Sheffield Teaching Hospitals NHS Foundation Trust

Information and Technology Strategy 2020
Chapter 1 – What the Trust needs technology to do by 2020
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Executive Summary

"The experience of industry after industry has demonstrated that just installing computers without altering the work does not allow the systems and its people to reach their potential; in fact, technology can sometimes get in the way. Getting it right requires a new approach; one that may appear paradoxical yet is ultimately obvious: digitising effectively is not simply about the technology, it is mostly about the people…"\(^1\)

Since the current Sheffield Teaching Hospitals NHS Foundation Trust (STH) Technology Strategy\(^2\) was published in 2013, much has changed. The way in which the Trust uses technology has changed significantly in the last 3 years as a result of the Transformation Through Technology (T3) Programme. Everything we do is to improve patient outcomes and we have learned a lot of valuable lessons about large scale IT change. The Trust has learned with us and now has a much greater appreciation of the benefits and some of the challenges of technology transformation. Technology itself has also moved forward in ways that might not have been foreseen when we started the delivery of our strategy. NHS England in particular has recognised this trend and has recently announced enhanced funding to allow the fast-tracking of "medtech" innovations\(^3\) which Trusts such as STH may be able to access.

More widely, continuing financial pressures, including significant cuts to social care spending, new national and local reports and initiatives, national staff shortages of doctors and nurses, and changing local demographics mean that how STH works and how we serve our community needs to transform\(^4\). As a Trust, we need to consider the role we take in the wider health economy system and how care crosses geographical, operational and financial boundaries.

The backdrop of the EU Referendum decision to leave the European Union further complicates this, although the implications of this on our funding and workforce are clearly as yet unknown.

Dr Robert Wachter’s influential book ‘The Digital Doctor’\(^5\) explored how technology is applied and adopted by the healthcare industry. In it he used his direct experiences of the American healthcare system, which is more advanced than in the UK, as his backdrop. The key message was that we must bring the worlds of medicine and technology into closer alignment. As a result, Dr Wachter was invited by the Department of Health to chair an advisory panel which undertook an assessment of technology in the UK healthcare system. His report to the National Advisory Group on Health Information Technology in England entitled ‘Making IT Work: Harnessing the Power of

\(^1\) Wachter, R. (2016) “Making IT Work: Harnessing the Power of Health Information Technology to Improve Care in England”
\(^2\) Informatics (2013) “Sheffield Teaching Hospitals NHS Foundation Trust Technology Strategy and Roadmap – Part 1- Strategic IT Requirements”
\(^3\) Building Better Healthcare (2016) “NHS chief launches new fast-track funding to promote medtech innovation”
Health Information Technology to Improve Care in England produced key findings that it is important to study and consider in the building of our future strategy. This must also be considered alongside the Carter Report, which identifies areas of variation and drives towards standardisation in the delivery of care and utilisation of resources. These are detailed across the chapters of the strategy.

To remain consistent in meeting the information and technology needs of the Trust, we should maintain our focus on supporting our clinicians and researchers in increasing activity, reducing waste time and delivering excellent patient care, whilst helping STH move from a Care Quality Commission (CQC) rating of Good to Outstanding and complementing the Trust’s corporate strategic objectives. To do this it is therefore important to review, refresh and reset our vision. Understanding our current position as a Trust and as a department is the first step and this part of the refreshed Information and Technology Strategy focuses on that. The strategy has been jointly produced with Information Services to create as holistic a strategy as possible.

The context for the Trust’s technology has changed significantly

The implementation of the T3 Programme, consisting of an Electronic Patient Record system, an Electronic Document Management Solution, an Integrated Clinical Portal and Xerox managed print service has taken the Trust on a significant journey. Externally, NHS England’s 5 Year Forward View (5YFV) has set key gaps the NHS needs to close and Information Technology has a key role to play in successfully accomplishing this, and attaining the Government’s goal of paperless at the point of care by 2020. To achieve this, the digital maturity of the NHS must improve and the adoption and implementation of technology should be coordinated at regional and local levels.

The South Yorkshire and Bassetlaw regional footprint’s Sustainability and Transformation Plan (STP) sees digital maturity as fundamental in achieving the wider ambitions of the priority work streams within it due to its potential to radically impact upon and transform health and care support across our communities more widely.

