NNUH Digital Health Strategy 2023-2027

NNUH Digital Health

1 Foreword – Ed Prosser-Snelling CDIO

Our hospital needs a digital infrastructure to support patient care.

This looks like a system where both technology (computers, software and devices) and digital regulations (information governance, cyber security and clinical safety regulation) work seamlessly to support the delivery of safe and efficient care to our patients.

We also know that IT has an important role to play in staff and patient experience, particularly in contributing to staff burnout.

Within the wider NHS we know that what we previously called "IT" and now call "digital", has a chequered history for delivery of these clear objectives. Within our strategy development process, our diagnostic phase uncovered many of the things we know are wider NHS barriers to delivering a good service. These include difficulty recruiting to key roles because of competition from industry, a restricted market for software products and the pace of change of technology developments (think of computing power, artificial intelligence and the data revolution).

There are so many issues with the way digital runs in the NHS it is possible to run a diagnostic phase indefinitely, persistently uncovering difficulties and issues. The challenge of this strategy is to focus on what is important for our organisation over the next three years.

Compared to other similar organisations, we spend less on digital and technology. This is helpful to understand the broad need for investment, but we know that in the past many investments have not delivered the results they intended. This means we must be extremely selective around what we spend money and more importantly our staff's time on.

We will never be able to predict the exact projects we will need to undertake to keep pace with the demands of healthcare, so it is important to structure our digital department with the skills and capabilities to respond to challenges as they arise. Our digital teams need to be focussed on solving the problems of the hospital, to make it work more efficiently.

Our diagnostic work frames our current performance. It would be easy to focus on the negative aspects, and we have to acknowledge that some areas of our service must improve. There are a number of objective measures which highlight this such as our technology assessment scores through HIMMS or the DMA from NHS digital. This picture has evolved from years of under-investment, a global pandemic and now a cost-of-living crisis. It is important to note that we have had some successes, such as cyber security compliance for the first time in 2021, a new data centre and our virtual ward. Digital at the NNUH is more connected through our clinical and operational leaders with the hospital than it has ever been.

Within this landscape this strategy identifies a key priority – making it easier to deliver care through technology at the NNUH – and five key strategic themes which underpin this. The strategic themes list strategic goals which are facilitated by key enablers and the removal of key blockers.

The major deficit in our current landscape is the lack of structured clinical data, which is corrected by the deployment of an electronic patient record (EPR). An EPR, however, is not the strategy and there are elements around this we must focus on.

This strategy outlines how we will build and develop our digital services over the next three years as we prepare for EPR deployment. Readiness for the EPR from a technical, data and clinical

transformation point of view will form a huge body of work. Ensuring that our supporting services such as the service desk, information governance, application support, network support, registration authority and others are all ready and prepared for being a digital organisation follows a close second. Thirdly we must make sure that we are supporting staff during the change and this has two elements: Making sure that we keep the current clinical environment as safe as possible as we move towards the EPR and preparing and supporting our staff to work very differently.

As we move through the next three years this strategy presents options for investment during our annual planning cycle. The priorities and objectives for 23/24 are set as EPR preparation and key tactical projects to support immediate priorities in staff experience and safety (Single Sign On, Reactive Wards Project and Digital Consent). When we come to next years planning, we can refer back to our strategy and roadmap and offer options for investment to achieve additional levels of digital functionality and maturity, as the investment landscape dictates.

Moving towards a service delivery culture will mean new ways of working, and our individual digital health teams will all produce a plan within the next 3 months of how they will achieve their strategic objectives as set out in this document.

We need to be able to measure how well we are doing in delivering the strategy over the next three years, and we have developed, with our staff a way of measuring this. An adapted hierarchy of digital needs will tell us how staff are feeling, and give us a metric to improve against. Programmes of work we are engaged in, such as the EPR, have specific technology maturity targets. It will be a key focus of the 24/25 refresh to align these with the new NHS Digital WGLL DMA process to ensure we are achieving the level of digital maturity we desire.

This strategy outlines in detail how we can establish the basics to deliver good care, improve upon that and move to innovate where we can. Once the strategy is approved we will release a detailed interactive roadmap, and launch the programme of work.

Every year we will refresh the strategy and roadmap in light of investment opportunities, regulatory guidance and technology developments. NHS England is currently in progress

Thank you every one from ward staff to board members who have contributed to the development of this strategy, and the digital health team look forward to working with you to deliver it.

2 EXECUTIVE SUMMARY

This strategy sets out our vision for a user-centred approach to digital transformation where access to information, services and support make it easy to provide the best care. This approach supports our wider trust vision to provide the best care for every patient.

> ***Our Digital Health vision*** *– a user-centred approach to digital transformation where access to information, services and support make it easy to provide the best care.*

In this strategy we set out our digital purpose, vision and values aligned to and supporting those of our hospital. We developed this strategy through a blend of user research in a range of clinical settings, expert interviews and an appraisal of our current technology environment. A seven-step approach took us from initial framing and diagnostics, through to generating and prioritising options, then setting out a roadmap to achieve our strategic goals. We will regularly refresh this strategy to ensure it continues to meet our needs and evolves over time. We will measure progress against the strategy by benefits realisation, staff experience and completion of projects.

We explore the strategic context in which we operate, including national, regional and local strategic and policy drivers. In particular, we describe how we work as part of an integrated care system and with our partners in initiatives such as the Norfolk and Waveney Acute Hospital Collaborative and the joint Electronic Patient Record (EPR) programme. We also provide an appraisal of the emerging technology environment.

At the heart of this strategy are our five strategic objectives which support the five strategic commitments in our Caring with Pride Strategy:

- **Our patients** - patients can participate in their care in ways which work best for them.
- **Our people** - colleagues are digitally confident and curious. They have technologies which meet their needs and enable them to deliver high quality care.
- **Firm foundations** - colleagues have access to easy-to-use, robust, secure and resilient digital technologies and data at the point at which they need them. We will reduce the number of platforms we use to minimise complexity when collaborating with our partners.
- **Improving care** - digital technologies and data enable colleagues to improve care pathways and transform services both within our hospital and across the region. We will comply with and seek to exceed our regulatory obligations.
- **Data foundation to improve care** – we will make critical decisions based on reliable and secure data. Our people can access up-to-date information that enables data-driven decision-making and continuous improvement. We will manage our data safely and in accordance with best practice.

For each strategic objective, we set out three levels of ambition that focus on getting the basic infrastructure and capabilities in place first with the flexibility to improve and innovate as opportunities arise and investment is made available:

1. **Basic** – The basic level of functionality we must achieve to support safe care and regulatory compliance.
2. **Improved** – An improved level of functionality.
3. **Innovating** – Options to innovate where opportunities arise and investment is available.

We recommend for most elements of the strategy we are aiming for the level of "Improve".

Our five strategic objectives

Throughout the document we identify key initiatives required to deliver against the recommended ambition to *improve*. Each strategic objective is dependent on the requisite level of investment to deliver.

Our Patients: patients can participate in their care in ways which work best for them.

- Deliver safer, efficient & effective care through an EPR shared with our Norfolk and Waveney Acute Hospital Collaborative
- Develop our digital patient engagement capabilities
- Enhance our clinical safety assurance function
- Extend the scope and functionality of our patient facing digital tools (PIFU, VC and Virtual Wards) and integrate to the core EPR
- Develop our patient portal and personal health records in line with the ICS strategy.

Our People: colleagues are digitally confident and curious. They have technologies which meet their needs and enable them to deliver high quality care.

- Design a people centred digital transformation methodology through the EPR readiness programme
- Develop our wider digital operating model
- Ensure colleagues are ready for the EPR programme
- Invest in digital workforce tools to streamline recruitment, onboarding and training processes for colleagues.

Improving Care: digital technologies and data enable colleagues to improve care pathways and transform services both within our Trust and across the region. We will comply with and seek to exceed our regulatory obligations.

- Deliver a new EPR across all our three acute sites, shared with our Acute Collaborative Partners across Norfolk and Waveney Acute Hospital Collaborative bringing the Trust to NHS's Minimum Digital Foundation level of digital maturity
- Align our diagnostics and imaging programmes with the core EPR programme, focusing on convergence and alignment
- Rationalise other applications not in scope of the EPR programme

- Integrate and deliver Single Sign On (SSO) and context search across all of our capable clinical applications
- Develop our digital dictation platform to an AI assisted voice recognition platform integrated with our EPR
- Develop an integrated mobile communications platform for clinicians.

Firm Foundations: colleagues have access to easy-to-use, robust, secure and resilient digital technologies and data at the point at which they need them. We will reduce the number of platforms we use to minimise complexity when collaborating with our partners.

- Invest in a technical architecture function as part of a revised digital health function
- Accelerate our cloud strategy
- Enable single sign on and in-context launch across EPR and other core clinical systems
- Enhance our communications platforms.

Data foundation to improve care: we will make critical decisions based on reliable and secure data. Our people can access up-to-date information that enables data-driven decision-making and continuous improvement. We will manage our data safely and in accordance with best practice.

- Consolidate and centralise our data and insight functions and invest in our reporting platforms
- Develop an Information Governance strategy and roadmap
- Invest in a clinical informatics function
- Review how we use data and prepare ourselves and our teams to exploit the rich data from the new EPR
- Align with ICS and regional data sharing programmes like the Shared Care Record, Health and Care Data Warehouse, Secure Data Exchange.

Along with our strategic objectives, this strategy also outlines how the Digital Health function will develop over the next three years and describes the governance needed to support digital transformation.

Operating model: **we will develop our Digital Health operating model to meet the needs of our organisation.**

- Define the digital health programme management function
- Make it easy for staff to access digital governance and understand escalation routes
- Produce a digital health communications plan
- Develop our user-centred design capabilities
- Create a TOGAF-lite architectural model for strategic oversight
- Create a digital workforce plan to maximise retention and expand recruitment
- Develop transparent resource plans for our key supporting functions (including information governance, cyber security, networks and all others)

Governance: we will develop our governance to meet our strategic ambition.

- Align Digital Health governance with divisions, corporate services and regional partners
- Incorporate BI into Digital Health governance
- Provide clear and transparent prioritisation of digital transformation
- Ensure our digital roadmap is visible to colleagues and partners
- Measure our success using user-centred metrics
- Improve our review and assessment process for digital health improvement/innovation proposals to ensure it is supportive, streamlined and facilitates innovation aligned to standards.

3 INTRODUCTION

This strategy is written at a time of significant change and we continue to work through extremely challenging times. The pandemic gave us momentum to accelerate many innovative digital projects. For example, increasing remote working and providing virtual consultations for outpatients. This strategy gives us a vision and plan so we can continue to harness this momentum over the next three years and beyond.

Healthcare is complex and the digital environment fast-moving. This means we must ensure we have a plan that focuses on the right things and has our end users at its heart. We have therefore developed this strategy in collaboration with our colleagues and their voice and experience shapes both our strategic objectives and action plan. This strategy also reflects national policy and strategy, including the Frontline Digitisation Programme. Finally, it considers trends in emerging technologies and our momentum towards becoming a digital hospital.

Despite starting from a low base of digital maturity, we have made significant improvements and intend to build on our success. For example, we are proud of our celebrated national exemplar status in delivering high quality virtual wards. We have increased our use of mobile devices, upgraded our digital dictation system and implemented an Electronic Document Management System (EDMS). In addition, we have improved our digital infrastructure including upgrades to our networks and data centres.

This strategy not only supports our organisational mission, but it will also directly support our most pressing challenges. These include winter pressures, strategic and major projects and addressing staff satisfaction. We recognise that we must make real and demonstrable changes to achieve our vision. We must embrace our move to new technology but ensure all our colleagues have the skills and confidence to use it. This means that, for example, we will enhance user experience and improve our digital support services. Our strategy is realistic and deliverable. It is aligned to our capacity for change and the financial constraints within which we operate.

4 OUR APPROACH

We wanted to ensure our strategy meets the needs of our people and therefore took a collaborative and user-centred approach throughout its design. Our seven-step approach is based on Monitor's strategy development toolkit.[1]

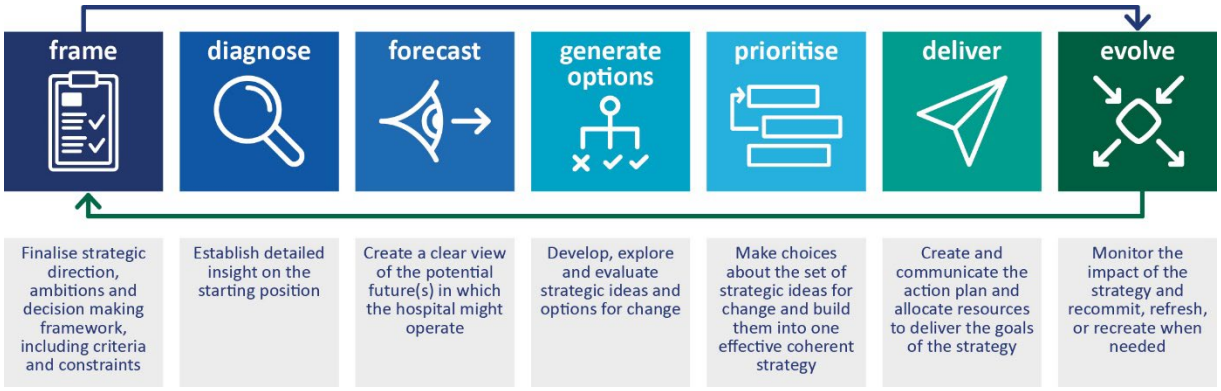

Figure 1 - Monitor's seven stage framework

Frame – we held a workshop with 14 senior leaders from across the Trust. This generated insights into our desired values and behaviours and ensured we understood the current position and any gaps in knowledge.

Diagnose - we used the following initiatives to better understand our starting position:

- **User research –** we held three pop-up workshops to understand key pain points for colleagues along with opportunities for improvement
- **Day in the life –** we shadowed eight colleagues to gain deep insight into their current experience of technology
- **Technology assessment** – we interviewed key digital colleagues to assess the current digital technology environment
- **Stakeholder interviews** – we interviewed key non-digital senior stakeholders within the Trust and our wider integrated care system
- **Desktop research** – we reviewed global, national, regional and local digital health insights to put the strategy in a wider context and identify opportunities for improvement and innovation

Themes from the diagnostic phase are set out in section 7.1.

[1] Monitor's Strategy Development Toolkit
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/365697/Strategy_development_toolkit_MAIN_22102014.pdf

Forecast – we created a vision of a digital hospital of the future to set out our ambitions for this strategy.

Generate & prioritise options – Our Digital Health leadership team reviewed our starting position against our digital ambitions to create a set of key strategic themes, strategic objectives and supporting strategic themes.

Deliver – we created a roadmap to deliver the agreed priorities which is a separate document owned by the Trust with a document reference of NNUH Roadmap v2.

Evolve – we agreed an approach to ensure this strategy is a living document which is regularly reviewed and refreshed (see section 10.2).

5 OUR PURPOSE, VISION & VALUES

Our Caring with Pride strategy describes our vision to become more digitally enabled by transforming how we deliver care through technology, infrastructure, devices and information. This supporting digital strategy sets out how we will move towards this vision over the next three years.

Purpose – what we do every day to achieve our vision

- **Our Trust's purpose** - working together, continuously improving for all.
- **Our Digital Health purpose** – working together, delivering high-quality, timely services that support our people and our patients.

Vision – is the future we are all striving for

- **Our Trust vision** – the best care for every patient.
- **Our Digital Health vision** – a user-centred approach to digital transformation where access to information, services and support make it easy to provide the best care.

Values – how we go about everything we do

Trust values	Digital Health supporting values
People focused	Participation- we involve both our people and our patients, creating the means and spaces for them to contribute
Respect	Inclusive - together we create a culture of inclusivity, respect and mutual support
Integrity	Honesty - we are transparent and learn from both our successes and our mistakes
Dedicated	Improving - we work together to improve Resilience - we are resilient even in the face of setbacks
Excellence	Focus – we are focused on our mission, and strive to achieve it Learning - we foster a culture of open communication and feedback

Table 1 - Values mapping

Principles - in addition to our core Trust values we will adopt the NHS digital design principles to ensure our approach is user-centred:

- Put people at the heart of everything we do
- Design for the outcome

- Be inclusive
- Design for context
- Design for trust
- Test our assumptions
- Make, learn, iterate
- Do the hard work to make it simple
- Make things open it, it makes things better.

Strategic Themes

Our digital strategy has five strategic themes which are aligned to our Trust's strategic commitments:

Trust strategic commitment	Digital Health strategic theme
Our patients – together we will develop services so everyone has the best experience of care and treatment.	**Our patients** - patients can participate in their care in ways which work best for them
Our NNUH team – together we will support each other to be the best that we can be, to be valued and proud of our hospital for all.	**Our people** - colleagues are digitally confident and curious. They have technologies which meet their needs and enable them to deliver high quality care
Our partners – together we will join up services to improve the health and wellbeing of our diverse communities.	**Firm foundations** - colleagues have access to easy-to-use, robust, secure and resilient digital technologies and data at the point at which they need them. We will reduce the number of platforms we use to minimise complexity when collaborating with our partners.
Our services – together we will provide nationally recognised, clinically led services, that are high quality, safe and based on evidence and research.	**Improving care** - digital technologies and data enable colleagues to improve care pathways and transform services both within the Trust and across the region. We will comply with and seek to exceed our regulatory obligations.
Our resources – together we will use public money for maximum effect.	**Data foundation to improve care**– we will make critical decisions based on reliable and secure data. Our people can access up-to-date information that enables data-driven decision-making and continuous improvement. We will manage our data safely and in accordance with best practice.

