provision. In particular, the REC studies identified role, culture of continuous improvement, and personality of the leadership team to be important with the need for strong and positive advocates during implementation. In a small organization this could be a medical champion or office manager; in larger organizations; this may be a Chief Medical Information Officer (CMIO) or its equivalent. It was also deemed instrumental when the Champion or Leader was a member of the Board and could more easily gain support from other Directors. UK studies also found that where efforts were made on aligning the digital health strategy with wider corporate objectives, there were fewer problems with consensus and agreeing the way forward both strategically and operationally.

“To be fully accepted by staff, the digital record system needs to demonstrate that it can deliver visible benefits, in particular, outcomes and patient safety”

Acceptance of change takes time and a systematic reinforcement of the positive benefits of technology use is needed. While leadership and buy-in at management level was important, it is crucial “to ensure that different groups of staff at different levels also had that buy-in”. In particular, encouraging open discussion and debate to identify and include those who are skeptical or are likely to resist change, can be effective: “If you win over those who resist initially, they are often the most enthusiastic in the end.” Indeed, case study evidence suggested that ‘early skeptics’ (who became converts) could be very useful in key adoption phases. By encouraging engagement early on and addressing concerns, the digital record system can be better adjusted to clinical needs and ensure that they clinically-driven solutions for improved care rather than technically-driven tools that do not fit well within the complex environment of care provision¹⁶.

The majority of the UK providers interviewed had made a deliberate effort to adapt systems to their local needs. It was noted how important it was to take clinicians to site visits to learn how similar systems were being implemented and used elsewhere and then to involve clinicians in designing ‘their own’ local version. Other case studies agreed that localization led to a sense of ownership by the staff and ensured that the features of the system were designed to fit with local workflows.

In contrast, there were examples where different services within organizations found it difficult to adapt to usage of the same shared design. This highlights the differences in complexities of workflow and need for tailoring within each area.

¹⁶ O'Malley et al 2010: Are electronic medical records helpful for care coordination? Experiences of physician practices, *Journal of General Internal Medicine* 25(3), p177-185;

These differences in ways of working can mean that successful adoption of interoperable digital health systems may be achieved with varying degrees of customization to adapt or optimize the system to meet practice needs. A customized system needs to be designed with the local technical team and clinicians working together with the system supplier, i.e. to determine what information is recorded and when, as well as how it is displayed by the system. It is important to think through the workflow separately for individual areas and identify who needs to see what information, and at what point in time. This stresses the importance of flexible and agile developments, even if at first, this appears to introduce inconsistencies. One way to get a balance between core functionality and local adaptation is to underpin local design with a common portal or hub. For instance in one hospital a core framework was procured and allowed departments to adapt this in partnership with the supplier to meet local workflow and practice needs. In another study, one system consisted of a core portal which pulled a common clinical dataset to a front page, but also allowed end users to navigate to specialist, departmental systems. Certain functions also offered limited customization which could be tailored to meet practice needs (i.e. choice of templates). Discussions also uncovered a need for easier data capture with better user interaction and access to tools, as opposed to just being presented with a catalogue of available templates or terms. However, this was often difficult for providers in both countries due to both organizational and technical constraints. It is worth noting that the desire to customize appears to be more specific to the UK supplier market and is often not the case in the US.

The use of interoperable digital health inherently requires continuous evaluation and improvement, achieved by agile and post implementation reviews. This enables organizations to continue improving workflows to achieve organizational goals by leveraging the functionality of the system. Post implementation reviews and periodic evaluations help to shape efficiencies and identify benefits, whilst increasing staff and patient satisfaction. This also provides a mechanism for staff participation in internal quality improvement initiatives.

3.1. Key learning points

- Systems should provide sufficient, correct and appropriate data, striking a balance between structured and free text entry.
- Specifications should be driven by clinicians based around their need for applications, the need for agile development to ensure the system can adjust to future requirements.
- Infrastructure and standards are critical to promote interoperability and effective use.
- Allocate resources for ongoing maintenance and development of the system with an agreed process for identifying and prioritizing change requirements.
- To maintain ongoing staff training and development as the system develops, also channeling feedback and training for change requirements.



- Post implementation review and user stories of successful adoption are important to staff satisfaction and ongoing adoption.
- Effective contracting and supplier management is key, having the flexibility in the IT contract to enable efficient modifications to the system on an on-going basis.