“Our digital and technological infrastructure can therefore be also regarded as the skeleton upon which our wider transformational ambitions depend.”

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6 Wachter, R. (2016) “Making IT Work: Harnessing the Power of Health Information Technology to Improve Care in England”
8 NHS England (2014) “Five Year Forward View”
To realise this vision, Sheffield’s CCG has developed a Local Digital Roadmap (LDR) built around the needs of our city’s population. This provides steer in terms of priorities highlighted by how we’ve scored against a digital maturity assessment and the requirements of our communities and fellow health and care workers.

Running in parallel to this is the national Test Bed initiative. The Sheffield city region Perfect Patient Pathway test bed (PEPPA) has facilitated the collaboration and communication between health and social care workers and key healthcare technology innovators to explore possible solutions that will support patients with long term conditions in self-management, allowing them to remain independent in their homes close to friends and family, monitor their own health and avoid preventable hospital admission.

STH’s digital maturity assessment has shown that although in some respects we exceed the national average, there are other areas in which development is needed if we are going to be able to deliver the vision laid out in the 5YFV.

- Records, Assessments and Plans
- Transfers of Care
- Medicines Management and Optimisation
- Clinical Decision Support

In some cases, the T3 Programme has started us on this path to digital maturity, but it has yet to be fully embedded so that the full benefits can be realised. It is anticipated that when the assessment is completed again next year that our score will have increased.

The Informatics Capital Plan for the coming years includes many items that will increase our maturity; however Informatics is working within tight capacity constraints and needs to serve the Trust in delivering benefits that increase activity and reduce waste. The last three years have shown us that our technology infrastructure is even less robust than we thought; therefore priority work to maintain service provision has already been scheduled for the coming years, which diminishes Informatics’ capacity to deliver other requirements.
Our understanding of what we would like from technology has grown

Extensive consultation with our clinical and non-clinical colleagues in the Trust, discussions with our patients via reference groups and governors, a review of emerging strategies in nursing and community, the lessons learned from the T3 Programme, and consideration of the wider system and technology landscapes all show that there is still a lot the Trust wants to do using technology. The requirements set out in this chapter break down into the following major focus areas:

<table>
<thead>
<tr>
<th>Focus Area</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Views</td>
<td>Making sure we can assure patients that the data we hold about them is kept confidential, has high integrity and is only shared where appropriate and when consent is given is a high priority. Accessing amenities such as Wi-Fi when an inpatient will improve the patient experience.</td>
</tr>
<tr>
<td>Technology Fundamentals</td>
<td>Providing a good IT service is fundamental to the smooth running of the hospitals and community sites, therefore getting the basics right is really important. We also need to be confident the technology is up to date and works when we need it to.</td>
</tr>
<tr>
<td>Electronic Communications and Collaboration</td>
<td>Ensuring clinicians can always access to systems they need both inside and outside the Trust and have the right tools to work together. A focus on communications and collaboration technology, and better integration at health economy level, could yield significant clinical benefits.</td>
</tr>
<tr>
<td>Easy to Use Systems</td>
<td>Making sure the information we have is reliable and easy to use is fundamental to how we work. Being able to capture and edit this easily is crucial to helping have the best picture of a patient’s history as possible.</td>
</tr>
<tr>
<td>Clinical Information and Decision Support</td>
<td>Making sure that we get the clinical information we need in one place in order to provide the best care and make the right clinical decisions is paramount.</td>
</tr>
<tr>
<td>Core Clinical Platforms</td>
<td>There has been a necessary focus on T3, but we need not to lose sight of the critical platforms that clinicians use today and how they will evolve too as they coalesce, interoperate and, ultimately, are retired and replaced.</td>
</tr>
<tr>
<td>Managing Assets &amp; Resources</td>
<td>Developing and introducing systems that enable more effective management of our clinical workforce, improved clinical safety and enhance our management of devices is becoming increasingly important.</td>
</tr>
<tr>
<td>Business intelligence</td>
<td>Ensuring that we understand and take collective ownership of our data collection processes and that these</td>
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are fit for purpose. Developing data standards allowing data to be integrated and analysed. Developing technical analysts that can support prescriptive analytics to drive improved patient health care outcomes.