Table 2 - Digital strategic themes

We also created two supporting strategic themes which introduce an improved operating model for Digital Health and enhanced governance.

Figure 2 (below) describes the relationship between our Digital strategy in relation to our organisational vision along with the operational model, process and standards that underpin it.

Figure 2 – Digital strategy relationships

6 STRATEGIC CONTEXT

We operate within a complex healthcare environment; the pandemic has not only accelerated our use of digital tools, but it has also increased the expectations of our patients. This section sets out our strategic context.

We initially consider the wider impact of technology trends and how we can harness them to improve our delivery of care. We then focus on how the NHS is using technology, including the opportunities created by the pandemic. Finally, we consider the impact of national policy before narrowing our lens to review how we work with our regional partners.

It is important that the Trust continually keeps an eye on emergent technologies and trends, in particular those that are becoming mainstream in other industries such as Artificial Intelligence, but where use of within highly regulated industries such as Health and Care requires creation of considered policies, procedures and rigorous testing before being utilised amongst clinical workflows and decision making.

6.1 Technology trends

The NHS does not exist in a bubble, and trends in technology in general provide opportunities for us to utilise emerging technologies in new ways to achieve our goals. As it takes time for new technologies to be applied successfully, we must ensure our strategic portfolio includes projects that prepare us to adopt innovations as they become mainstream. To succeed, we need to aim high and continue to create time and space to scan the horizon of emerging technologies.

Figure 3 below illustrates some of the key drivers for the adoption of technology in healthcare.

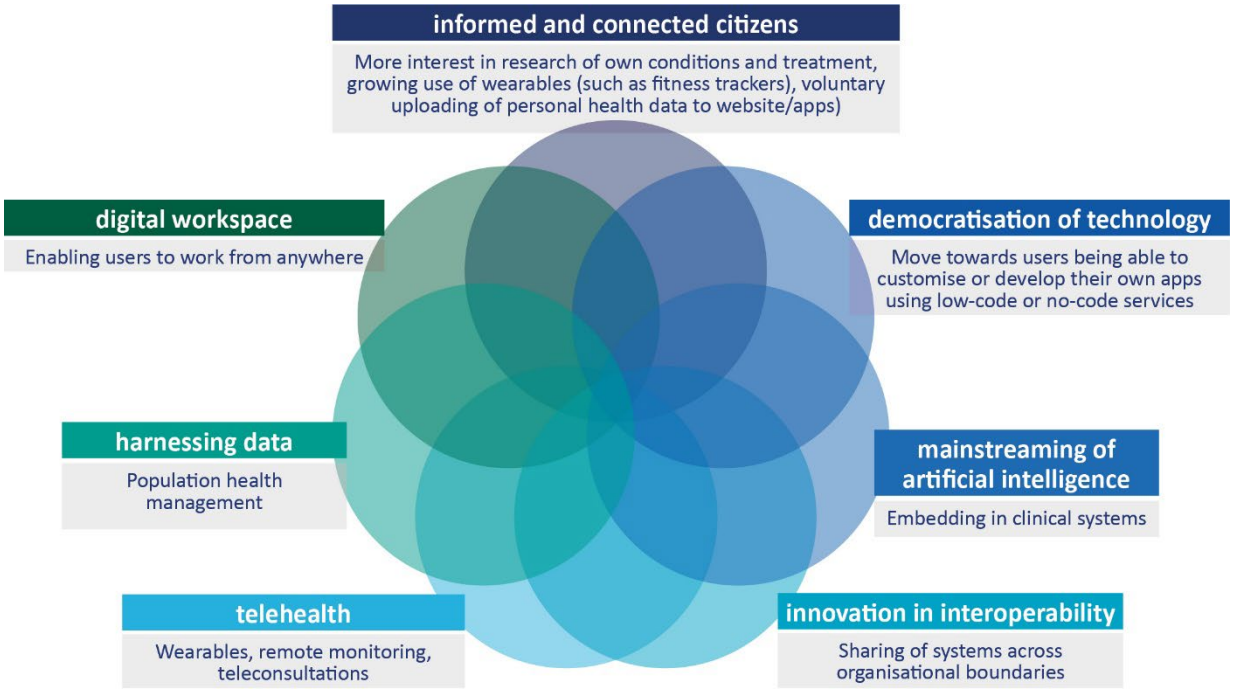

Figure 3 – Key drivers for the adoption of technology in healthcare

Appropriate use of trends such as artificial intelligence (AI), advanced analytics, automation through machine learning will enable us to design new models of care for our patients. This will help us streamline services, reduce our costs, increase efficiency and allow us to better manage our scarce resources. NHS England (NHSE) has recognised key drivers of transformation such as the move to interoperability and the importance of connected data to create a digital environment which is ripe for change.

There is an expectation that the NHS will continue to provide more services through forms of digital innovation. However, these developments shouldn't be a one-size fits all - a shift to digital is not appropriate for all touchpoints, nor for all sectors of the population. The risk of exclusion from a too rapid push to digital is evident. Both patients and clinicians will need the freedom to exercise their preferences and judgement. Some appointments will still need to be in person rather than virtual, depending on the patient, their condition or stage of their pathway. Remote monitoring will work well for some, but not all patients. Therefore, it is vital that our design of digital tools and their careful integration into pathways across health and social care enables all to participate.

6.2 Embracing artificial intelligence

AI is a key area of innovation in digital healthcare and one which we are keen to exploit as part of our models of care and as part of our research capabilities.

AI has the potential to improve health and care, change the way we work and help people do more, and do it better. It is already becoming pervasive in our society and is a key priority of the Government's industrial strategies. The setting up of the NHS AI Lab, and lessons learnt from supporting the COVID-19 response will help deliver a data-driven,

continuously improving learning health and social care system. In addition, the UK Government wide National AI Strategy builds on the UK's strengths but also represents the start of a step change for AI in the UK. It recognises the power of AI to increase resilience, productivity, growth and innovation across the private and public sectors. Below are some examples of AI currently being used within the health and care system in the UK.

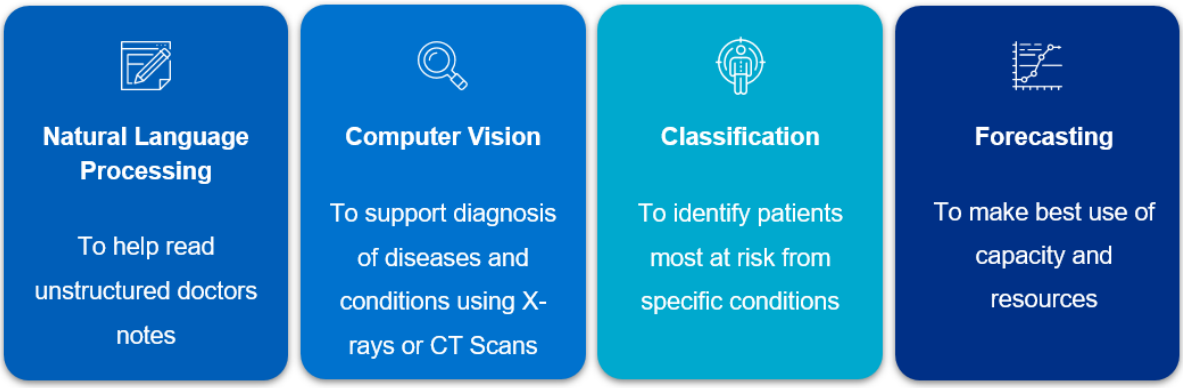

Figure 4 - Examples of AI use with health and care systems in the UK

There are three pillars fundamental to the development and use of AI in the NHS which we plan to adhere to:

Pillar 1: Investing in the basic needs of the AI ecosystem to see more people working with AI within our organisation, more access to data and computing resources to build and deliver AI systems

Pillar 2: Support the diffusion of AI technologies across all areas of care delivery, administration, support and functions of the organisation

Pillar 3: Develop a pro-innovation regulatory and governance framework that protects our patients and citizens.

6.3 Virtual Technology Enabled Care Delivery

Hospitals use technology and tools to improve patient outcomes and streamline hospital operations. This includes the delivery of clinical care and the operational side of the hospital such as the supply chain and staffing. One of the main goals for digital hospitals is to streamline communications, integrating biomedical equipment, patient care systems, buildings, administration and operational systems thus providing staff and patients with instant access to information.

The first fully digitally enabled hospitals are now operational in the US, Singapore and Australia. They leverage digital technologies such as software-as-a-service (SaaS), cloud/edge computing, internet-of-things (IoT), artificial intelligence/machine learning (AI/ML), Big Data, 3D Printing, robotics, and assistive and immersive technologies like virtual/augmented realities (VR/AR).

A summary of the key elements of a digitally enabled hospital follows:

Supporting our patients:

1. Self-directed digital and remote care models - ongoing condition management and virtual care
2. Data follows the patient and is accessible to all professionals involved in their care
3. Collaboration via modern communication tools such as instant messaging and video conferencing
4. Intelligent online scheduling
5. Smart check-in kiosks produce notifications
6. Digital signage and wayfinding apps
7. Notifications to the patient's specialist and family doctor
8. Access to own record from bedside and smart phones
9. Smart beds to monitor patients.

Supporting our workforce:

10. Robots help deliver basic care and support other tasks such as housekeeping
11. Care decisions supported by AI monitoring for and escalating deteriorations
12. Robotic surgery
13. Automated, personalised prescriptions delivered by drone
14. Access to buildings and systems via biometric identification and geotags.

Foundations:

1. Smart logistics for supplies and equipment – tagged and geolocated
2. State of the art, flexible and performant network and infrastructure.

Hospitals are developing in the UK and there are exceptional examples of hospitals moving at scale towards digital models of care. The new hospitals programme has greenlighted the development of six brand new hospitals. These organisations are embedding digital technologies across their care pathways to improve care, reduce costs and drive sustainability. A further 21 hospitals are developing their business cases; a key criterion of these is how they are digital by design.

Key benefits to any hospital from a model of care which is digital by design include streamlining administrative and clinical tasks through an integrated digital platform for the patient. This means that patients benefit from better managed self-care, hospitals from reduced administration and streamlined clinical tasks.

6.4 NHS strategic drivers and policy

NNUH exists not only as a distinct organisation but as an integrated partner at national and regional level. We operate within a complex ecosystem where all partners have digital requirements. Many of these requirements have similar objectives, however, the timelines for execution, prioritisation, funding and delivery models often vary.

Navigating these variations and balancing priorities whilst ensuring that we deliver to the core needs of our Trust is at the heart of this strategy. The diagram below illustrates the national policy and strategic context within which we operate.

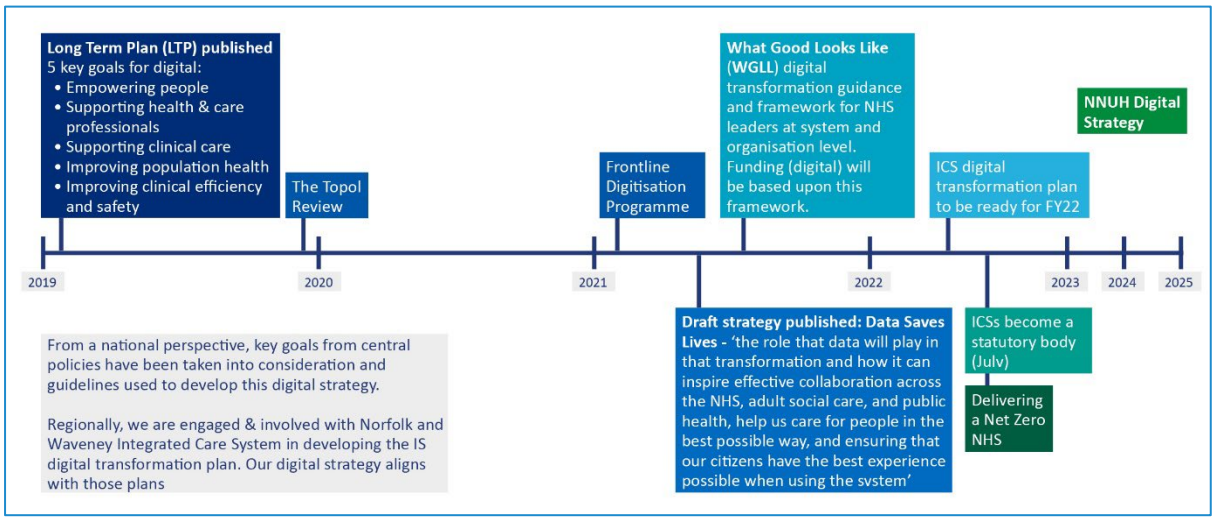

Figure 5 - Summary of strategic context

6.4.1 National context

This section sets out the six national policy and strategic drivers and how our Trust aligns with them.

- Long Term Plan
- Data Saves Lives – national data strategy
- What Good Looks Like
- Frontline Digitisation Programme
- Delivering a Net Zero NHS
- Topol Review

Long Term Plan (LTP) - sets out the ambitions for the NHS and has a core commitment to making better use of data and digital technology providing:

- more convenient access to services and health information for patients
- a digital front door through the NHS app
- better access to digital tools and patient records for staff
- improvements to the planning and delivery of services based on patient and population data.

The LTP also sets out ambitions for joined up and collaborative care, with patients' voices at the heart of the design of services. It seeks to make the NHS an easier place to work and thrive. Finally, it identifies the need for cost effectiveness and reduced spending on administration.

These ambitions are picked up in more detail in the 22/23 operational planning guidance, Department of Health and Social Care (DHSC) data strategy and ICS guidance documents which make explicit the importance of digital and data not only during the pandemic but in the recovery of services.

National Data Strategy (NDS) - states that the future of the NHS depends on improving how we use data for four related purposes:

- Direct care of individuals
- Improving population health through the proactive targeting of services
- Planning and improving services
- Research and innovation that will power new medical treatments.

We generate and use data across all of our services and recognise the critical importance of safe, secure, accurate and well managed data. We are careful stewards of our patients' information and we handle all data creation, modification and use in compliance with our data governance policy.

What Good Looks Like (WGLL) - provides guidance on how health and care leaders can safely and securely digitise, connect and transform services. This reflects the expectation that organisations will use the standards in the framework to accelerate digital and data transformation and thus improve the experience, safety and outcomes of care delivered to patients and citizens.

The What Good Looks Like framework has seven success measures as shown in the diagram below.

Figure 6 – what good looks like framework

We have aligned our digital roadmap and digital operating model with the requirements set out in the WGLL framework. See Appendix B for more detail.

Frontline digitisation - NHS England has set out a priority programme and £2 billion of central funding through 2023 to 2025 for Frontline Digitisation (FD). This FD Programme sets out the Minimum Digital Foundations (MDF) which all Trusts must meet by 2025.

Through this programme and central funding, we will implement a new Electronic Patient Record (EPR). This significant investment will deliver the foundational infrastructure needed to accelerate our digital transformation.

Delivering a Net Zero NHS - we operate within the Net Zero Greener NHS national programme and have embedded environmental sustainability into how we design our services. Digital has a core part to play in reducing our carbon footprint by streamlining and virtualising services.

These national priorities are picked up in large scale digital transformation programmes delivered at a national or ICS level. These programmes can also significantly support us in achieving our own digital models of care.

The Topol Review - outlines recommendations to ensure the NHS is the world leader in using digital technologies to benefit patients. This involves implementing technologies such as genomics, digital medicine, artificial intelligence and robotics at a faster pace and on a greater scale than anywhere else in the world. The review explores how to prepare the healthcare workforce including the skills required and identifying relevant professions and sub-specialisms. It explores the impact on the selection, education, training, development and lifelong learning of current and future NHS staff. Enabling our workforce to adopt digital technologies is a key part of our EPR readiness programme supported by our new Digital Faculty and Digital operating model.

Key commitment

We are committed to leveraging national and regional digital programmes and utilising associated digital tools and technologies where they meet the needs of our local context and population.

6.4.2 Regional context

During the life of this strategy, how we work with our closest partners will become increasingly important. In particular, we will grow our relationships with The James Paget University Hospitals Foundation Trust (JPUH) and The Queen Elizabeth Hospital, King's Lynn (QEHKL) as we work together to transform how we deliver care.

Norfolk and Waveney Integrated Care System (ICS)

We are part of the Norfolk and Waveney Integrated Care System (ICS). Our ICS is made up of a wide range of partner organisations, working together to help people lead longer, healthier and happier lives. Our ICS partners work across three main places – North Norfolk, Norwich and South Norfolk. This strategy will enable us to work with these partners to organise and plan services which improve the health of the population, reduce health inequalities and allow people to receive care closer to their homes in the future.

The digital vision of our ICS is to develop a fully integrated digital service across Norfolk and Waveney. This will make more effective use of the technical expertise it already has across the region and develop its digital abilities to support its ambitions. Patients and citizens

want to use digital for more reliable information sharing, improved access to services and access to resources for living well. However, they have concerns about exacerbating inequalities, want the human element of care to be preserved and to ensure that information is kept confidential and shared securely. There are regional challenges around connectivity as well as the digital literacy of citizens. In a regional staff survey, just over half of colleagues stated they are unsure about using new digital technologies.