4. Data sharing and interoperability

Analysis of past evidence has identified common patterns of practice which have affected adoption rates and system usage, and have highlighted the need for intervention around user-interface design, data input and data sharing. The key points related to:

- Incomplete record-data entry: This poses a risk for patient safety; “absence of evidence is not necessarily evidence of absence”¹⁷. Even relatively simple systems may include incomplete data.
- Misaligned input of data: System structure needs to be suited to address different pathways and scenarios; as opposed to having a one data-structure fits all approach; but also needs to be interoperable. Structured data fields which are limited by the type of information they allow (i.e. using check boxes or drop-down lists) tend to be most suited for performance or quality reporting¹⁸, and can also be useful in designing automatic alerts and similar decision support mechanisms, e.g. reminders for regular checks for people with long-term conditions or when checking for counter-indicated drugs in emergency situations. However, this type of data capture is still often burdensome and restrictive for clinicians and can be a challenge in the adoption or ownership of the system.
- Changes in technology: This may cause obsolete functions in the system. Skills and knowledge in the workforce are needed to find local innovative solutions to problems¹⁹.
- Information being accessed and used by more than one clinician or team at a time: Digital health record systems also need to be effectively interoperable to ensure this, seeing real-time updates from different disciplines²⁰. Interoperability is key to enable providers to obtain a holistic view of the patient and engage that patient in their care²¹.

Broad adoption of digital health will require that health information can be easily and appropriately shared to support multiple uses. An interoperable digital health ecosystem makes the right data available to the right people at the right time among disparate products and organizations in a way that can be relied upon and meaningfully used by recipients. The US Department of Health and Human Services

¹⁷ Coiera 2011: Do we need a national electronic summary care record? In Medical Journal of Australia 194, p 90-92

¹⁸ Kern and Kaushal: Interoperable Electronic Health Records and Quality of Care

¹⁹ Van Heerden et al 2012: [Point of care in your pocket: a research agenda for the field of m-health](#), Bulletin of the World Health Organisation 90(5)

²⁰ DH 2012: The Power of Information

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/213689/dh_134205.pdf

²¹ Frankel et al 2013: Sustainable health information exchanges: the role of institutional factors, Israel Journal of Health Policy Research 2 (21)

(HHS) and ONC defined interoperability in the Connecting Health and Care for the Nation: A Shared Nationwide Interoperability Roadmap Draft Version 1.0²² released in January 2015 as the ability of a system to exchange electronic health information with and use electronic health information from other systems without special effort on the part of the user²³. In the United States, several barriers inhibit use and interoperability of digital health systems which must be overcome rapidly. Barriers include:

- Proprietary vendor or health care system interests;
- Workflow challenges in automating health information;
- Differing, or lack of understanding of, policies and laws governing health information sharing;
- Fragmentation of the health care system; and
- Disconnection between the health care system and key social service providers.

As such, interoperability is a shared agenda that takes a collaborative effort by government, the private sector, health care providers and other stakeholders, focusing on several critical building blocks to build towards a nationwide interoperable health information infrastructure. At this time of publication, within the 'Interoperability Roadmap', these interdependent, critical building blocks have been categorized as follows:

- Core technical standards and functions: Includes consistent data formats and semantics, standard secure services, consistent secure transport techniques, accurate identify matching and reliable resource location.
- Certification to support adoption and optimization of digital health products and services: Includes stakeholder assurance that digital health is interoperable.
- Privacy and security protections for health information: Includes consistent representation of authorization to access health information, consistent representation of permission to collect, share, and use identifiable health information, verifiable identity and authentication of all participants and ubiquitous, secure network infrastructure.
- Supportive business, clinical, cultural and regulatory environments: includes rules that govern how health and care is paid for, empowering individuals to be active managers in their health and care and enabling providers to partner with individuals to deliver high-value care.

²² [Nationwide Interoperability Roadmap](#)

²³ Derived from the Institute of Electrical and Electronics Engineers (IEEE) definition of interoperability

- Rules of engagement and governance: Includes a shared governance of policy and standards that enable interoperability, as well as ongoing coordination and collaboration about change.

In simple terms, this means all individuals, their families and their health care providers will have appropriate access to digital health information that facilitates informed decision-making, supports coordinated health management, allows individuals and caregivers to be active partners and participants in their health and care and improves the overall health of the nation's population. 'The Interoperability Roadmap' identifies near-term and longer-term goals working towards a nationwide interoperable infrastructure by identifying incremental milestones over the next few years.