This chapter of the Information and Technology Strategy explores these needs in more depth, and sets the foundations on which our technology vision and roadmap must build. Refreshing our strategy and embracing the STP and LDR puts STH at the forefront of IT innovation with our patients needs at the core of our journey towards being paperless at the point of care by 2020 and having more connected regional healthcare services. It also allows us to realign with the wider Trust and its clinical priorities. We want to support the Trust’s vision of being “recognised as the best provider of health, clinical research and education in the UK and a strong contributor to the aspiration of Sheffield to be a vibrant and healthy city region”11, aid in the delivery of the Trust’s aims and reinforce the adoption of technology within the Trust.

Refreshing our Strategy

Why do we need a refreshed strategy?

- Pressures on NHS funding have created the need to make significant savings over the coming years\(^\text{12}\). The need to balance managing finances and improving service delivery without compromising quality, our values or the patient community we serve, is a challenge for all services. Technology will hold the key in many cases to eliminate waste and increase quality.

- The need for standardisation is no longer up for debate – it is an NHS wide necessity\(^\text{13}\) and STH must respond to realised any clinical and corporate efficiencies possible. Information and technology will underpin our success in this.

- An STH Board Report\(^\text{14}\) has showed decreases in activity levels, which impacts on already time poor clinicians and their ability to deliver patient care. Our projects should be designed to deliver valuable benefits in this space.

- We need to ensure that we continue to be highly successful in providing quality clinical care to our patients, whilst striving to be at the forefront of research and innovation.

- As we introduce more technology into the healthcare sector and share information more widely, we need to be vigilant in our approach to cyber security. With the levels of cybercrime with respect to large provider organisations increasing internationally including ransomware attacks and the threats of terrorist attacks on our hospitals, we will need to build a robust and sustainable response.

- The environment and context in which we provide services is changing very rapidly. Our population is aging; coupled with a rise in long term and complex conditions, the impact on our health and care services will be significant.

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\(^{12}\) Nuffield Trust (2012) "NHS and social care funding: the outlook to 2021/22"

\(^{13}\) Carter, P (2016) "Operational Productivity and Performance in English NHS Acute Hospitals: Unwarranted Variations"

\(^{14}\) Sheffield Teaching Hospitals (July 2016) "Board of Directors Integrated Performance Report"
We also need to consider the younger, more tech savvy Generation Z that will be entering the workforce over the next few years – how they use technology is very different from previous generations.

There is global recognition that health care is at least a decade behind other industries in its use of IT\(^\text{15}\). The 2013 STH Technology strategy acknowledged that our existing technology was fragmented and not capable of meeting the needs of the Trust\(^\text{16}\).

The EU referendum result has created economic and political uncertainty. The impacts are at present unknown. Determining what the implications are for the NHS in a post-Brexit world is something that the health and care community needs to be involved in from the outset\(^\text{17}\).

The Trust realises that in order to be fit for this future it needs to continue to transform. These ambitions can only be realised by changing the way the hospitals are run, both operationally; the way in which processes are operated and controlled, and clinically in terms of the speed and quality of providing patient care.

Building partnerships with other Trusts and becoming part of a wider health economy system will be important in improving regional care and Informatics needs to be flexible in order to support these relationships.

To be successful in this we need to look outwards to the bigger drivers whilst maintaining our internal focus and alignment with the Trust’s Making a Difference strategic objectives. Ensuring our strategy is clinically led will mean that Informatics can better support our colleagues around the Trust in delivering patient care. We also need to:

- **Build upon our technology investments** to date over the next 5 years.
- **Enable technology and service change to be in step** by supporting standard processes.
- **Benefit from innovation elsewhere** (e.g. via the Sheffield Test Bed).
- **Interface more effectively with the wider health and social care economy** so as to mitigate the risks of disconnects and benefit from greater integration.

\(^{15}\) Nuffield Trust (2016) “Delivering the benefits of digital health care”


\(^{17}\) NHS Providers(2016) “Brexit Briefing Paper”
- **Aim to become a Digital Hospital** and use the best that the market has to offer.
- **Remain flexible and agile** in order to be able to respond to evolving needs, technology and funding constraints.
- **Strive to realise the benefits from our investments and innovations.**
Where have we been?