Working with the ICS will help us to integrate, scale and accelerate the delivery of our services. We will be a good ICS partner – taking the lead where appropriate. Where the ICS is best placed to lead, we will collaborate and co-design. We are active partners in the delivery of the ICS's digital roadmap and will benefit greatly from joined up collaborative working in the following areas:

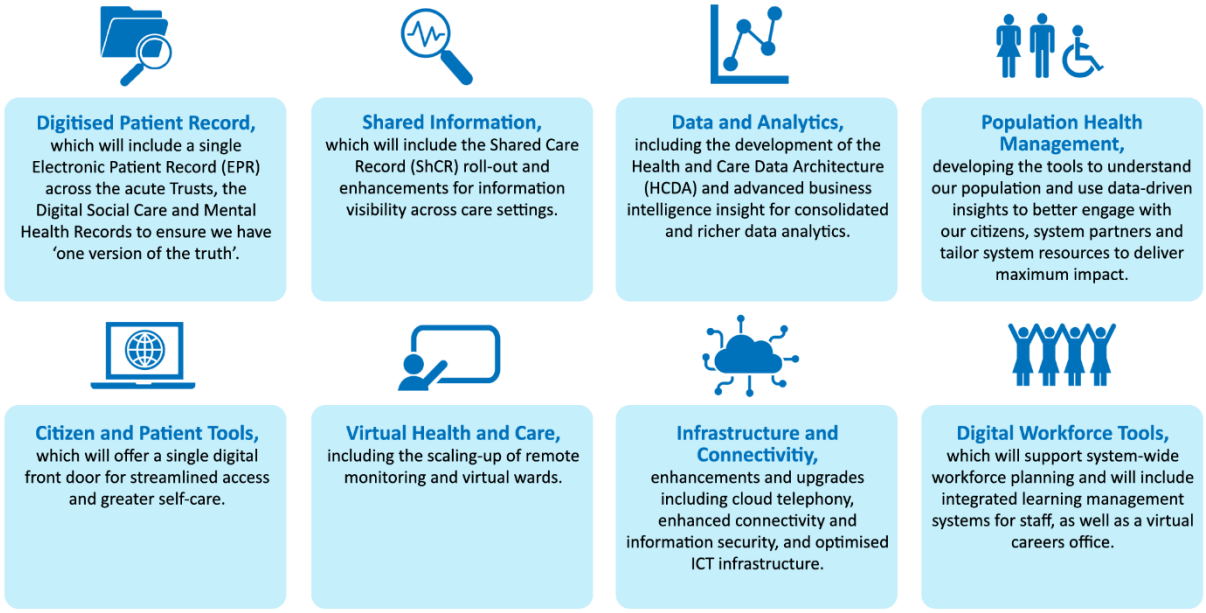

Figure 7 - N&W ICS digital Road map

Norfolk and Waveney Acute Hospital Collaborative

Our links with the other two acute Trusts within Norfolk and Waveney are vital and will play an important role in how we deliver care in the future. Together, we form the Norfolk and Waveney Acute Hospital Collaborative. We recognise that the most effective way to support our patients and our people is through close collaboration in key clinical, operational and digital areas. Our collective vision and shared objectives will guide our plans and how we shape our services.

Our collaborative vision is:

By working together, we will provide you with high quality hospital care when you need it, supporting you to get the care and treatment you need.

Our collaborative objectives are:

- We will listen to what you say and work together to build health services which meet your needs and the needs of our local communities across Norfolk and Waveney

- Together, we will support our staff to have rewarding careers and a good experience working in our hospitals
- Public money will be used efficiently to provide better, safer and faster care across Norfolk and Waveney

As the collaborative develops, we will identify more opportunities to support each other operationally and make our services more resilient. This will provide interesting roles and development opportunities across our hospitals making it easier to attract and retain high calibre people.

We are already starting work on projects such as developing a joint acute clinical strategy which looks at the needs of patients as a whole and will help us to design resilient services around them. By working collaboratively, we aim to reduce long waits, improve health by acting early and tackle health inequalities.

We have developed a governance structure which will enable us to work together and better align aspects of decision making. All three Trusts have established committees which meet simultaneously but take decisions separately on behalf of their own Trust. This is called the Norfolk and Waveney Committees in Common (CiC) and it has the following shared objectives:

- Overseeing the development of the single hospital clinical services strategy for Norfolk & Waveney
- Increasingly aligning key clinical and non-clinical policies, procedures and protocols
- Establishing joint large-scale strategic projects as required (e.g., digital)
- Aligning capital planning and investment, with a focus on understanding where capital is best invested to support system integration
- Guiding the consolidation of some corporate support functions in order to promote consistency and, where possible, release efficiencies.

Our joint EPR programme

Case study – collaboration for EPR convergence

By the end of 2023 all four acute NHS Trusts within the North West London ICS will join a shared instance of the Oracle Cerner Millennium EPR solution. The decision to converge was driven by a desire to enable care across the four Trusts, develop shared care pathways, reduce costs and merge the digital teams.

Creating common ways of working is key to realising shared benefits and requires clear accountable governance. The Change Board, chaired by the CIO, meets for two hours weekly. It is attended by clinical, IT and operational staff from the four Trusts plus the EPR supplier. This breadth of representation ensures that interdependencies and unintended consequences are identified early. Any additional optimisation requests, beyond the requirements of business as usual, require a business case with funding agreed.

Our joint EPR programme is the biggest piece of digital transformation work we've ever undertaken – moving from paper-based patient records to electronic ones. This programme will transform how information about patients' health and care is stored, viewed, and used within our acute hospitals. It will provide a digital system where our staff will be able to access patients' health and care information quickly and securely, delivering responsive care.

This shared system will allow us to remove many outdated systems and will reduce our use of paper. It will support new ways of working by allowing our staff to access the full patient record remotely or from any location within the ICS. This will help to ensure we can deliver the best – safe and efficient – care for every patient.

The programme will bring our digital maturity to a similar level of most other acute Trusts and will:

- Enhance patient care by empowering clinicians, providing them with the right information at the right time
- Replace Trust-specific and specialty-specific digital silos with integrated data
- Provide clinicians with a 'single source of truth', making sharing information across pathways much simpler
- Maximise efficient working and reduce errors when making decisions thus improving patient care
- Provide embedded clinical decision tools to support informed decision-making at the point of care
- Enable integration and/or reconfiguration of acute services across the three Trusts
- Allow significantly greater clinical information-sharing with our partners in primary care, community care and mental health.

All other digital programmes within the three Trusts will be designed and delivered in the context of the joint EPR programme. This will ensure that we leverage every possible opportunity to streamline, digitise, align and modernise our current infrastructure.

We will view all our strategic outcomes and digital plans through the lens of the EPR programme. We have also identified some clear opportunities to integrate and enhance our current clinical applications as we progress through implementation to go-live. The diagram below outlines the anticipated timeline for the EPR programme.

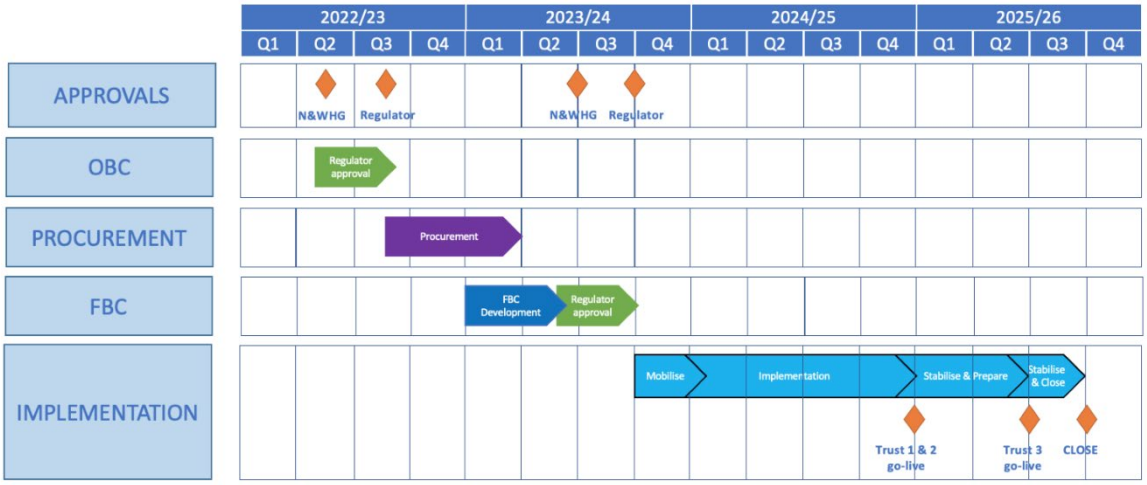

Figure 8 - EPR programme timeline

Key commitment

In the design of our digital strategy, where digital products span more than one organisation, we have considered which party is best placed to lead and which to participate. We will engage with the ICS as an active and committed partner to take full advantage of the opportunities which it brings.

We will seek to leverage the economic and commercial benefits of scale in supplier negotiations though the ICS's consolidated position.

7 CURRENT STATE

This section summarises our diagnosis of the current state. These insights are based on user research, ethnographic work and interviews with members of the digital team and colleagues across the Trust.

7.1 user insight and interviews

> "I can't wait for the electronic patient record. The only thing that worries me about it is just the lack of infrastructure around digital health" ward sister

In the diagnostic of the strategy, we generated insights through a number of key qualitative activities and a desktop review, as set out in section 4.

We themed the qualitative user research and cross-referenced with other sources of insight; they are combined as improvement opportunities in a supporting document.

Ethnography – a day in the life

> "We use quite a lot of spreadsheets because we haven't got a good digital system, but then they glitch and they break" ward physiotherapist

A user researcher shadowed eight colleagues as they went about their everyday work. The researcher observed what technologies they used, how they used them, what worked well and what worked less well.

As a result, we created a series of pen portraits describing a *day in the life* for each colleague. These provide a deep qualitative insight into people's current and desired experiences of technology.

We incorporated these pen portraits into the strategy document to illustrate the user experience from a colleague perspective. Themes from the ethnography were incorporated into those arising from the pop-up workshops.

Pop up workshops

> "On a ward round I need to find the computer and find the computer that works. And then logging on to seven different systems one after the other each time you find a different computer to then deal with that one patient. And it takes time and you know that's the problem and I'm sure we could be far more efficient"
> Inpatient consultant

We wanted to understand key pain points and opportunities for improvement. To give colleagues the opportunity to share their views, we ran three pop-up workshops in the Emergency Department, Outpatient Clinic West and Edgefield inpatient ward.

We took a grounded approach to our user research whereby we generated the key themes by grouping insights from participants related to (a) technology type [where applicable] (b) primary theme; (c) secondary theme (d) (e) description (f) individual role (g) clinical area (h) quote [where recorded].

This research generated 294 insights which we categorised under twelve high level themes as set out in the table below. A spreadsheet with the raw data is a key output from the user research.

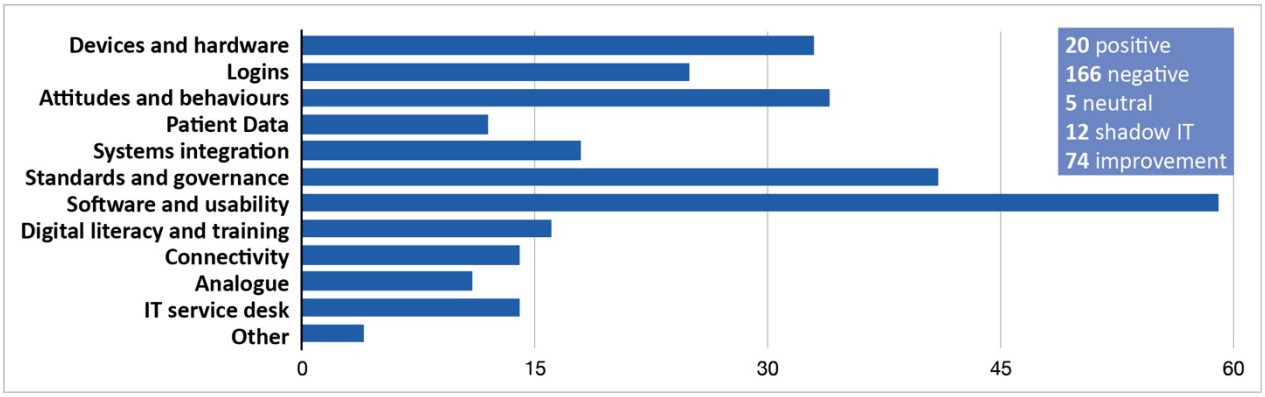

Figure 9 - categorised insights from our user research

Interviews

We undertook interviews with 33 key stakeholders from within the Trust as well as external partners. Interviews were a combination of Digital Health team experts to inform the technology assessment, and corporate stakeholders to explore interdependencies with Digital Health.

The interview insights have been themed and are provided in the user-centred design output with a series of recommendations that have been addressed and incorporated into this strategy.

7.2 Our digital maturity

We are at the start of our digital journey; we have a low digital maturity and despite some notable successes, such as our virtual ward project, we have long way to go. However, whilst we are keen to innovate and adopt some of the ground breaking digital hospital technologies, we recognise that as an operator of essential services we first need to fix the basics and build strong foundations.

Poorly implemented digital solutions are costly, risky and likely to fail. Through this strategy, we identify options for accelerating areas of our digital transformation, however our core focus is on improving the basics to accelerate long term change.

We want a digitally able and curious workforce keen to adopt new technologies and ways of working. To achieve this, we must first deliver highly performant infrastructures with safe and resilient networks that allow our colleagues to connect from any location. Delivering digital patient records and joining up clinical systems will enable access and visibility of useful patient data, more efficiently.

Once we implement these foundations and build our baseline capabilities we can innovate at scale and pace towards our vision of a digital or smart hospital. This will enable our people to move up the digital hierarchy of needs scale shown below. Our Digital Health roadmap sets out how we will make progress towards the top of the pyramid over the course of the strategy.

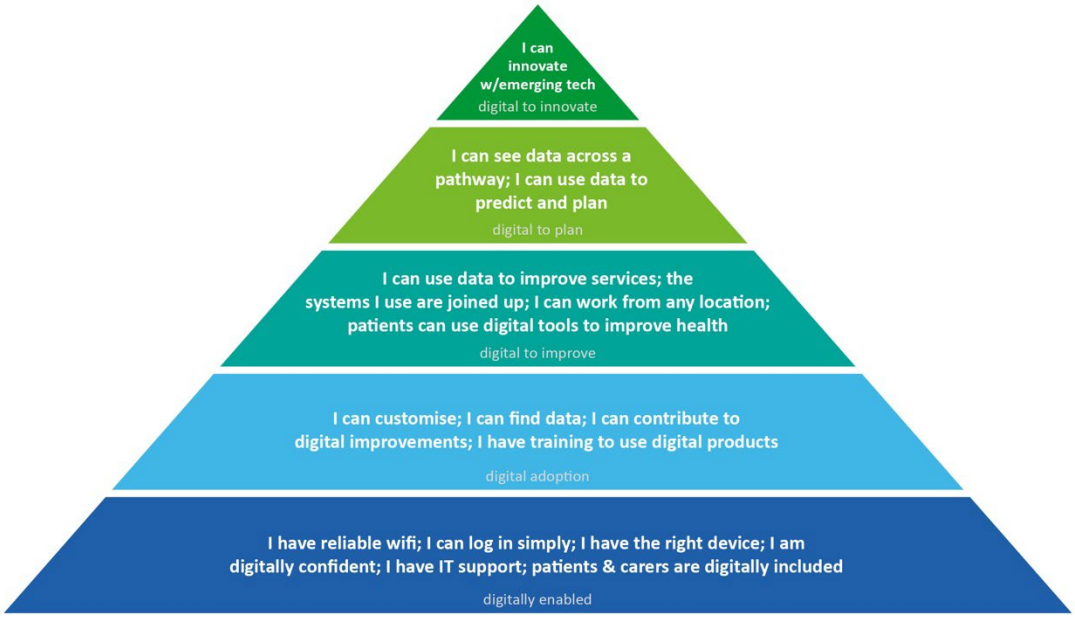

Figure 10 – NNUH hierarchy of needs scale

7.3 What we have delivered to date

In 2020 we identified a three-year digital roadmap, aligned to our ICS digital roadmap. Since then, we have delivered some fundamental successes as shown below. This is only the start of our digital transformation and much remains to do. However, this foundation will enable us to move at pace through the next stage of digital transformation and the implementation of our joint EPR programme through 2023-2025.

Pillar	What we have delivered	What this means for Patients/ People/ Services/ The Trust
Patients	Virtual Wards, remote consultations and remote monitoring	Our virtual ward programme is a national exemplar currently expanding to be able to support up to 60 patients with over 50 acute beds in the community, enabling patients care to be treated within their own home. at home in the setting of their choice. This frees up hospital beds for those who need them most.
Improving care	Electronic observations across wards	We have delivered the foundational stage of the programme with continued engagement and optimisation across clinical teams.
	Digital Dictation	We have deployed digital dictation platforms across wards to further drive the move to digital for our colleagues.
Data	Power BI platform	This provides enhanced reporting capabilities to our Business Intelligence team.
	ICS Health Care Data Analytics function and shared care record	We are active participants in ICS shared data projects such as the shared care record and analytics environment. These will remain at the centre of our strategy.
Firm Foundations	Improved networks, hosting and Wi-Fi	Often unseen, these major programmes are the building blocks of a digital organisation, enabling the deployment of digital applications such as our EPR and other clinical systems.
Innovation	Innovation Lab	ICS level innovation capability which allows for cost efficient evaluation of innovations at pace and scale.
	Robotic Process Automation	Pilot of process automation engines to streamline administration tasks, freeing colleagues to focus on critical functions.