In the UK, the overall vision of the strategy for interoperability is underpinned by the principles; 'right data, right place, right time'. It is driven by two key objectives:

- a) By 2018 clinicians in primary care, urgent care and emergency care and other key transitions of care contexts will be operating without needing to use paper records;
- b) By 2020 all patient and care records will be digital, real time and interoperable.

In practice this means that information flows with the patient or service user, that practitioners and the public have access to their information, and that improved digital transfer of information improves the delivery of health and care. As described above, individuals, caregivers and professionals will be able to send, receive, find and use digital health and care information in a manner that is appropriate, secure, timely and reliable without any additional effort on the part of the recipient.

These efforts will support the NHS and social care to make progress towards securing improved outcomes for patients, citizens and caregivers through the sharing and joining up of information, integrating care, improving outcomes and delivering a digitally enabled health and care system. Similar to the US Interoperability Roadmap, this also needs to be underpinned by a series of essential building blocks which are summarised as follows:

- The development and adoption of digital data standards and functions that enable information sharing as part of a coherent interoperability strategy.
- The development of a supportive health and care system through appropriate investment, prioritization and the alignment of levers and incentives to ensure that the benefits enabled by information technology are identified and optimized.
- The development of an approach that supports localities and enables them to plan their own route to a paperless health and care system
- The development of a learning culture that supports local innovation and delivery



- The building of effective leadership and capability to drive digital across the health and care system.

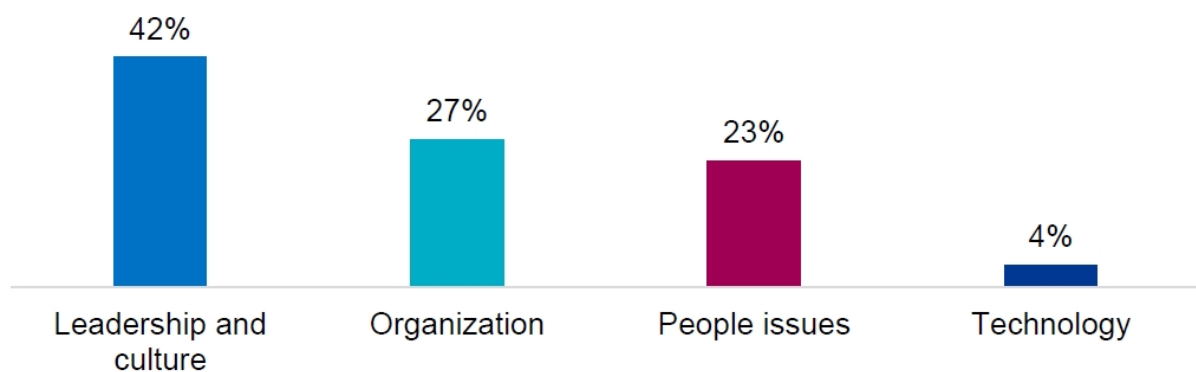
To ensure transparency on progress towards being paper-free in 2018 and 2020 a Digital Maturity Index²⁴ is being co-produced with the health and care sector. This will enable individual providers and health and care economies to baseline and benchmark their current position and mark progress.

²⁴ [Digital Maturity Index](#)

5. Digital workforce competencies

Technology is a means to an end whose adoption is reliant on the ability of the care team members' ability to use it as an effective and efficient tool in patient care. Sometimes the technology itself simply does not meet the needs of the end user, leading to a need for workarounds, constrained innovation and maturation of products prior to being able to be fully utilized. As such, implementation and design of digital health technology is only part of the picture and alone will not result in the realization of benefits associated with meaningful use and full adoption. Sometimes the greatest barriers to successful adoption are associated with training people and/or cultural issues and not the technology.

Figure 1: A chart showing the attributed barriers to successful adoption²⁵



The expanding role of health information to improve patient outcomes means that all health care providers, patients, consumers, commissioners and policy makers need to rely increasingly on technology use and data generated from digital health systems. It therefore follows that standardized input of and access to this data is fundamental to the effective functioning of the health care system and the validity of its data.

Whilst all health workers need a core set of digital competencies to enable them to work safely, effectively and efficiently, there are significant variations in the extent required for different job roles and therefore point to a need to identify targeted ongoing education, training and development needs which recognize the potential impact on the skills of the workforce that could come about as a consequence of digital systems deployment.