The Technology strategy, published in 2013 following approval from the Trust Board, set out to deliver useable and well supported technology that enabled the development of the Trust’s capability and supported its strategy.

The requirements were grouped into technology themes, our goals were identified and a plan put in place to address each of the themes.

The Transformation Through Technology (T3) Programme – our focus since 2013 - delivering the foundations for a new Electronic Patient Record system, providing an Electronic Document Management Solution and an Integrated Clinical Portal to draw information together in one place. We also implemented PACS and a Renal Information System (on-going).

E.g. The introduction of Electronic White Boards for bed management on the wards as part of T3.

E.g. The start of our network and infrastructure refresh as part of the recent risk assessments conducted in preparation for T3, the refresh of our desktop, the roll out of a managed print service and the introduction of the FlexPod technology. ‘Keeping the Lights On’ work that ensures our systems run reliably, software is secure and up to date and end of life equipment is replaced.

E.g. The Community Mobile Working project replaced Toughbooks with laptops that had better connectivity.

Informatics has undergone some organisational change and is on the journey to be structured to enable an end to end delivery system that identifies requirements, devises solutions, implements the change, drives benefits realisation and provides the support needed to maintain it going forwards. Surrounding this, a robust, clinically led governance structure has been put in place. The Technology Board, chaired by the Medical Director, ensures that major decisions made are from a clinical perspective and support our clinicians in their delivery of patient care.
The roadmap below lays out the planned timeline of activity set out in 2013 and shows the significant progress we have made.

The 2013 Technology Strategy focussed on the development of a “core” Electronic Patient Record (EPR) system (focussed on an integrated PAS, A&E, Orders and Results, Maternity and Theatres modules), augmented by an Electronic Document Management Solution (EDMS), and an Integrated Clinical Portal to provide access to Departmental systems outside the EPR. The T3 Programme was established to start the implementation of that strategy. It was the largest IT Programme in the NHS and delivered on time and within budget. Amongst its many achievements:

- The first modules of our new EPR system, Lorenzo, are now live, and we have trained more than 8,500 staff. The application will be our core platform on which to build additional functionality and modules and will provide a focal point for our on-going EPR strategy.
- Our Electronic Document Management Solution (EDMS) is being implemented and has so far scanned over 8.5 million pages of paper records.
- Single Sign On (SSO) is in place with 20 systems included and the Integrated Clinical Portal (ICP) has been connected to 9 core clinical platforms with multiple views available. Pilot and Community users are now live, with Acute Clinicians due to follow later in 2016.
- Our Xerox project has completed the first phase of installations and decommissions across the estate with over 1000 machines replaced.
- Electronic Prescribing (IPPMA), a module in Lorenzo, is planned to be rolled out during 2017.
The T3 Programme is the first step in our journey to modernise our major platforms. This process will continue through the next few years as we add additional functionality and optimise the operational deployment of the T3 product set. This was always foreseen in the timeline presented in the 2013 Technology Strategy above. The current timeline for the process of deployment, stabilisation and optimisation is demonstrated below:

Decisions on the future direction of ICP and Xerox are pending, however approval has been given for the IPPMA investment case and Project Initiation Document by the Health and Social Care Information Centre (HSCIC), now rebranded as NHS Digital.
Where are we now?

Since 2013, the IT landscapes both inside and outside the Trust has changed significantly. Technology is advancing in areas that could provide real benefit to health care but these breakthroughs demonstrate how far behind the curve we, and the wider NHS, still are\(^\text{18}\). The “Delivering the benefits of digital health care” study by the Nuffield Trust showed that in 2015\(^\text{19}\):

\[\begin{array}{ll}
71\% & \text{of all UK citizens had a smartphone} \\
88\% & \text{of all adults use the internet} \\
2\% & \text{of all adults use the internet} \\
\end{array}\]

Only a tiny fraction of those surveyed reported any digitally enabled transactions with the NHS…

…but there are over 43,000 medical apps available on iTunes

We are living in a ‘high touch – high tech’ world.