Table 3 - 2020 three-year digital roadmap progress

7.4 Our current technology environment

We explore our existing environment as a series of technology 'layers' shown in the diagram below. The lower horizontal layers support the higher horizontal layers with management and governance columns depicting processes that span all layers. A summary of our technology environment follows, further detail is provided in Appendix C and we provide a full review in the separate document – Digital Health Technology Diagnostic v2.docx.

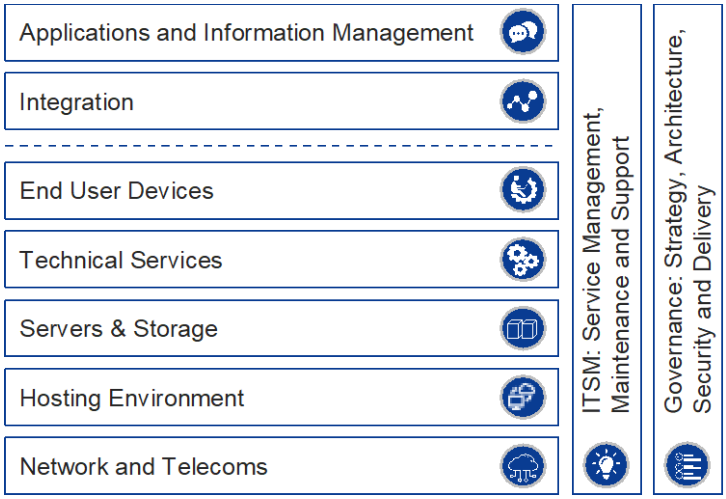

Figure 11 - current technology layers

Case study – colleague & patient engagement in digital transformation

Berkshire Healthcare NHS Foundation Trust provides both community and mental health care services in the Southeast. They are in the process of optimising their EPR, Rio.

Berkshire Healthcare's digital strategy is a critical subset of the organisational strategy and an enabler to its delivery. When it comes to key strategic challenges, such as workforce shortages, the board identified advancing the Trust's EPR as an investment in addressing the problem rather than a cost.

Over the last nine years, the board of directors has worked hard to develop an open culture of regular staff and patient engagement. When it comes to addressing clinical priorities, the team involves health and care practitioners in identifying options to address those challenges and include them when assessing supplier solutions. The team recognise that good communications are imperative as it can take years from inception to delivery of an EPR improvement.

The Trust has invested in a transformation team and has taken control of the EPR in a more confident way than previously. They understand it is critical for the digital team to keep focused on the organisational strategy to ensure they deliver what matters for the organisation rather than simply what might be technically possible. Key to this has been having clinicians as core members of the digital team.

8 STRATEGIC OBJECTIVES

During the last three years, we have delivered foundational technologies, created our Digital Health function and built a governance framework. This provides a baseline from which we can continue to improve.

Where possible we are keen to improve and innovate where investment is available and there are clinical and operational benefits.

8.1 Strategic objectives and ambition

For each of our strategic objectives we set out three levels of ambition:

1. **Delivering our electronic patient record EPR –** building on the basics with our EPR programme
2. **How we can improve –** improvements we expect the strategy to deliver from existing investments
3. **How we can innovate –** options to innovate where opportunities arise and investment is available.

For each of the options we set out the functionality we would deliver and how this would improve the experience of our patients and people. We explore the options to develop our operating model for Digital Health in more detail in section 8.1.

Further detail on the strategic objectives can be found in Appendix A.

8.1.1 Our Patients

Strategic objective: patients can participate in their care in ways which work best for them.

We will deliver a patient centric, clinically led approach to designing and delivering digital models of care. We will exploit and extend the capabilities of our current virtual wards, virtual consultation and PIFU projects and integrate them with the new EPR programme and shared care record so that clinicians can easily find and access the data and record they need across the boundaries of organisations. We will exploit wearables and AI assisted MedTech where possible and safe to do so.

We will review all clinical applications to ensure that they are fit for purpose and rationalise where we can.

We will develop a patient portal and personal health record in line with the ICS strategy to ensure that patients are able to participate in their own health and care.

Case study – my medical record

My medical record

Winner of #HealthTechToShoutAbout **HTN Awards 2019**

Southampton introduced a patient portal twelve years ago and is seen as Global Digital Exemplar for this service which it also offers to other Hospitals. UHS My Medical Record provides a range of interactive and care co-ordinating services across specialties and integrates patient wearables. It provides a secure co-authored patient owned record with information (including laboratory results) populated direct from hospital systems and care providers that:

- Supports co-management of healthcare including active monitoring
- Connects patients with care teams
- Provides information from the hospital
- Supports patient surveys
- Patients can add information such as weight and blood pressure
- Reduces the need for hospital visits
- Provides a range of condition specific tools – including management of long-term conditions.

8.1.2 Our People

Strategic objective – colleagues are digitally confident and curious. They have technologies which meet their needs and enable them to deliver high quality care.

We will equip our colleagues with the equipment, tools and skills to be effective. This means access to laptops, desktops, printers and other devices. The infrastructure such as connectivity and networks will enable flexible remote working.

As we develop our EPR readiness programme, we will ensure that colleagues are engaged and able to participate by developing our digital health faculty to work across the Trust.

We will also enable flexible recruitment, onboarding and professional development solutions to support ongoing learning.

Case study – digital monitoring of foetal and maternal vital signs

Imperial College Healthcare NHS Trust maternity service provides care for around 10,000 babies and their mothers each year. Contractions and foetal and maternal heart rate are monitored using cardiotocograph (CTG) devices. Previously, the readings were printed out on rolls of paper. Midwives added handwritten clinical observations to these 'foetal strips' and used them to make critical decisions about the management of labour.

The solution was to connect the cardiotocograph machines to the electronic patient record system, eliminating the need for paper and make the results an integral part of the patient record.

Maternity staff can now view electronic graphical displays of heart rates and contractions for all mums and babies on all our labour wards right across the Trust – midwives at the bedside and the midwives desk, and consultants from elsewhere in the hospital. They can spot signs of distress and take action quickly, improving patient safety. Maternal blood pressure, temperature and oxygen saturation are also collected. And all the data is recorded in the electronic patient record.

Global Digital Exemplar Case Study

8.1.3 Firm Foundations

Strategic objectives: colleagues have access to easy-to-use, robust, secure and resilient digital technologies and data at the point at which they need them.

We will reduce the number of platforms we use to minimise complexity when collaborating with our partners.

We will accelerate our infrastructure programmes to deliver the robust digital foundations which we require in order to deliver a digital model of care. The EPR programme will provide the investment and programme to ensure that we reach an agreed level of digital maturity across networks, infrastructure, communications and applications.

We have identified opportunities to accelerate our cloud strategy and to leverage our networks to enhance our communications' capabilities.

Case study – unified communications

As part of its 2023 strategy Wrightington, Wigan and Leigh Teaching Hospitals NHS Foundation Trust is developing its digital capabilities and implementing a modern and resilient unified communications (UC) service to support communication across the entire organisation and enhance the patient experience through its contact centre.

The service delivers scalable cloud-based telephony and UC solutions that utilise both Cisco and Microsoft technologies for enhanced collaboration. For the Trust's 7,000 employees this provides a secure and easy-to-use UC platform that's available at anytime, anywhere. Web and video conferencing, voice calling, desktop sharing, and instant messaging allows employees to work effectively with each other and provide an optimised patient engagement journey.

8.1.4 Improving care

Strategic objective – digital technologies and data enable colleagues to improve care pathways and transform services both within the Trust and across the region. We will comply with and seek to exceed our regulatory obligations.

We will exploit and extend the current functionality delivered through our PIFU, virtual wards and virtual consultation programmes and improve our clinical assurance function as part of our enhanced digital operating model.

We will review all clinical applications to ensure they are fit for purpose and make them easier to access through Single Sign On and contextual search.

We will enhance clinical insights by integrating core applications to make sure data flows between systems and is available to view as required.

We will move from digital dictation to AI assisted voice recognition again reducing time spent on clinical administration and improving clinical insights.

Case study: Virginia Mason (VMI) and the NHS

In July 2015, the Secretary of State for Health announced a partnership between VMI and five NHS Trusts. This was part of an ambition for the NHS to become the world's largest learning organisation.

The aim of the partnership was to develop a localised version of the Virginia Mason Production System, based upon 'lean' principles, in each of the Trusts. The objective was to embed and sustain a culture of continuous improvement capability within each of these five Trusts and the NHS more broadly.

An analysis of the outcome of this partnership shows how culture, leadership and a coherent and integrated change methodology are the foundational building blocks for enduring systemic change. However, collecting, managing and sharing data was essential to enable rapid, focused and coordinated decision making processes and implement change at pace.

8.1.5 Data foundation to improve care

Strategic objective – we make critical decisions based on reliable and secure data. Our people can access up-to-date information that enables data-driven decision-making and continuous improvement. We manage our data safely and in accordance with best practice.

We will consolidate our data and insight teams and invest in the reporting tools that they use. We will review how we collect, collate, review F and analyse data in preparation for our EPR programme to ensure that we are ready to exploit the rich data this will bring. This means investing in a clinical informatics function with the Trust.

We will deliver changes to our data warehouse to incorporate the new EPR, exploring the possibilities of Azure. We will explore the needs of our clinicians across the trust in preparation for the increase in access to digital clinical data.

We will align with the ICS and regional data sharing programmes such as the Shared Care Record, PHM, Health and Care Data and Analytics project and the Secure Data Environment

research platform as we develop our data analytics maturity; we will explore opportunities to apply machine learning, AI or predictive analytics across the data to drive decision making.

We will develop an Information Governance strategy and roadmap, which will include enabling and embedding an improved IG culture in our organisation.

Our ambition is to establish our organisation as a leading trusted, pro-innovation leader in the safe use of AI in healthcare in the country. We will invest and plan for the long-term needs of the AI technologies ecosystem through skill development, data availability, infrastructure and tools. This will support the transition to an AI-enabled organisation, capturing the benefits of innovation and ensuring that we maximise on the benefits of AI for our patients, staff and citizens. Further information can be found in Appendix D.

9 SUPPORTING STRATEGIC OBJECTIVES

To deliver the changes we have outlined in our strategic themes we need to ensure our Digital Health team is set up to effectively support our colleagues. We also need to ensure we have appropriate governance in place. We have therefore created two additional themes in support of this strategy.

9.1 Supporting theme 1 - Digital Health operating model

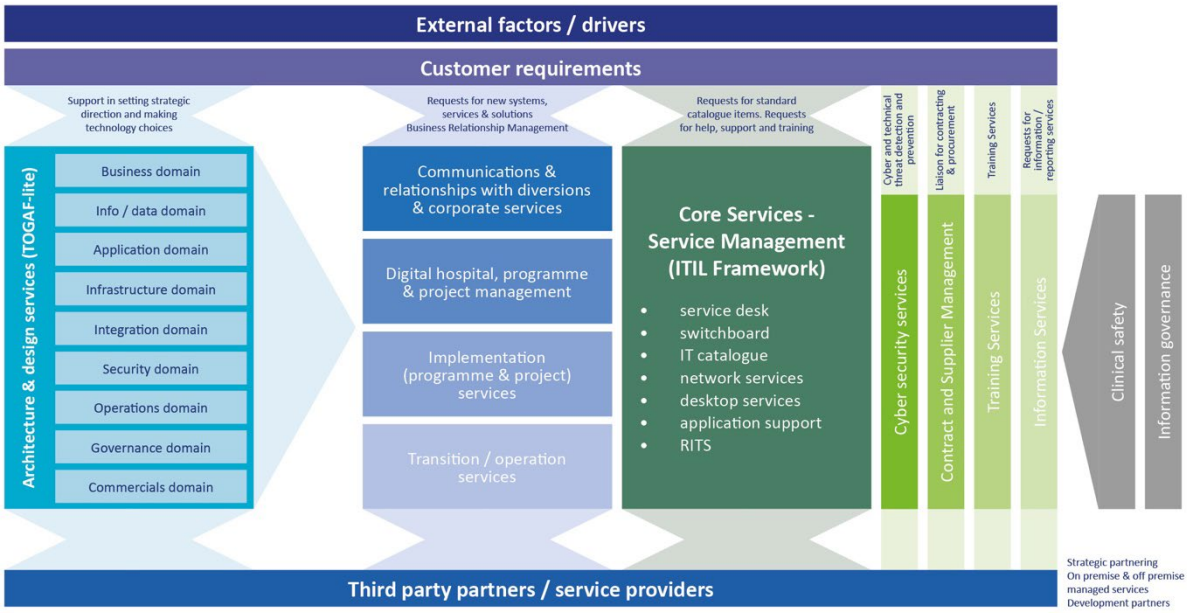

Figure 12 - proposed operating model for Digital Health

Delivery of our strategic ambitions for Digital Health requires an uplift to our Digital Health operating model: that is a revision of the way Digital Health is structured and operates, along with the skills we have across the teams and the capacity we have to deliver an enhanced digital environment. This will ensure we support our vision for digital transformation with the right capabilities, capacity and maturity to enable its delivery.

We developed a set of values for Digital Health in collaboration with senior leader colleagues during our digital strategy framing workshop. These are:

- **Communications** – we will provide high quality, timely communications between the Digital Health team and the clinical and corporate services across the wider organisation
- **Relationships** – we will strengthen relationships with our divisions so the Digital Health team can understand the context, ambitions, priorities and constraints of each division from a clinical and operational perspective. This is a two-way relationship which will also allow the divisions to understand the services offered by Digital Health and how they can use them to deliver their ambitions
- **User-centred** – we will use a change approach and methodology that puts end users at the heart of digital transformation. This will ensure digital products meet user needs, are effective and are consistently adopted

- **Innovation –** we will use an approach to facilitate colleagues with innovative ideas on digital health so they can test them out through a structured discovery process, align them to standards and promote engagement.

We will design our Digital Health operating model with the needs of our users at its heart.

Case study – user-centred design

Following a difficult EPR implementation a few years ago, Surrey and Borders Partnership NHS Foundation Trust (SABP) switched from traditional programmatic approaches towards user centred design. This has delivered a better user experience and shifted their core focus to the usability of the product. By creating a design team, with user researchers, designers and developers; and involving operational teams they improved the EPR experience beyond the constraints of the system.

The SABP digital team has been nominated for awards for their fusion team approach. This brings together a range of skill sets to design for the desired outcome based on a deep understanding of users' needs. The approach started as an experiment and the team has grown as it has created value. The clinical team are delighted with the results and benefits include increased satisfaction, efficiency and productivity.

Figure 13 sets out a framework for an NHS Trust with a mature approach to user-centred design and which focuses on the needs of users at all stages of digital technology adoption.

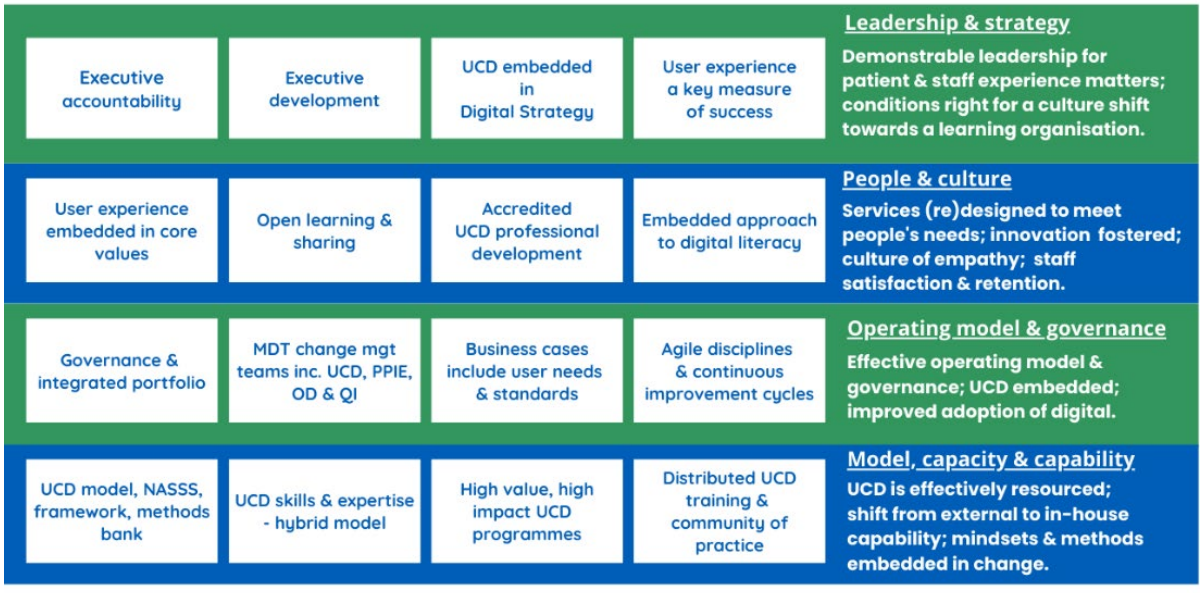

Figure 13 - user centred design approach

Themes emerging from our diagnostic gave a clear steer on improvements to our operating model:

Communication - we will extend our business partner model to align a digital health expert with each division. We will identify clinical digital champions in each directorate to co-design digital solutions. We will also appoint digital advocates from the digital health team, to liaise between the clinical teams and the digital health team. This will ensure we fully understand the needs of the division and can responsively and flexibly support clinicians and practitioners through their clinical workflows. We recognise the importance of keeping our people up to date with developments in Digital Health. We will therefore appoint a dedicated specialist to develop and deliver a Digital Health communications plan.