5.1. Levels of competence

A number of digital health related competency frameworks already exist in the US and individual EU countries. The EU-US eHealth Cooperative Initiative²⁶ has

²⁵ Source: Jim Markowsky, Organizational Dynamics

²⁶ [HITCOMP – Health IT Competencies](#)



provided an important framework within which the use of job roles, as opposed to job titles, to enable transferability to other organizations and different care settings. Roles however can also be hybrid in nature and require a mixture of competencies at different levels. The framework is designed to support this flexibility in the identification of competencies required for individuals and teams. This means individuals can potentially acquire not only “technical” capability but also expertise in leadership and management related knowledge.

We need to ensure we have sufficient specialist capability in the right place; with the knowledge, skills and experience necessary to meet successful adoption of systems but we also need to ensure every role in the competency model inherits “baseline skills” that are essentially needed by everyone working in a healthcare system regardless of role. The framework goes further to describe skills required at other levels such as clinical, non-clinical and from basic to expert.

There may also be opportunities to modify language and terminology within the framework to ensure accessibility and meaning to regional and national workforces. The competencies and competency profiles could be used to design educational programs and to indicate the suitability of existing learning and development opportunities for individuals and groups of staff.

5.2. Competencies and skills needed

Based on the competency frameworks that already exist in the US and individual EU countries this program has synthesized the competencies thought to be most crucial for successful adoption:

5.2.1. For Board members (Found in health systems, larger practices and hospitals):

- Understand the critical role of information and IT in the delivery of safe, effective and efficient delivery of healthcare and to the business, ensuring that local strategies are fully aligned, with informatics a golden thread that connects them all together
- Promote a clear vision of the future state and the benefits for patients and staff
- Provide strong and visible leadership and act as champions for IT enabled change
- Specify their business and information needs and interpret and challenge the data and information presented to them and use this as the basis for decision-making
- Understand the risks and issues associated with the use of information systems and ICT as well as the benefits and ensure these managed appropriately

- Advocate transformational change programs rather than IT projects and identify and address the cultural and behavioural barriers to change and new ways of working with appropriate levels of investment and priority
- 'Walk the talk' – are confident users of information and ICT and model the behaviours needed of the workforce.

5.2.2. For informatics leadership function (CCIO/CMIO/CNIO and CIO):

- Seen as a partnership between the CIO (or equivalent) and the CCIO/CMIO/CNIO
- Skilled in communication and engaging with peers and colleagues to sell the benefits of informatics and secure involvement in design and development
- Able to win the hearts and minds of staff across the organisation
- Set out clear objectives and benefits that build on the corporate (Board) vision; and plans that have included input from a diagonal slice of stakeholders
- Demonstrably listen to users and responds appropriately
- Cognisant of the importance of effective communications and the avoidance of "geek speak"
- Foster productive working relationships with system suppliers
- Ensure adequate levels of staff and expertise and is committed to building and developing (or commissioning and requiring) excellence in the informatics workforce
- Skilled in project and program management to ensure delivery according to plans and within budget
- Provide high quality customer support and help desk facilities
- Plan effectively for training of staff at the right time and to the right level.

5.2.3. For clinicians:

- Understand the risks, issues and benefits of using IT systems in health and care delivery
- Possess the knowledge and skills to use information and IT with confidence
- Actively contribute to the development and deployment of information and IT systems and represent the patient as well as the professional perspective at all times
- Able to review and recommend changes to a care or business process enabled by information or ICT
- Handle and share data and information safely and securely and understand the implications of poor data quality

- Demonstrate good practice in the creation, use and storage of electronic health and care records and adhere to agreed standards
- Routinely share information with patients and use information and IT effectively in the consultation
- Identify the barriers to successful informatics enabled change and how each barrier might be tackled or prevented through the use of effective change management techniques and good practice.

5.2.4. For patients:

- Understand how accessing reliable health information online can empower them to take greater control over self-management of their own health and engage in a more informed dialogue with health professionals²⁷
- Have the capability to communicate with their primary care provider on-line, for example to book appointments and request prescriptions
- Understand medical terms and language²⁸
- Understand how their digital care record documents their history, treatment and care plan and how they can share this information with others.

5.3. Building a capable workforce

We have found that the culture and leadership of the organisation is absolutely essential in terms of making for a stable workforce with teams needs to have an optimum skill-mix to be able to execute change. Whilst continuous improvement remains evident during the course of adoption, the retention of related skills and local expertise was deemed a key in this process.

Ongoing training is also found to be critical as opposed to one-off courses, which were found to be ineffective. Training needs to be embedded into departmental workflow and inductions. Furthermore, a core set of competencies including information input and retrieval skills, security, confidentiality and quality management; and some knowledge of project and benefits lifecycles are also seen as essential. Extra skill-sets should also be provided for according to clinical level of use and for specialised system use.