Technology is advancing at an unprecedented rate and even its traditional patterns are changing\(^\text{20}\). Innovations, ranging from wearable technology tracking vital signs and activity to 3D printing parts for jet planes, are pushing the boundaries and have enormous potential for health care application. In the last 3 years\(^\text{21}\) there have been significant advances.

At the same time the Trust still has a complex set of interconnected systems at both corporate and departmental level. The current map of those systems is provided in Appendix C.


In response to this the NHS has set out a new technology direction, which is being cascaded through regional and local activities.

- **NHSE 5 Year Forward View (5YFV)**
  - In its drive to deliver the highest quality of care for patients, NHS England’s information technology and informatics agenda is directed at enabling commissioners, providers and suppliers to make informed decisions about the investments and technologies to adopt that will best support this outcome.
  - To implement this, regions across the country have been divided into 44 footprints that will focus on the development of a Sustainability and Transformation Plan.

- **Sustainability and Transformation Plan (STP)**
  - The STP’s goal is to build care services around the needs of the local populations in an effective and sustainable way.
  - Technology has a significant role to play in the design.
  - STH falls into the South Yorkshire and Bassetlaw footprint, which serves ~1.5 million people and covers 5 Care Commissioning Groups (CCGs).
  - The technical element of the plan will be developed by each CCG in the footprint in the form of a Local Digital Roadmap.

- **Local Digital Roadmap (LDR)**
  - Each CCG is required to design a digital roadmap that lays out the direction of travel required to support the STP by improving the digital maturity of organisations.
  - The goal is to deliver a plan that closes the gap between care and quality, finance and efficiency, and health and wellbeing.

- **STH Technology Strategy**
  - We need to align ourselves with these external drivers, whilst maintaining our internal focus on what our clinicians need.
  - But there is a huge amount to do.
For South Yorkshire and Bassetlaw and specifically in Sheffield we have a cohesive regional technology vision, which is shared by the STP and LDR.

This diagram proposes a holistic and personalised care model for patients throughout the course of their lives by addressing physical and mental health needs on equal terms through the application of appropriate technology and alternative provision of care.

**Patient Empowerment** will be achieved through utilising apps and home based monitoring devices within a supportive environment.

**Independent living** will be encouraged by the adoption of discrete remote monitoring systems which provide peace of mind to patients, families and professionals.

**System Integration** will achieve a central digital data repository that facilitates interconnectivity and integration of technologies. This will allow for interoperability, data sharing and openness.

**Strategic Decision Support** will be drawn from the data gathered and assessed by cross-functional decision makers, empowered by organisations and equipped with real time data analytics / risk predictions to anticipate episodes and provide intervention to avoid emergency admission.

STH is at the heart of the regional and local initiatives that aim to bring the vision above to life. As one of the busiest and most successful Trusts in the UK and the largest in our region, we are looked to by other Trusts to lead the way.
We also have multiple delivery footprints.

The Sheffield City Region footprint is the focus of the Test Bed initiative involving health and care providers from:
- Barnsley
- Bassetlaw
- Bolsover
- North East Derbyshire
- Chesterfield
- Derbyshire Dales
- Doncaster
- Rotherham
- Sheffield

The CCG footprint comprises of:
- STH
- Sheffield Children’s Hospital
- Sheffield Health & Social Care
- Yorkshire Ambulance Service
- Sheffield City Council
- Primary Care Staff

These parties have been involved in the development of the Local Digital Roadmap.

The Working Together Programme (Acute Trust Vanguard) footprint includes the following:
- Barnsley NHSFT
- Chesterfield Royal
- Doncaster Hospital
- Bassetlaw Hospital
- Mid Yorks Hospitals Trust
- Rotherham NHSFT
- Sheffield Children’s Hospital
- STH

The WTP is a collaborative partnership aiming to make joint efficiencies and joined up care pathways between these regional Trusts:

South Yorkshire & Bassetlaw STP Footprint

This footprint includes health and care providers from the NHS and councils within 5 CCGs.
- Sheffield
- Barnsley
- Rotherham
- Doncaster
- Bassetlaw

The Digital Health Chapter of the STP provides steer for each CCG’s Local Digital Roadmap.
The Making it Better Programme, led by the Service Improvement team, has been established to oversee the Trust’s improvement and transformation programme. It draws on the recommendations made by the Nuffield Trust, King’s Fund and others to drive forwards our efforts on improvement and transformation and deliver the Trust’s objectives to provide the best clinical outcomes and patient centred care. The Programme has been designed to develop the organisation to successfully deliver sustainable quality and finances through the expansion of a high engagement, improvement and performance culture. The diagram below demonstrates the context and focus of the programme within the STH organisation.