User-centred design and change capabilities - we will build the capability of our existing digital transformation function to use user-centred design. Methods will include training, a community of practice and a methods bank. This will help to ensure we better understand user needs and that our Digital Health projects and programmes are designed, implemented and optimised with users at the centre.

Strategic change function - we will engage with colleagues across the three acute Trusts to scope a strategic change function, this will bring together user-centred design, QI, PPIE and transformation.

Strategic oversight - we will create and implement a pragmatic architectural model for strategic oversight and governance, supported by standards compliance and relevant technical accreditations, including clinical safety aspects. We will develop a software policy that defines how the organisation will procure, distribute, manage and maintain software across the organisation, and the responsibilities of the individuals that are given permissions to use that software. In combination, this will help to ensure consistency and compliance of technical systems deployment and minimise the occurrence of non-compliant or shadow IT across the organisation.

Recruitment and onboarding processes - we will streamline and improve our recruitment and onboarding processes. These changes will reduce current frustrations and will include integrating Recruitment (TRAC) with Budget approval and integrated with Trust Payroll; integrated Starters & eLearning so logins are pre provisioned and new starters able to commence orientation, mandatory and Digital training ahead of their first day; Advanced eLearning Services including orientation to the Digital health team, digital champions and advocates and an introduction session to all the digital technology available to colleagues; assistive technology that makes Trust mandatory training easy to schedule and complete online from anywhere; intuitive seamless onboarding processes.

Attracting and retaining talent - we will create a dynamic and creative digital health team to deliver the major digital programme required by the joint EPR. We will undertake a skills audit to identify the key skills and expertise required to support our transformation programme. We will take into account the following considerations:

- Talent management and succession planning within our teams to create enticing career plans for digital and data talent
- Our joint programme delivery model as part of our Acute collaborative and joint EPR programmes

- The future service delivery model for EPR support and development
- Alignment with local universities and academies to encourage talent to work with NNUH

This will underpin a digital and data workforce recruitment and retention strategy at a trust and ICS level.

As our Digital Health operating model is focused on providing excellent service to our colleagues, this section also includes elements which are included in the summary for Strategic Theme 2 – Our People.

9.2 Supporting theme 2 - Governance

Our vision for digital transformation must be supported by robust communication, relationships and governance. This will ensure our transformation is joined up not only within the Trust but also with our regional partners.

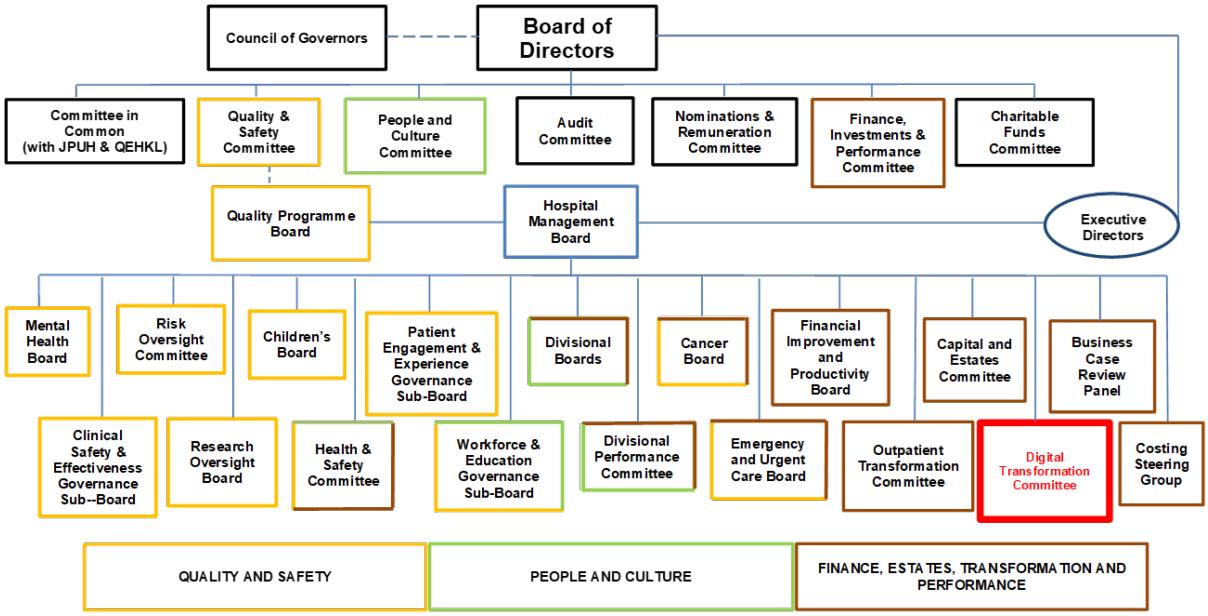

Figure 14 - governance model

The Digital Transformation Committee (DTC) provides governance for Digital Health, reporting to the Board of Directors via the Management Board. The DTC provides the Board of Directors with assurance regarding the Digital Health's contribution to the achievement of the Trust's strategic commitments as part of the Board Assurance Framework.

The DTC oversees the delivery of the Digital Health strategy and governs the development and delivery of the Norfolk and Norwich Elements of the Three Hospital Electronic Patient Record.

Its membership includes clinical leads from each of the divisions as well as corporate services to ensure alignment. It also has a role to horizon scan future opportunities as well as manage digital transformation opportunities and risks.

The following committees or working groups report to the DTC:

- Clinical Informatics Group
- The Caldicott and Information Governance Assurance Committee
- Digital Health Programme Board
- The Artificial Intelligence Management Oversight Group (AI-MOG).

The DTC is responsible for ensuring alignment with business and clinical objectives. This includes liaison with the Research Oversight Board, Capital and Estates Committee and Financial Improvement & Productivity Board, Finance, Investment and Productivity Committee and Quality Performance Board as appropriate. Finally, the DTC is responsible for ensuring strategies and plans are informed by and focused on the needs of our patients and are properly informed by clinical and non-clinical end-users; it also includes governance for the EPR programme, utilising the Digital Health Operating Model and ensuring appropriate Project and Programme Governance is formed for each Project reviewed through the Digital Health Operation Model.

The EPR Transformation Programme is a major organisation-wide and potentially countywide transformation. Its cross-organisational governance has been agreed with ICS acute partners as set out in the Norfolk and Waveney Acute Hospital Collaborative EPR outline business case.

Themes emerging from our diagnostic gave a clear steer on the requirements for governance:

- **Divisional and corporate alignment** – we will align Digital Health governance with divisions, corporate services and regional partners so that we are aligned
- **BI alignment** – we will incorporate BI into Digital Health governance
- **Prioritisation** – we will provide clear and transparent prioritisation of digital transformation
- **Decision making** – we will make clear and accountable decisions
- **Communication & engagement** – we will ensure our digital roadmap is visible to colleagues and partners
- **Metrics** – we will measure our success using user-centred metrics
- **RITS** – we will improve our review and assessment process for digital health improvement/innovation proposals to ensure it is supportive, streamlined and facilitates innovation aligned to standards.

We will develop our Board's engagement with digital transformation through regular workshop sessions. A change matrix will help to ensure more governance alignment between Digital Health, Quality Improvement and strategy. We will also improve awareness

of the role and remit of Digital Health via a dedicated session in our corporate induction programme.

This strategy document will be renewed every three years to ensure we remain aligned with the developing EPR and other Trust Transformation Programmes. We will refresh our three-year workplan annually and produce a report on progress to date.

We will design a set of user centred metrics such as user satisfaction with digital technologies, adoption by patients and staff satisfaction to guide the development of our key digital projects. We will continuously learn from each project and embed the learning into the design of the next project. Through our revised governance approach, we will ensure that we can be agile and self-learning.

APPENDIX A Strategic Objectives in Detail

The following section provides further insight into each of the strategic objectives. Each objective is set out with three levels of ambition:

- **Delivering our electronic patient record EPR** – building on the basics with our EPR programme
- **How we can improve** – improvements we expect the strategy to deliver from existing investments
- **How we can innovate** – options to innovate where opportunities arise and investment is available.

Each objective is set out below in a table, followed by a detailed narrative.

Strategic objective - our patients

Strategic objective:	Our patients	
Basics	**Improve**	**Innovate**
Delivering our electronic patient record (EPR)	**How we can improve**	**How we can innovate**

Current functionality
• Delivery of a Cross-Organisational EPR with our ICS Acute Partners to make Patient care, Safer, Efficient and effective
• Virtual Wards
  ○ Current Health remote monitoring
• Virtual clinics via Attend Anywhere
  ○ Set and Manage roles and professions for users in Flow and noting.
• Patient Initiated Follow-Up (PIFU)
  ○ DrDoctor Questionnaires
  ○ Self service appointment requests.
	Improved functionality
	• Enhanced Virtual Wards
	  ○ Expand Wearables e.g. combining Current Health with Kardia AliveCor ECGs
	  ○ Expand Virtual Ward to Chemo @ Homepathways i.e. chemotherapy
	  ○ ECG Patch (Holter replacement) for stroke prevention/paroxysmal AF Detection
	  ○ Linking up with community systems for increased visibility and support for patients of N&W
	• Virtual clinics
	  ○ Review VC technology alongside EPR & PHR
	  ○ Enhance with patient questionnaires and PREMS & PROMS
	  ○ Enhance with Instant GP communications
	  ○ Patient symptom logging & tracking
		Innovative functionality
		• Moving from individual projects to continuous, iterative improvement
		  ○ Data gathered from across our clinical systems combined with detailed patient level feedback drives the next phase of development of our patient facing digital care models
		• Advanced patient portal
		  ○ Provision of a suite of interactive capabilities linked to our core clinical systems to enable patients engage with their care, from updating address and contact information, scheduling appointments, review of results, medicines adherence, responding to health questionnaires such as pre-operative assessments and engaging in prescribed support

	• Patient Initiated Follow-Up
	  ○ Linked with holistic untethered PHR
	• Personal Health Record
	  ○ Appointment letters/reminders
	  ○ Notification of missed appointments.
	  ○ Patient correspondence
	  ○ Secure Messaging
	  ○ Untethered patient-controlled record able to share & receive data from any professional care organisation in the world from which the Patient is receiving care.
	• Enhanced Clinical Safety Assurance framework
	  ○ Improved clinical safety standards
	  ○ Nationally approved patient facing apps
	• Advanced patient engagement
	  ○ Patients and carers engaged in the design of digital models of care ensuring they meet their needs.
		through physical, nutritional and psychological pre and rehabilitation programmes all through the single patient portal.
		• Innovate patient Facing AI enabled MedTech
		  ○ Moving remote monitoring to Remote Diagnosis through app-less AI Solutions enabled through patient's smart phones
		  ▪ Smartphone observations 'via a selfie'
		  ▪ Smartphone respiratory disease cough diagnosis
		  ▪ Smartphone COPD/asthma exacerbation detect & prevent
		  ▪ Pre-surgery @home sleep apnoea detection
		  ▪ @Home finger prick blood tests
		  ▪ @Home IBS (SIBO) diagnosis & monitoring.

What it means for patients Patients are able to receive flexible care remotely for certain conditions and to access our services outside of the boundaries of the Trust.	**What it means for patients** Increased confidence and assurance around the digital solutions we offer to our patients means increased satisfaction.	**What it means for patients** Patient becomes the point of care with improved outcomes due to proactive monitoring and rapid escalation of treatment Reduced societal impact & enabling clinical teams to care for more patients. We will identify a set of patient outcomes to enable us to track outcomes and progress.

Table 4 - strategic theme - our patients

Our patients - building on the basics

We have implemented a set of foundational technologies which extend the boundaries of care outside of the hospital:

Virtual consultations

We deployed virtual clinics and video consultations using Attend Anywhere as part of our pandemic response. We will review this approach and if retained will ensure that appointments and notes from consultations flow into our patient record and are easily accessible.

Virtual wards

Our virtual ward project established a clinical team to mirror a normal ward to support patient recovery and has treated almost 2000 patients to date. This is a flagship project and we have been recognised as a national exemplar for this work. Importantly, our patient experience score remains consistently positive at 98%. We have recently received funding for 60 beds and plans are in place to expand to support the national agenda and targets. This programme is an excellent example of clinically led innovation at scale and at pace. This methodology will form the basis of how we rapidly design new digital programmes.

Digital outpatient administration – Patient Initiated Follow Ups (PIFU)

We have implemented the DrDoctor platform to digitise core aspects of outpatient administration and to start to understand patient communication preferences. This puts patients in charge of their outpatient experience by allowing them to digitally request follow ups and specify their channel of choice. Requests for support coming into the Trust are key candidates for automation through Robotic Process Automation (RPA).

Our patients – how we can improve

We will improve the digital tools and services we offer to our patients. Initiatives will include:

- Extending the clinical specialities covered and identifying new pathways for digitisation
- Extending and making better use of the functionality in our current technology including opportunities for rationalising administration
- Designing these platforms into our EPR, Patient Health Record, Patient Portal as an integrated proposition
- Layering in AI assisted technology, new wearables and MedTech as it becomes available in the market
- Engaging patients and carers in the design of digital models of care
- Enhancing clinical safety standards.

Virtual clinics and remote care

As we work through our EPR programme we will understand where and how we can integrate these tools into core clinical records. As we do so we will enhance the current platform with additional functionality such as patient questionnaires, symptom tracking and better integration and communication with GP and community care providers.

Community Care is also extended through the use of the Current Health Platform for (Weight/ blood Pressure, Pulse Oximetry, Glucose & ECG) thus keeping patients out of hospital. The existing platform will be transitioned to Feebris over the next six months across the whole ICS.

Virtual wards

We will extend the functionality of our virtual wards to new clinical areas by expanding the use of wearables and the patient engagement platform. For example, we will use patient questionnaires and social prescribing tasks for patients to complete and respond to. Extending conditions supported by remote monitoring will include, for example, chemo@home or intermittent ECG monitoring through Kardia AliveCor or continuous ECG wearable Patches for paroxysmal atrial fibrillation detection. This will provide the potential to prevent stroke and to monitor for other abnormal arrhythmias with automated reporting and alerting.

We are part of an ICS programme which will take a population health management lens to our local patient population and design the programme to meet local needs.

Patient portal and personal health records

As part of our EPR programme, we will design a portal to digitise key patient interactions. We will leverage the ICS patient portal and personal health record projects to align across health and social care. This will provide a joined-up experience for patients and ensure they only have to tell their story once. This will mean leveraging the NHS App as it develops to drive traffic to the most appropriate point of care. This will also include reviewing all aspects of patient communications such as access to medical records, appointment scheduling and reminders, and sharing data between professionals.

Our patients – how we can innovate

Our approach to innovation is one of continuous improvement with clinical leadership at the heart of our digital projects. We will feed this process with patient feedback and rich data from our clinical, operational, financial systems. This will allow us to select, prototype, iterate and deploy new patient facing digital tools as they become available and where they meet our clinical requirements and our patients' appetite for smart MedTech.

Advanced patient portal

We will provide a suite of interactive capabilities linked to our core clinical systems which will enable patients to engage with their care. Functionality to be explored from within a single patient portal includes:

- Basic patient administration such as maintaining contact information, scheduling appointments, requesting and review of results
- Monitoring medicines adherence
- Responding to health questionnaires such as pre-operative assessments
- Engaging in prescribed support through physical, nutritional and psychological Pre and Rehabilitation programmes

- Notification and management of missed appointments.

We will move from remote monitoring to remote diagnosis via app-less AI solutions enabled through patients' smart phones. Examples could include:

- AI supported rapid diabetes diagnosis and monitoring
- Smartphone observations 'via a selfie'
- Smartphone respiratory disease cough diagnosis
- Smartphone COPD/asthma exacerbation detect & prevent
- Pre-surgery @Home sleep apnoea detection
- @Home finger prick blood tests
- @Home IBS (SIBO) diagnosis & monitoring.

Proactive monitoring and rapid escalation will not only improve our outcomes but will also help to prevent patient deterioration. This will provide benefits to our patients and allow us to deliver safer care. This will also enable our clinical teams to focus their attention where it is needed most, thus becoming more efficient and allowing us to care for more patients.

Creating the right framework and methodology for innovation, based on an integrated suite of foundational capabilities (such as the EPR) will drive our success and the adoption of innovation at scale.

The insight from our user research that underpins this strategy clearly demonstrates we have a lot to do to meet the expectations of our colleagues. We have been waiting for the investment into our shared EPR. We now have authorisation to proceed and are embarking on the most ambitious programme of digital change we have ever known. These new capabilities will move us towards an integrated model of working beyond the boundaries of our organisation. As part of our digital workforce strategy, we will need our colleagues to be flexible as we work across our Acute Hospitals Collaborative and integrate with our ICS.