The continuing transformation of the health and care environment through the use of digital systems, and through the increasing reliance on data and information to promote personalized care, highlights the importance of investing in workforce competence and capability. Yet this also highlights the need to strengthen the essential knowledge and skills required by citizens, patients and caregivers so they are able to exploit the benefits provided by online access to their records and the use of applications in managing their health and care. In the UK, this forms part of the National Information Board's strategy which is addressing the digital challenges

²⁷ [Improving Digital Skills Report](#)

²⁸ [Health Literacy Report](#)



experienced by different groups in society building on the work from the Widening Digital Participation Programme.

5.4. Key learning points

- The greatest barriers to successful adoption are associated with people and cultural issues and not the technology.
- All health workers need a core set of competencies (outlined in baseline skills). Extra skills are required at other levels such as clinical, non-clinical; from basic to expert i.e. analytical, project or change management skills.
- Competency frameworks in themselves have limited value. Practical tools are required to help users identify competencies required and then to understand how gaps can be filled.
- As well as building a confident and capable workforce, there is a need to recruit and develop professional information and IT specialists to identify and implement local solutions to problems.
- Clinicians may need to be supported to develop informatics specialist skills and to undertake leadership roles working closely with CIO/CMIO/CCIO/CNIO partners.

6. Conclusion

The findings from this work program have been synthesised into a set of essential attributes which can be used by organisations to consider when embarking on a digital health transformation program. These are derived from the key learning points addressing cultural aspects, workflow design, and workforce competency and leadership qualities. All of these attributes require significant initial and on-going effort, often with delayed but ultimately positive results. Our findings were clear in that there were a number of factors which were seen as pre-requisites (must have's) and others which, although still essential, could not work without the former. For example, core standardised infrastructure was seen as one of the 'must have's', whilst localised workflow design although extremely important, would not be possible without the other. In piecing together these critical factors, a distinction between them was made; the 'must do's' were labelled Primary Attributes, with the others being labelled as Secondary Attributes, yet all still being essential .

The synthesised findings are set out overleaf, which taken together with the accompanying toolkit comprising materials from both countries, can support both those who are early into their digital journey as well as those who are more advanced on their path to digital care records.

7. Essential attributes of successful adoption

7.1. Primary attributes

Need to be in place before the secondary attributes, and remain so throughout the development and continued use of the system.

- **Ownership and inclusiveness needs to be felt by all staff, with support for patient care as the central focus of the deployment and genuine leadership commitment.** This needs clear and regular communication across the whole workforce and transparency and realism around timelines and outcomes. A culture of trust should be developed throughout the development and continued use of the system. Consider the needs of patients, engaging with them as well as clinical and administrative staff. Take time to pause, and get it right.
- **A solid core standardised and reliable infrastructure is imperative** (i.e. networks and databases) which is able to support clinical and reporting requirements. Standardised, secure, uniform interfaces, reports, and templates across the organisation are important to ensure consistency in information aggregation and reporting. Local customisation has proved to be key to successful adoption.
- **Establish and maintain a strong working relationship with the vendor/supplier.** Work together to establish a fair contract and ensure the product meets organization and/or practice needs, ensures accessible interoperability, and identify opportunities such as participating in user groups to both learn and provide feedback to vendor/supplier to influence and inform future developments.
- **Interoperability with other systems is imperative.** Patient information must be able to flow freely among patients and providers alike, enabling them to securely send, receive, find, and use the right information at the right time.

7.2. Secondary attributes

These need to be met through mobilising the primary attributes in order to continue to successful adoption.

- **System workflow design should be a top priority and follow intuitive care pathways where possible.** It should encourage patient engagement with their record and offer efficient, flexible and relevant data input solutions. The ability to customise and adapt the solution to local requirements has been found to overcome barriers to use.
- **Training should be continuous.** A core set of competencies is a must and should include information input, retrieval skills, security, confidentiality and quality management; with some knowledge of project and benefits lifecycles.



Extra skill-sets should be identified and invested in according to clinical level of use. This will help with the retention of local expertise and key roles.

- **Local expertise and key roles need to be retained, achieving a stable and motivated workforce.**
- **Easy access and effective use of other health IT technology, including mobile technologies, should be an important part of digital strategy.** Use of hand held devices, barcodes, RFID, voice recognition etc.