Strategic objective - our people

Strategic objective:	**Our people**	
Basics	**Improve**	**Innovate**
Delivering our electronic patient record (EPR)	**How we can improve**	**How we can innovate**
Current functionality • EPR readiness programme will assess and prepare for digital transformation • Digital Faculty ○ A digital academy and research directorate providing the foundational capabilities to support our	**Improved Functionality** Developing our wider digital operating model • We will appoint digital advocates to liaise between the clinical teams and the digital health team to ensure that we can be responsive	**Innovative functionality** • A multidisciplinary, nationally networked analytics team able to rapidly turn around problems providing clinically meaningful insights and provide advice on capturing data to both drive and

digital transformation.	and flexible to the needs of our colleagues • Invest in upskilling development and integration team capabilities ahead of EPR. Enabling flexible recruitment and professional development • Advanced eLearning services • Assistive technology that makes Trust mandatory training easy to schedule and complete online from anywhere. Intuitive seamless onboarding processes • Integrating Recruitment (TRAC) with budget approval • Integrated with trust payroll • Integrated starters & eLearning so logins are pre provisioned and new starters able to commence orientation, mandatory and digital training ahead of 1st day.	measure improvements in care. Enabling people to develop across the boundaries of organisations • Develop digital staff passports across all three Trusts in the collaborative • AR and VR enabled training and collaboration.
What it means for our people Core foundations set for future digital improvements.	**What it means for our people** A modern and effective workplace which removes frustration and drives efficiency Colleagues are eager and able to adopt new technologies and ways of working Colleagues feel engaged and able to participate in developing our new models of care safely.	**What it means for our people** Flexible movement of staff between Trusts develops collaboration and innovation The Trust is a better place to work and a more attractive prospect for trainees and possible new joiners.

Table 5 - strategic theme - our people

Our people - building on the basics

Transformation

Our EPR readiness programme will continue its work assessing and preparing our Trust for the digital transformation. Our digital academy and research directorate will provide the foundational capabilities to support our digital transformation.

Digital Health faculty

Our aim is that digital is seen as a positive enabler, opening up the possibilities of doing things differently. In order to make this ambition a reality, we have established the Digital Health Faculty. The evolution of the Digital Health Faculty will be instrumental in our ability to achieve successful digital transformation at scale.

We must move to a culture where people think digital first. We want important information entered directly (and once) into clinical and operational systems so we can eliminate the use of paper. We believe that high-quality clinical representation is fundamental to digital health projects, from inception to delivery and to the development of our clinical systems.

The Digital Health Faculty is funded as part of EPR readiness activities. It is a group of healthcare professionals who are able to understand the digital landscape and influence change within it. There are different tiers for those with different experience and expertise, but everyone is welcome. The objectives of the Digital Health Faculty are:

- To provide staff who have the subject matter expertise to support:
  - the EPR organisational readiness assessment
  - benefits discovery and validation
  - the clinical safety process
- To create a group of individuals throughout the organisation who understand and can support digital transformation activities
- To provide subject matter experts that after implementation can ensure we maximise benefits from our EPR
- To ensure there are clear professional development pathways for those wanting to develop a career in digital health at the NNUH and in our ICS
- To develop a cadre of clinical leaders who are adept in digital leadership.

We have developed a framework identifying key competencies and suggested training/learning activities for each level. Members will receive a certificate acknowledging their level within the faculty to demonstrate their professional development.

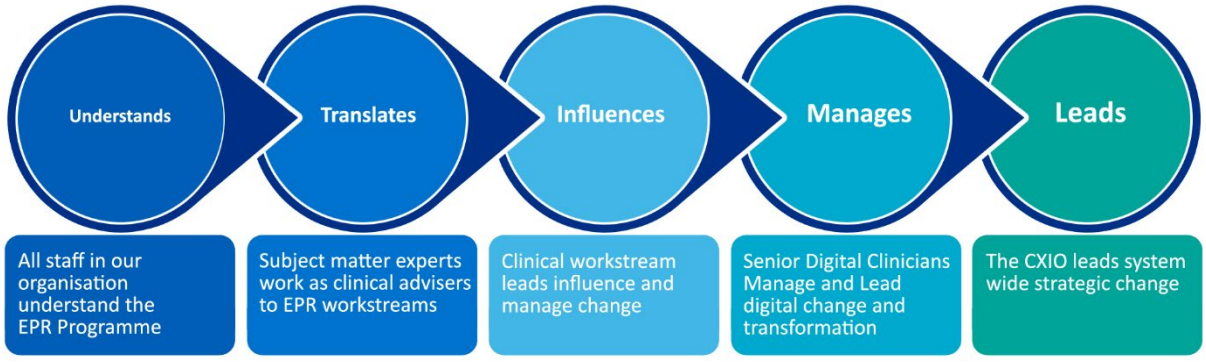

Figure 15 – competencies framework

Our people – how we can improve

By improving the digital tools and technology our colleagues use we will provide a modern and effective workplace. Our aim is to provide solutions which are easy to use thus removing frustration and driving efficiency. We want to engage our colleagues, so they are comfortable and feel safe as they adopt new technologies and ways of working. Ultimately, we want them to feel confident and eager to participate in the development of our new models of care.

To transform how we support our colleagues we will introduce a new Digital Health operating model. This will:

- Improve communication between digital health and our clinical teams
- Provide flexible recruitment and professional development
- Support intuitive seamless onboarding processes.

Developing a new Digital Health operating model is a supporting objective and we explore this in detail in section 8.1.

Our people – how we can innovate

As we innovate, we will provide a more interesting place for staff to work. Flexible movement of staff between Trusts will further develop collaboration and innovation. The Trust will become a more attractive prospect for trainees and potential new colleagues.

We will exploit technology such as augmented and virtual reality to support training and multi-disciplinary learning models. This technology can also be used to support multi-disciplinary meetings across the globe bringing professionals together to collaborate in new ways.

Supporting professional development through digital

As a major teaching hospital, we have the opportunity to innovate and lead in developing and deploying new teaching methodologies. We have identified a range of opportunities to make use of immersive technologies to support professional development. These include:

AR - Augmented Reality uses technology to superimpose digital elements (such as sounds, images, and text) on the world we see using a tablet, smart eyeglass or a smartphone camera.

VR - Virtual Reality allows a person to explore and interact with an

immersive, three-dimensional, computer-generated environment. Instead of projecting the images and sounds on a real environment, virtual reality uses a headset to immerse users within a 360-degree environment.

MR - Mixed Reality merges real and virtual worlds to produce new environments where both physical and digital objects co-exist and interact in real time. Methods include the use of holograms and mixed reality glasses.

One of the greatest advantages of AR, VR and MR is the ability to provide immersive learning using a smartphone app, simple cardboard VR glasses and earphones. Interactive 3D objects will give the user a real life-like experience of their augmented or virtual surroundings, allowing a better perception of the environment.

We will use these immersive technologies to train students and medical practitioners through interactive learning before exposing them to real-life patients. These technologies provide more realistic visuals than books and videos resulting in reduced learning time and a better grasp of, for example, operative techniques. Another benefit is the higher engagement rate which has a direct result on performance and the application of knowledge.

We will exploit technology such as Augmented and Virtual reality to support training and multi-disciplinary learning models. Using these technologies, the learning medical practitioner can realistically see themselves in the situation, explore different structures within the region being studied and has a better perception of real-life outcomes. A practical example of this is AWTG's AR/VR tool which aims to train non-radiologists to perform bedside ultrasounds on patients.

Our shared EPR programme will allow us to transform how we deliver care. It will replace a plethora of separate clinical systems and lead to the removal of paper. It will also provide a core of data which will allow us to better understand and manage how we deliver care.

Strategic objective – improving care

Strategic objective	Improving care	
Basics	**Improve**	**Innovate**
Delivering our electronic patient record (EPR)	**How we can improve**	**How we can innovate**

Current functionality
• Core MDF EPR
  ○ We will implement a Minimum Digital Foundations EPR in collaboration with our ICS Partners to replace paper and consolidate legacy systems and to give us a solid core of clinical data
• Diagnostics
  ○ Upgrade and integration of diagnostics and imaging platforms with access across our partner
	Improved functionality
	• We will review and identify opportunities to rationalise and bring together the applications outside of the core EPR scope in advance of the deployment of the new platform
	• We will rationalise and remove redundant or legacy systems through improved contract management
	• Single sign on (SSO)
		Innovative functionality
		• AI assisted care pathways
		  ○ Stroke AI detection outreached to smart ambulance service to diagnose and treat faster.
		  ○ AI assisted lung cancer pathways for same day diagnosis
		  ○ Clinical decision support through A&E to guide care and automate tasks
		  ○ Machine learning to guide standardisation of clinical decisions based on best

networks • Document Management ○ Complete deployment of our Electronic Document Management System digitising paediatric patient records.	○ Move capable Systems to active directory (AD) authentication ○ Wrap Non-AD capable systems with a SSO technology enabling fast user switching and reduced login times • Context launch ○ Utilise the Mediviewer Investment to Context launch AD enabled systems and reduce number of logins and system timeouts • Clinical insights ○ Optimise and integrate systems such as ICNet for clinical insights, infection control and sepsis management (ICNet linked with Eobs, Alertive and Patient Flow) ○ Move from digital dictation to AI voice recognition in readiness for EPR.	outcomes • Smart hospital ○ Medical devices from beds, observation monitors, ECGs and infusion pumps networked, receiving patient details and outputting results reducing transcribing and enabling sentinel monitoring & alerting of deteriorating patients ○ Natural language processing applied across voice recognition enabled correspondence and clinical noting to autonomously code episodes of care and drive actionable insights and continuous learning for healthcare improvements ○ Robotic surgery with remote surgeons.
What it means for our patients & people Core foundations set for future digital improvements.	**What it means for our patients & people** Easier to access through single sign on and it is much easier and safer to locate patient data across systems Clinical applications are linked so that data can flow where appropriate to reduce clinical administration time Colleagues feel engaged and able to participate in developing our new models of care safely.	**What it means for our patients & people** Systems and processes are a delight to work with, outstanding patient satisfaction due to highly personalised digital health models Outstandingly safe practices with reduced clinical risk Well managed low waiting lists due to overall efficiency gains. Able to attract top talent as a digital hospital others aspire to.

Table 6 - strategic theme – improving care

Improving care - building on the basics

In parallel with our EPR programme, we will deliver a number of foundational clinical system transformations which will align with and enhance the functionality of our digital patient record. These will include:

E-observations

We have completed our rollout of NEWS2 and current compliance within inpatient areas is 95%. We are developing maternity charting in line with national scoring to support

paperless maternity services. We have also started a Paediatric Early Warning Score (PEWS) paper pilot which we will use to develop electronic charting in line with national scoring.

Our EDMS is live across most of the Trust. It provides an electronic version of patient notes (up to seven years ago) and covers all new appointments and admissions as well as ongoing scheduled treatments. This programme has introduced the concept of digital patient records and provides a portal which colleagues can use to search for and find patient records digitally. The next stage of the project includes paediatrics, ophthalmology and safeguarding.

Digital dictation

We have deployed digital dictation across key areas, this provides a foundation for moving away from paper notes and digitising care delivery in preparation for our EPR.

Shared Radiology Information system (RIS) / Picture Archiving and Communication System (PACS)

We have a significant programme of transformation to ensure that our diagnostic request, imaging, sharing and laboratory platforms are fit for purpose, cost effective and integrated into core clinical systems.

Our ambition is that clinicians can order and receive diagnostics (imaging, pathology and radiology) as part of an integrated clinical pathway from a range of locations both onsite and from satellites such as our Diagnostic Assessment Centres. We continue to embed the use of our new Radiology Information System (RIS) and increase the number of requested investigations (for example X-ray/imaging) via ICE. In parallel with this work, we are participating in a joint procurement with Norfolk and Suffolk Mental Health Trust for a replacement PACS and RIS solution.

Foundational capability and preparation for ICS and our joint EPR delivers the following:

- Upgrade and alignment of current PACS and RIS solutions across the Trusts and the ICS
- Procurement of a Vendor Neutral Archive to enable images to be safely stored and accessed across organisations via a digital interface to clinical systems
- Upgrade of current laboratory system Labtrack and alignment of ICE
- East of England Imaging Network strategy alignment

Improving care – how we can improve

We recognise that an EPR platform will not solve all of our issues and we will retain a large number of clinical and non-clinical applications post its implementation. However, in the next year we have the opportunity to review the overall landscape and focus on quick wins for clinical areas which the EPR will not address.

We will review and identify opportunities to rationalise our clinical systems in advance of the deployment of the new EPR. We are developing an enterprise architecture framework

and a set of principles which will guide how we deploy and integrate the EPR into our current complex, legacy and unconnected system landscape. We will appoint an Enterprise Architect and align with the joint EPR and ICS team to ensure that we design a foundational set of applications which support the deployment of remote and digital care at scale.

We will undertake a comprehensive review and analysis of all our clinical and non-clinical applications to identify opportunities to:

- De-duplicate and retire existing applications which will be replaced by the EPR
- Upgrade to current and supported versions of applications we intend to retain
- Fully exploit every functional component of existing technologies to extract the maximum value for the Trust – in particular through connecting those platforms and systems with each other to improve the flow of patients and data across the Trust
- Leverage the investment into diagnostic technologies to retire out of date and inaccessible platforms
- Integrate those remaining technologies into the "To be" EPR architecture

Practical applications of these principles will deliver:

Single Sign On (SSO)

Many of our new clinical applications such as our ED system, E-obs, shared care record can be accessed via Single Sign On. This means that via a single authentication, colleagues can access a much wider range of systems without the need to log in and out continuously. This will also enable colleagues to move between parts of the hospital and remain logged into the systems which they habitually use. We will do this by upgrading our Active Directory and Authentication functionality and moving those capable systems into these environments. Where our systems do not support this capability, we will wrap SSO technology around them.

In context launch

The feedback from our user research identified a strong need for colleagues to be able to safely navigate between patient records on different systems via a single search. This must ensure the same patient record is displayed in context, reducing the likelihood of patient data between different patients being conflated.

Our recent investment in an Electronic Document Management System (Mediviewer), which is widely used and adopted across the Trust includes functionality to locate and display records from across multiple systems retaining the patient in context. We will leverage this capability to reduce the number of logins and system timeouts and reduce the clinical risk of simultaneously managing multiple systems.

Improved clinical insights derived from existing platforms

We will optimise and integrate systems such as ICNet for clinical insights, infection control and Sepsis Management into our E-observation platform, and clinical communications

system Alertive. This will create an end-to-end monitoring and escalation pathway to support clinical colleagues.

We will leverage our digital champions and advocates to ensure that alerts are useful, appropriately calibrated and clinically safe. We will also integrate applications into the presentation of patient flows to ensure that the data and decisions made are automatically recorded and available to view.

Move from digital dictation to AI voice recognition in readiness for EPR

Moving from paper to voice is an important step in changing our models of care for clinicians and preparing for EPR.

Investment in developing in-house integration capabilities

We are also developing an integration framework and need to recruit and train integration specialists to ensure that the applications we retain can be safely linked to the EPR and our underlying architecture. The technical skills which we require in our Digital Health teams will need to change and adapt to the new technical environment which we are building.

Improving care – how we can innovate

As we develop the core patient record and bring together data from multiple systems into accessible and usable platforms for clinicians, we can envisage how new technologies such as machine learning and assisted intelligence decisioning will support them at key stages of the patient pathway. This will reduce clinical risk and increase safety. It will also improve patient satisfaction as we introduce personalised digital health models and use insights to better manage our waiting lists and reduce waiting times.

The following offers some examples of where AI is assisting and enhancing care pathways. The development of our digital advocates and champions aligned with the new digital design methodology will enable us to select, design, prototype, iterate and implement innovative technologies in the areas which are most critical to us as a Trust and which meet the needs of our patients.

AI assisted care pathways

The following offers some examples of where AI can assist and enhance care pathways.

- Stroke AI Detection outreached to smart ambulance service to diagnose and treat faster.
- AI Assisted lung cancer pathways to enable same day cancer diagnosis from Chest X-Ray through Interventional CT or Bronchoscopy and Histopathology Results improving mortality and decreasing overall cost of care and improving patients' lives
- Clinical Decision Support through A&E to guide care and automate tasks
- Machine Learning to guide standardisation of clinical decisions based on continually improving best outcomes data.

Digital hospital

As we progress through the digitisation of our services, we move closer to the concept of a smart hospital. Having moved through the hierarchies of digital needs, we can envisage a super connected medical environment. Medical devices will integrate into smart beds, observation monitors, ECGs and Infusion pumps will be networked, receiving patient details and outputting results. This will reduce transcribing and enable sentinel monitoring, alerting and orchestration for deteriorating patients. We will predict hospital acquired acute kidney injury risk on admission, flag sepsis earlier and co-ordinate antibiotic reviews digitally.

The treatment we provide will exceed guidelines – resulting in better patient outcomes, a shorter average length of stay and greater bed capacity. An added benefit of becoming a smart hospital is that we will become a hospital people aspire to work at, enabling us to attract top talent.

Natural language processing applied across voice recognition

We will apply natural language processing across voice recognition enabled correspondence and clinical noting. This will provide the capability to autonomously code episodes of care, drive actionable insights and support continuous learning for healthcare improvements.

Robotic surgery

Our super-fast, connected infrastructure and networks will support our fully skilled and digitally enabled workforce who are trained in multimedia immersive technologies. They will operate within a fully digitised operating theatre where robot surgeons assist our on-site and remote colleagues. We will have the option to livestream procedures for multi-disciplinary collaboration, research and training purposes.

We recognise that we are at a basic level of data maturity. This is because most of our clinical systems are either paper based or not connected to a central data repository or data warehouse. This means that our data is in siloes making it difficult to access, connect, manipulate and report on. Our current insight is reactive, driven by regulatory and performance requirements and mainly manual.

Feedback from our users shows a strong desire for connected, (as close to real time as possible) data which enables clinical, operational, management and financial decision making. Joining up data across the boundaries of care organisations was also a key theme. This would enable clinicians to view trustworthy patient records and history from across primary, secondary and community care. In addition, a repeated request was for patients to only have to tell their story once.

Strategic objective - firm foundations

Strategic Objective:	Firm Foundations

Basics	Improve	Innovate
Delivering our electronic patient record (EPR)	**How we can improve**	**How we can innovate**
Current functionality EPR readiness programme will deliver a baseline of infrastructure and security IT strategy across hosting, infrastructure, communication and hosting projects to attain digital maturity standards set out in the Frontline Digitisation programme.	**Improved Functionality** Accelerate our cloud strategy and move to secure, resilient and cost-effective hosting of all relevant applications Leverage our EPR programme investment to review integration, single sign on and in-context search capabilities in aligned applications.	**Innovative Functionality** Leverage and integrate existing projects into unified strategy and design of a multi-channel communication platform for NNUH • Integrated multi-channel communication platform linked to EPR and on duty roster to enable alerts and communications to clinicians' smartphones/ devices across multiple locations. • Option to extend core EPR functionality like ePMA and Order management to connected devices to support mobility.
What it means for our patients & people Core foundations set for future digital improvements.	**What it means for our patients & people** Fast, resilient and on demand access to internet-based services Ability to rapidly adapt and deploy new digital technologies across the estate.	**What it means for our patients & people** Robust and reliable foundations that enable confidence and capability to innovate.

Table 7 - strategic theme - firm foundations

Firm foundations - building on the basics

Our EPR readiness programme will deliver a baseline of infrastructure and security IT strategy across hosting, infrastructure, communication and hosting projects to attain digital maturity standards as set out in the Frontline Digitisation programme.

Networks and connectivity

We will continue to invest in our network, and where possible, we will move away from private connections to the Health and Social Care Network (HSCN). This will ensure we maintain a resilient, disparate and diverse network. We also face increasing demands for high quality, high speed external networks to support innovative clinical initiatives such as the live streaming of robotic surgery. For our internal network, we will address wireless

access blackspots to achieve consistent WIFI coverage throughout the hospital, especially in wards and clinical areas.

Firm foundations – how we can improve

We will provide our people with fast, resilient and on demand access to internet-based services. Our firm foundation will allow us to rapidly adapt and deploy new digital technologies across the estate. As part of the development of this strategy, we have identified some clear opportunities to accelerate and extend our currently planned programmes as shown below:

Extending our cloud strategy

Our approach to cloud is a key component of our IT service delivery model. This encompasses IT and data architecture, the design of networks, connectivity, devices, data governance and delivery and support models. Our current strategy is to use a "hybrid cloud" approach. This means that where possible, within the confines of our current applications landscape, we will adopt cloud technologies and services in conjunction with on-premises technologies for data storage, application hosting and services provision.

We have identified multiple opportunities to accelerate and extend our applications and data hosting strategy aligned to our EPR and refreshed digital clinical programmes. We will develop a Trust-wide cloud strategy which analyses all clinical and non-clinical applications against the core EPR scope. Where the application is to be retained, the strategy and roadmap will define the options for moving to cloud or modernising the application to be cloud-based as appropriate. We will apply the principles derived as part of our cloud strategy into our data strategy to ensure that we leverage the benefits of flexible, on demand hosting across the ecosystem.

Review of integration, single sign on and in-context search

We will review the integration, single sign on and in-context search capabilities in aligned applications to leverage our investment in our EPR Programme.

Firm foundations – how we can innovate

As we modernise and improve our internal IT operating model and develop the joint EPR and ICS programmes, we have the opportunity to re-think our fundamental delivery models. We explore this in our supporting theme – Digital Health operating model in section 8.1.

Unified communications

We have invested in a number of foundational capabilities through modernising our networks and reviewing our telephony and communication needs. By implementing clinical messaging systems such as Alertive and non-clinical applications such as Office 365, we have put in place baseline capabilities. These will allow us to develop an integrated multi-channel communications platform to manage flexible communication across channels for staff and patients. This will link to the EPR and on duty roster. It will also enable alerts and communications to clinicians' smartphones and devices across multiple locations.

Increasingly colleagues are operating across multiple locations and organisations, aligning contacts with the electronic staff record and the directory will enable us to flow traffic flexibly across the network using the channel of choice. We will also review how we use external communication tools such as Attend Anywhere to find opportunities to create care pathways which blend face to face and virtual consultations depending on the nature of the appointment and preference of the patient

Review EPR to explore mobility opportunities

We will review the capability to extend core EPR functionality such as EPMA and order management to be accessed via mobile devices. This will provide additional flexibility to allow our colleagues to work from any location.

Strategic objective - Data foundation to improve care

Strategic objective:	**Data foundation to improve care**	
Basics	**Improve**	**Innovate**
Delivering our electronic patient record (EPR)	**How we can improve**	**How we can improve**
Current Functionality • Participation in the ICS shared care record • Contribution to the ICS HCDS Cogstack data environment and analytics function • Joint waiting list project across the Trusts (LUNA) • Centralisation of our data analytics and business intelligence functions within the Trust • Tactical improvements to Trust level reporting.	**Improved Functionality** • Develop an Information Governance strategy and roadmap, which will include enabling and embedding the F.A.I.R.E.R. IG culture in our organisation. • Consolidate BI platforms onto Power BI retiring older tools such as Business objects and Qlikview • Preparing for EPR through developing our data operating model capabilities • Invest in clinical data analytics function focussed on clinical insights in readiness for managing rich EPR data • Exploit and align with the Secure Data Environment (SDE) programme to define a data architecture and AI driven research	**Innovative Functionality** • Linked data across estates, operational, clinical and medical devices to underpin the development of a self-learning system – an eco-system of data driven continuous improvement where the organisation learns and develops in response to real time accurate data • Digital twin capabilities to enable personalised medicines for our patients • AI assisted population health data analysis to mine past patient data insights across community, acute and GP to find trends to assist proactive patient management.

	environment for NNUH. • Deliver changes to our data warehouse to incorporate the new EPR, exploring the possibilities of Azure. • Explore the needs of our clinicians across the trust in preparation for the increase in access to digital clinical data.	
What it means for our patients & people These investments deliver the foundational capabilities upon which to build a data driven model of care.	**What it means for our patients & people** Increased investment in our data functions will increase confidence in data, improve speed and responsiveness of adoption of new technologies.	**What it means for our patients & people** NNUH is a leading self-learning organisation in the East of England, designing and delivering new change models.

Table 8 - strategic theme - Data foundation to improve care

Data foundation to improve care - building on the basics

We have built some basic foundational capabilities within the Trust and the ICS as follows:

Internal reporting and insight

We have invested in some core foundational capabilities to improve the ways in which we manage and collect data. We have implemented Power BI as our core reporting platform and have centralised our insight teams. We have also made some tactical improvements to our data operating model. However, we recognise that we need to develop some additional foundational capabilities through the design of a data operating model and data architecture.

Participation in ICS data led programmes

We are participating in a number of ICS wide data projects which will enhance and extend our capabilities. These include the ICS shared care record and Health Care Data Architecture.

Shared care record (ShCR) – read only

The roll out of the ShCR will be an important milestone in Norfolk and Waveney as it will allow our health and care professionals to access patient records from other services. Having access to this information will allow our staff to do their jobs well. It will improve clinical decision making and reduce time spent by frontline staff obtaining vital information.

The ShCR will allow our staff to access a wide range of information from across primary care, community, mental health and social care as well as data from the other acute Trusts in the ICS. Access will be provided through SSO and it will support in context search to ensure that

the same patient records are accessed in multiple systems. In time, our clinicians will be able to input data into the shared care record.

ICS data analytics and data warehouse programme

We have identified that insight programmes such as Population health Management are best delivered at an ICS level. We are contributing data and resources to the ICS-wide population health management platform (Health Care Data Architecture, HCDA - Cogstack). We will use this intelligence to inform local care planning and to support the implementation of new ICS-led pathways and personalised care models.

LUNA - joint waiting lists across the acutes to support elective care recovery

We have an internal data cleansing and Patient Tracking List (PTL) programme to ensure that our patient waiting lists are accurate, up to date and can be shared with the other acute Trusts. This will enable us to work collaboratively and make the best use of our resources across the hospitals. This is a highly manual, reactive and complex process which will be automated and integrated into a single view as a result of our EPR programme.

Data in the context of our research ambitions

In 2020, we set out our research strategy. This is a key part of our five-year plan and aligns with our vision for patient care and supporting public health. We also use research to address the challenges facing our hospital such as the length of time that patients stay in hospital.

Data foundation to improve care – how we can improve

From our user research we identified key pinch points in the way data is currently managed, accessed and shared. Additional investment in our data functions will increase our colleagues' confidence in data. Having access to rich data will help to improve our responsiveness and speed the adoption of new technologies.

Our user research identified key pinch points around our approach to Information Governance and Data Protection. The IG team has capacity issues and is not yet resourced with the latest data privacy management tools available on the market. The team currently uses standalone manual processes to manage its reporting, monitoring and registry management processes.

Our approach to information governance

We will develop an Information Governance strategy and roadmap, which will include enabling and embedding the F.A.I.R.E.R. IG culture in our organisation.

We have identified an immediate opportunity for improvement in reviewing how we approach the application of data protection principles (i.e. a risk-based IG approach) and to develop an IG "as a service" model. This may include developing shared delivery models

with other organisations to increase access to resources and streamlining the RITS process as part of our digital health operating model review.

We will move to using automated unified data privacy management tools. This will streamline requests, support service levels and provide standard response times to requests. We will also investigate developing a central digital repository for standard information governance policy, guidance and past decisions/case history. This will enable colleagues to be better informed and engaged in understanding best practice in information governance.

Exploiting rich data from our EPR programme – developing our data operating model

We will develop an information culture in which decisions are evidence-based, supported by easily accessible, timely, accurate, relevant and trusted information. Operational data will enable us to understand how colleagues are engaging with systems and processes and will help to identify where we have capacity and capability issues.

Our joint EPR programme will digitise our patient and clinical records and integrate diagnostic and wider patient data. This will provide us with access to rich patient, clinical, administrative and performance data for the first time. We will therefore need to design a data operating model and infrastructure capable of managing and exploiting this data in advance of implementation and go-live. This will enable us to move from reactive data analysis from disparate paper records to integrated data gathered across the patient journey.

We will implement the following initiatives to support the move to digital record keeping:

- **Skills analysis:** we will review staffing and skillsets within the Information and Digital teams to identify and address skills and training gaps
- **Embedding information analyst:** support within Directorate teams will enable us to better understand their data and reporting requirements
- **Platform and toolset review:** we will review the BI toolsets and invest in making full use of those already available to the Trust, including exploring usage of the proposed ICS Health and Data Architecture (HCDA) which will support population health
- **Skill sharing:** we will explore opportunities for sharing skills and resources with ICS partners
- **Data quality:** we will deploy data quality initiatives to validate, cleanse and maintain underlying data, and identify a “single source of the truth” for each data item. This will support us in our preparation to move to the new EPR as well as enhance current reporting accuracy
- **Data education and awareness programmes:** we will provide programmes to improve understanding of the importance of accurate and timely recording of data into digital systems as they become the primary source of the patient record.

Having conducted these reviews, we will develop a data strategy and improvement plan to significantly enhance our data operating model in readiness for our EPR programme. This will adopt the principles from the national data strategy, Data Saves Lives:

- All data will be validated at the point of entry to improve data quality
- All data will be made discoverable - a catalogue of all data will help it be easily discovered and reused across all appropriate settings, where information governance allows
- Data will not be duplicated across disparate repositories - Data will stored once and shared, with availability and performance guaranteed for users across the system
- All clinical data stored will be made accessible to patients, their carers and clinicians using a standard suite of APIs (Application Programming Interfaces)
- People will be able to self-manage any data relating to contact details and preferences
- Organisations should be able to self-manage any data relating to them, e.g. locations and types of services offered
- Data should be digitally signed to an appropriate level.

Secure data environment programme

Our high quality, high value research positions us to take a role in leading and driving research locally, nationally and internationally. We will exploit and align with the Secure Data Environment programme to define our data architecture and an AI driven research programme for NNUH.

Our research vision

To deliver our research vision we need high quality data. Healthcare records must be digital and integrated so we can share data as appropriate with research partners and other healthcare organisations. We use clinical information to provide care and treatment to our patients and where they provide consent, we also use their information for research.

This approach requires healthcare records to be digital, integrated and the data carefully managed and shared appropriately with research partners and other health organisations. As new digital systems come online, we will develop research around the longitudinal health and social care record, scanned electronic records and full electronic patient records.

Our AI ambitions

Our ambition is to establish our organisation as a leading trusted, pro-innovation leader in the safe use of AI in healthcare in the country. We will invest and plan for the long-term needs of the AI technologies ecosystem through skill development, data availability, infrastructure and tools. This will support the transition to an AI-enabled organisation, capturing the benefits of innovation and ensuring that we maximise on the benefits of AI for our patients, staff and citizens.

Data foundation to improve care – how we can innovate

Our ambition is that NNUH will become the leading self-learning organisation in the East of England, designing and delivering new change models.

Self-learning system

We will create an eco-system of data driven continuous improvement where the organisation learns and develops in response to real time accurate data. Linked data across Estates, operational, clinical and medical devices will underpin the development of a self-learning system.

AI assisted population data analysis

Clinical, operational and financial data from across the Trust, remote monitoring and patient created data is all integrated into a federated data model across all health and social care providers.

Each organisation manages and controls its own data and contributes into a decentralised data environment which enables machine learning and predictive analytics to be applied to data at scale. These insights can be shared on request, creating near real time insights which will drive the further development of care and operating models. This capability will enable us to find trends and will assist in proactive patient management.

These real time insights aligned to flexible insights will create self-learning environments where decisions are driven by data and insights.

Research

Our research function is enabled to become world leading as access to patient data, outcomes, imaging and diagnostic information is readily available, supported by an informed and progressive data sharing culture.

We will leverage our research capabilities and infrastructure to test new medical devices, digital technologies, artificial intelligence, pharmaceuticals and deliver innovation throughout the Trust. By digitising and centralising patient outcome data, we will be able to test the effectiveness and quality of new models of care. This will allow us to drive rapid adoption where it is the right thing for our patients and our people.

Personalised medicine

Digital Twin capabilities enable personalised medicines for our patients. This capability will allow us to predict health problems that specific patients or similar people may suffer from in the future.

Our reliance on digital technologies to deliver clinical care and run the hospital continues to increase. Underpinning our ambition for digital transformation is the need for our infrastructure to be modern, fit-for-purpose, secure and future-proofed. As care moves outside of the boundaries of the hospital to remote and virtual models our need for flexible and scalable infrastructure becomes even more critical. A flexible and mobile workforce also

requires resilient and performant infrastructure to enable people and data to move across the ecosystem.

The Frontline Digitisation programme is funding our joint EPR programme and requires us move to a standard of digital maturity and capability. Our Digital Health operating model will help deliver this, see section 8.1.

Digital Health Operating Model

Strategic objective	Delivering our EPR	How we can improve	How we can innovate
Operating model for Digital Health	Develop the existing patient panel to bring the patient voice into our digital strategy Implement the Data Privacy, Security and Corporate Records Management Operating Model Maintain existing levels of partnerships.	Build the capability of our existing digital transformation function in user-centred design through training, a community of practice and a methods bank Create a TOGAF-lite architectural model for strategic oversight Develop and deliver a Digital Health communications plan with a dedicated specialist role Develop a recruitment and retention plan for Digital Health workforce Develop an enhanced partnership arrangement for expanding capabilities and capacity on *as required* basis to match delivery requirements. We will develop a policy that defines how the organisation will procure, distribute, manage and maintain software	Introduce executive leadership for user-centred design and designated capability and capacity to embed a user-centred approach across all programmes Engage with colleagues to scope a strategic change function comprising user-centred design, QI, PPIE and transformation.

		across the organisation, and the responsibilities of the individuals that are given permissions to use that software.	
	What it means for people	**What it means for people**	**What it means for people**
	Patient voice is included in digital programmes and projects.	Digital Health projects and programmes are designed, implemented and optimised with users at the centre.	User-centred design is embedded at all levels of the organisation and works in tandem with other change approaches, so users are at the centre.

Table 9 - supporting strategic objective - operating model

Digital Health operating model – basic foundations

Core current Digital Health delivery functions and capabilities are as follows:

- **Clinical & corporate divisions** – managing relationships
- **Core services** – service desk, switchboard, IT services catalogue, network services, infrastructure services, desktop services, application support, RITS
- **Cyber security** – threat detection and prevention, policy, compliance and accreditation function
- **Training & support** – onboarding and upskilling users, and administratively supporting applications
- **Information services** – operational reporting, business intelligence and data science
- **Information governance** – advice, guidance, compliance and regulatory function
- **Clinical safety** – assessment for all new digital products and services
- **Digital hospital –** projects and programmes delivery and governance.

As part of ensuring that we have firm foundations for our Digital Health operating model we will maintain existing levels of partnerships and implement the Data Privacy, Security and Corporate Records Management Operating Model.

Service desk

This strategy sees us move to a more digital operating model, this will automatically translate into an increase in volume and severity of calls to the Digital Service Desk. As we roll out clinical and operational systems which are increasingly mission-critical to the safe and efficient delivery of care, we must provide digital support both day and night. To achieve this, we will need to expand key Digital Health teams to provide 24x7x365 on-call

support. Our Digital Health service delivery roadmap will help deliver reliable, responsive and consistent digital support across the Trust. We will align our support to ITIL industry standards and include key performance indicators and operational level agreements. This will ensure we provide a solid support function which will be an essential part of a successful EPR go-live.

Equipment and end user devices

A key finding from the user insight was the need for access to sufficient, quality devices which operate at the standards expected in a modern workplace. As part of our Digital Health operating model, we will ensure that staff have access to the technology and devices that best support their roles. We will also ensure that hardware, software and end user devices are all within the suggested supplier life cycle and fully supported. We will work with our suppliers and our health and care partners to ensure we can get the best deals and value for money on our IT equipment purchases. Mobile workstations will have manufacturer's next day support and battery replacement to ensure equipment is useable at the bedside.

Patient panel

We will develop the existing patient panel to bring the patient voice into our digital strategy.

Contract management

We will develop a strategic approach to contracting and management of supplier relationships

Strategic direction & architecture

We will develop a practical and pragmatic architecture framework that provides an overarching context for the design, planning, implementation, and governance of an enterprise information management and technology environment.

Digital Health operating model – how we can improve

We will design our Digital Health operating model with the needs of our users at its heart.

Case study – clinical engagement in EPR optimisation

Alder Hey Children's NHS Foundation Trust is a small acute NHS Trust in the North West. In 2015 it opened a state-of-the-art hospital alongside a brand-new research, innovation and education centre which aimed to bring together excellent care, technology and design and provide the best possible healing environment for children and their families.

The Trust has created associate clinical digital roles for each division after recognising that one CCIO was not sufficient. It has a growing team of medics, nurses and allied professionals who not only work as clinicians but also have dedicated time to work with the digital team. This approach recognises that there are different challenges and opportunities in each specialty and that optimisation requires a deep clinical understanding of each clinical area. Focusing on the experience of clinicians and what is most important to them has meant that the EPR meets their needs, resulting in better

data entry, data quality and increased staff buy-in.

Communication

The feedback from our research indicated that colleagues wanted to feel more connected to the Digital Health Team. This meant that at times, they were not able to seek the expert advice which would enable their creative and clinically innovative ideas to be safely implemented at scale.

We will extend our business partner model to align a digital health expert with each division. We will identify clinical digital champions in each directorate to co-design digital solutions. We will also appoint digital advocates from the digital health team, to liaise between the clinical teams and the digital health team. This will ensure we fully understand the needs of the division and can responsively and flexibly support clinicians and practitioners through their clinical workflows.

We recognise the importance of keeping our people up to date with developments in Digital Health. We will therefore appoint a dedicated specialist to develop and deliver a Digital Health communications plan.

User-centred design

We will build the capability of our existing digital transformation function to use user-centred design. Methods will include training, a community of practice and a methods bank. This will help to ensure we better understand user needs and that our Digital Health projects and programmes are designed, implemented and optimised with users at the centre.

Strategic oversight

We will create a TOGAF-lite architectural model for strategic oversight.

We will develop a policy that defines how the organisation will procure, distribute, manage and maintain software across the organisation, and the responsibilities of the individuals that are given permissions to use that software. This will minimise shadow IT in the organisation.

Recruitment and onboarding processes

We will streamline and improve our recruitment and onboarding processes. These changes will reduce current frustrations and will include:

- integrating Recruitment (TRAC) with Budget approval and integrated with Trust Payroll
- Integrated Starters & eLearning so logins are pre provisioned and new starters able to commence orientation, mandatory and Digital training ahead of their first day

- Advanced eLearning Services including orientation to the Digital health team, digital champions and advocates and an introduction session to all the digital technology available to colleagues
- Assistive technology that makes Trust mandatory training easy to schedule and complete online from anywhere
- Intuitive seamless onboarding processes.

Attracting and retaining talent

During interviews senior stakeholders shared their difficulties in recruiting and retaining digital and data talent across the organisation. This is evidenced in the current level of vacancies, bottlenecks in project delivery and the lack of ability to succession plan. We will need to create a dynamic and creative digital health team to deliver the major digital programme required by the joint EPR. We will therefore develop a recruitment and retention plan for our Digital Health workforce. This will cover topics such as recruitment campaigns, apprenticeships, graduates, career development, shared roles across the ICB, support as a service, equality & diversity.

Digital Health operating model – how we can innovate

There are opportunities to digitise the workforce model at every stage of the journey from recruitment to ongoing professional development. As we move towards shared staffing models and shared models of care across the Acute Collaborative, we need our people to be able to move seamlessly across the boundaries of organisations and work effectively across sites.

We will build on the improvements made in streamlining key parts of the process to look at:

- Joint recruitment and appointment campaigns
- Collaboration with the University of East Anglia to incorporate digital within the student nursing curriculum
- Flexible staff passports between the 3 Trusts to enable the movement of people between roles
- Joint electronic rosters across the Trusts and combined on call rotas for Drs as well as a digital staff bank to support the Trusts
- Geolocating and RFID tagging devices to enable efficient location and deployment of assets across the estate
- Wayfinding technologies akin to modern airports to enable people to find their way intuitively around sites.

Partnership arrangements for resourcing

We will need to create a dynamic and creative digital health team to meet our growing requirements. We will investigate alternative models to expand our capabilities and capacity on an as required basis to match our delivery requirements. This may include partnering options with external organisations or developing shared delivery models at a local or ICS level. A blended approach in tandem with our in-house teams will bring additional capabilities (skills) and capacity (resources) as and when required, whilst increasing the

overall maturity of the functions. Any such approach will need to be flexible so that the Digital Health team can scale up and down as required, with a focus on knowledge transfer and building internal capabilities.

Embedding user-centred design

We will embed user-centred design at all levels of the organisation including our executive leadership. We will ensure it works in tandem with other change approaches so users are at the centre across all our programmes.

Strategic change function

We will engage with colleagues across the three acute Trusts to scope a strategic change function, this will bring together user-centred design, QI, PPIE and transformation.

Intelligent analytics support

We will create a multidisciplinary, nationally networked analytics team that is able to rapidly turn around problems. They will provide clinically meaningful insights and provide advice on capturing data to both drive and measure improvements in care.

Strategic objective - governance

Strategic objective	Delivering our EPR	How we can improve	How we can innovate
Governance	RITS is amended to include a requirement to include user needs Introduce a central Digital Health lead for clinical divisions.	RITS is overhauled to provide light touch discovery support for new improvements/innovations including expert advice, discovery methodology and application of standards (e.g. DTAC) Digital Health aligns leads for each division and participates in their governance Design and incorporate user-experience metrics into all projects and programmes Regular colleague survey of usability.	RITS is replaced by a 'living lab' in which new ideas can be assessed through discovery, prototyping and assessment against standards - delivered in partnership with an academic institution.
	What it means for people	**What it means for people**	**What it means for people**
	There is a process in place for new proposals to be assessed by the digital team	People with new proposals have a supportive experience and understand standards and dependencies	People are enabled and encouraged to test out ideas for improvement and innovation in

	There is a minimum capability to manage relationships with divisions.	There is good engagement with divisions aligned to their governance arrangements.	partnership with Digital Health and other expertise. (e.g. universities)

Table 10 - supporting strategic theme - governance

APPENDIX B WGLL Alignment

We have aligned our digital roadmap and digital operating model with the requirements set out in the WGLL framework.

Guidance	NNUH alignment
Maintain a central, organisation-wide, real-time electronic care record system.	Our ambitious joint EPR programme with the two other acute Trusts in N&W will deliver real-time electronic care records.
Extend the use and scope of Trust electronic care record systems to all services, ensuring greater clinical functionality - this must include links to diagnostic systems and electronic prescribing and medicines administration. (EPMA)	All clinical applications which are technically capable of being digitally integrated will be linked into the EPR. This is part of the underpinning architecture of our joint EPR programme.
Contribute data to the ICS-wide shared care record.	This is a key deliverable in progress with milestones in place at an ICS and Trust level. It is a foundational programme across the ICS supporting health and social care workers to share and access information about patients and citizens, combining information from acute hospitals, general practice, community and mental health, and social care. Phase 1 read only access will go live in Q1 2023.
Ensure compliance with NHS national contract provisions for technology-enabled delivery. (for example, clinical correspondence and electronic discharge summaries)	Our revised digital operating model will ensure all new clinical applications are contracted in line with national guidance.
Ensure clinical systems and tools meet clinical safety standards.	Our revised digital operating model ensures all systems and tools are reviewed with a plan in place to ensure they are compliant.
Have a plan to get off and stay off unsupported systems.	Our Digital Health strategy has a plan to move off unsupported and in-house developed systems. This is aligned to the implementation of our new EPR
Ensure that the systems Trust staff use are	User centred design is at the centre of our

intuitive and easy to use.	approach. We will extend its use across all digital projects.
Use digital communication tools to enable self-service pathways such as self-triage, referral, condition management, advice, and guidance.	We have already implemented a range of remote digital and virtual care projects. We will continue to deliver self-service pathways as part of our patient centred digital strategy and in line with our design principles.
Ensure that people can access and contribute to their own health and care data.	This is a central tenet of our patient digital strategy and underpins our approach to the design of digital projects.

Table 11 - digital alignment to WGLL framework

APPENDIX C Technology environment at NNUH

Network and telecoms - this layer is a critical enabler to all other technology layers. Our comprehensive wired and wireless network equipment refresh will complete in March 2024. We have some connectivity concerns – including the guest Wi-Fi. We have an aging IP telephony system which we will review for potential replacement in conjunction with the capabilities available via Microsoft Office 365/ Teams.

Hosting environment - we have two data centres. Equipment is being migrated into the new modular data centre and supported by high availability deployment options. We plan to increase our use of cloud hosting, with a target of 20% being cloud-based by the end of 2024. Further work is required to improve our capabilities, communication and understanding of disaster recovery and business continuity.

Servers and storage - we have around 650 servers, 80% of which are virtualised. An upgrade of the remaining server operating systems from Windows Server 2008 and 2012 to 2019/22 is ongoing. A managed service NetApp MetroCluster hosts two SQL clusters, some clinical applications and file shares. PACS is hosted as an on-premise managed service. We are assessing AWS and Azure cloud-based resources.

Technical services - basic network security, monitoring and management tools and services are in use including AD, antivirus, Microsoft Defender for Endpoint, Microsoft Data Loss Protection. On-site CommVault backup agents stream data to remotely hosted media vaults, managed by Proact. We provide VPN connectivity for third party suppliers and a remote worker VPN solution via the Checkpoint firewalls. We deployed Office 365 five years ago, have fully deployed Apps for Enterprise and are assessing options to deploy SharePoint and OneDrive across the Trust. The Azure Virtual Desktop is also in use.

End user devices - there are about 12,500 users and around 7,500 desktop clients in use across the Trust. This is a mixture of desktops, laptops and tablet devices.

Integration - our Development & Integration Team develop and maintain 45 in-house apps and the integration between all our applications. InterSystems' Ensemble platform (being upgraded to HealthShare) is our main Trust integration engine. The Mirth integration engine supports interfaces to PAS. Restart are subcontracted to provide maintenance and some development. There is support for integration into ICS level initiatives (such as the shared care record).

Applications - we have around 140 main applications. A core subset has a dedicated Application Support and Training team who provide second line support, sysadmin functions and liaise with third-party application suppliers. They also manage training, most of which relates to PAS and is online. Our Change & Transformation team develop training materials as part of project delivery.

Information management - our BI team of 20-25 people build and maintain the data-warehouse, develop operational reports and dashboards. We also have devolved BI staff in other areas including critical care, labs, cardiology, infection control, and the commissioning team. The BI team use a range of tools including Power BI, SSRS, SSIS, Excel and SQL Server Management Studio. Data for reporting is pulled from various systems on a daily basis and fed into a summary database, this includes some near real time data (e.g. for the ED dashboards). We do not currently have a BI Strategy but have recently defined a set of strategic goals.

Our data science team use the Healthcare Data Architecture (HCDA) hosted on Azure and CogStack hosted in the cloud using Amazon Web Services (AWS). The CogStack tool was developed by Kings College and loaded with millions of records of reference data to enable AI analysis of that data and provide informed insights. There is an upcoming regional level investment of £10m over 3 years in a Secure Data Environment (SDE).

IT Service Management (ITSM), maintenance and support - we have a four-phase roadmap for development of our Service Delivery function. We have an "In your shoes" initiative that offers IT staff the opportunity to experience the clinical environment by shadowing clinical staff.
We use the Request for IT Services (RITS) process to manage and prioritise IT-related requests which are shared across IT, IG and security teams for input. The Programme Board has final sign off of RITS items.

Our ITSM team provides support for all applications, infrastructure (including the switchboard) devices, and deliver some applications training. The ITSM are linked into procurement activities and provide a 'business partner' role that liaises with the departments and services on a regular basis.

The team uses Freshservice, an ITIL-compliant service desk tool. We use other tools to monitor the virtualised environment (V-Realise Ops) and the network (PRTG). Native tools are used across cloud services. There is a change advisory board (CAB) attended by Business Systems Managers that runs weekly.

Governance: strategy, architecture, security and delivery - we have a technical design authority role within the Digital Health team, but recognise that we need to

define an overarching architecture. We do not currently have a portfolio or programme management function.
Our small cyber security team works closely with other local hospitals' cyber security teams to share knowledge and resources in mitigation. The team author and enforce security policies. We have a range of security measures and tools in place and plans to implement Secure Boundary. We conduct annual penetration testing. We are not currently compliant with the CE/CE+ standards and we do not have a formal cyber security strategy or roadmap.

We have a two-person Information Governance (IG) team who manage the Data Security and Protection Toolkit (DSPT) submissions, Data Protection Act (DPA), General Data Protection Regulation (GDPR) compliance and fulfilment of Subject Access Requests (SAR) and Freedom of Information (FOI). Our team has worked with a third party to complete a review of the IG function and produced a SWOT analysis. This will input into our IG strategy along with working to establish concept of a "FAIRER" context for IG.

Underinvestment in technology over the last 10 years has resulted in the need to do 10-15 years of 'catch up' in 3-5 years. This strategy sets out an advanced future state vision as a target however pragmatism is needed in the short term. The Digital Health team need a longer-term approach to provide of appropriately skilled IT resourcing and skills (capability, capacity, maturity). A revised operating model aligned to future state digital technology environment and services is required. Funding will need to match the strategic ambitions and also align with and support the ICS/ICB strategy.

APPENDIX D Embracing Artificial Intelligence (AI)

	Pillar 1: Investing in the basic needs of the AI ecosystem	Pillar 2: Ensuring AI Benefits All Sectors and Regions	Pillar 3: Governing AI Effectively
Short term (1-2 years):	• Publish a framework for how we can enable better data availability and data access at NNUH and its partners • Perform a consultation on existing compute infrastructure, AI technologies, and data sources • Support the development of AI, data science and digital skills through the co-development of educational programmes with partners such as UEA and Health Education England	• Integrate and engage wider strategic programmes which contain AI elements (such as digital transformation, COTS AI apps and initiatives) • Consult and align with large scale data infrastructure programmes (NHS England Federated Data Platform and Secure Data Environment (SDE) and the Norfolk and Waveney Health and Care Data Architecture (HCDA)	• Publish an AI assurance roadmap for the organisation which includes the foundations for the safe use of AI • Determine the role of data protection in wider AI governance and information governance legislative framework • Publish details and horizon scanning of the approaches other healthcare, government departments and international bodies use when adopting and using AI
Medium to long term (next 2-5 years)	• Publish research into what skills are needed to enable employees to both build and use AI in healthcare and research settings and how national, regional and local skill provision programmes can meet those needs • Support and partner with local and regional centres to promote the use of	• Publish research into the opportunities and challenges to encourage the diffusion of AI across the health and social care sector locally and regionally • Consider how innovation can include AI capabilities and promote ambitious clinical and digital transformation	• Publish white paper on pro-innovation position of the organisation in relation to governing and regulating AI in healthcare • Complete an in-depth analysis on algorithmic transparency, bias and interpretability of AI with a

	AI in health and social care (i.e. local government bodies, university and research partners, innovation centres) • Evaluate the changing landscape and impact of the increasing use of AI in major programmes such as electronic patient record, population health management, shared care records, genomic and precision medicine	• Build open data initiatives and data labs to promote the use of AI for societal change and understanding	view to develop standards frameworks • To work with partners to co-develop guidance and standards frameworks for ethics and safety, values and priorities for the use of AI in healthcare

Table 12 - Artificial Intelligence - Three Pillars