There are 8 workstreams and high level aims identified within the programme, out of which technology needs are likely to arise.

**External Partnerships**
- To optimise external strategic partnerships to deliver improved services and organisational models for the future.

**Outstanding Outpatients**
- To develop high quality, continuously improving outpatient services where enthusiastic, valued and able staff provide the right care, first time to patients.

**Seamless Surgery**
- To create a best practice truly patient centred experience of elective surgery where the referral to recovery process is right first time.

**Excellent Emergency Care**
- To provide highly responsive, effective and personalised services for patients requiring unplanned care.

**Transformation Through Technology**
- To lead the delivery of a paperless STH by 2020, modernising processes and improving quality and efficiency through technology.

**Workforce Transformation**
- To develop a vision and workforce plan for the future, supporting teams to redesign their workforce models around improved processes, technology and service models.

**Commercial & Corporate Support Services**
- To develop back office processes and clinical support services to enable great frontline services.

**Organisational Development**
- To create a continually improving, sustainable organisation that delivers the best care for our patients through our highly motivated and engaged staff.

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22 STHFT Service Improvement (2016) “Making It Better Programme PID”
**Information Services** lead the implementation of the information and intelligence components of this strategy. The team provide a critical function not only in ensuring that information to support statutory and national reporting is satisfied, but also to ensure that information collected within the organisation can be used intelligently to deliver the best clinical outcomes and spend public money wisely.

**Running alongside this is STH's position as a Centre for Research Excellence.** There are teams involved in lots of national research projects in which STH is a lead or participating organisation (100,000 Genomes project\(^{23}\), the Academic Health Science Network’s Health North projects\(^{24}\) and the Insigneo Institute for in silico Medicine\(^{25}\)). We are proud of the strong partnership between STH, the University of Sheffield and the National Institute for Health Research (NIHR) and want to work to strengthen this further and achieve the Trust’s objective or delivering excellent research, education and innovation and helping STH to become one of the top Research and Development performers in England and a leader in innovation.

Specialised IT professionals in the Medical Imaging and Medical Physics (MIMP) team contribute significantly to STH’s research agenda. The MIMP team typically develop software applications that are developed to service specific, research funded needs. Frequently, these software applications can deliver significant value in the Trust as a whole. The MIMP development team is involved in the development and support of key products using a number of platforms (principally Alfresco, ARQ and a workflow engine). The team is highly skilled in these platforms and also has the clinical knowledge to use them to develop solutions that rapidly gain traction. The team also has a substantial analytics capability and uses a data warehouse and high end analytics processing capability to provide insights for research purposes.

The team is successful and products such as the new e-Check-in application are rolling out across the Trust as a result. This creates a longer term support need. Having developed a number of more widely used systems, capacity across the MIMP team is starting to struggle to meet the demand for new research systems due to support obligations. This may ultimately have a detrimental effect on the ability to service core research priorities and so will require a more holistic examination of the boundaries between MIMP, Informatics and Performance and Information.

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\(^{23}\) Genomics England (2013) *“The 100,000 Genomes Project”*

\(^{24}\) Academic Health Science Network North East and North Cumbria

\(^{25}\) Insigneo (2016) *“Insigneo Institute for In Silico Medicine”*
Sharing information internally

A key goal of this strategy is to develop a culture of curiosity within the Trust with regards to data and information. The Carter Report placed emphasis on this by stating “the innovative use of system-wide information and communications technologies…that support clinical processes, with the aim of improving the quality, efficiency and safety of the care delivered. Such systems can also empower patients to be effective members of their own care teams, this improving their experience.”26 There are definite and real needs to improve data quality of all records, including corporate as well as clinical. By standardising our data gathering we can improve quality and produce ‘a single source of the truth’. With this as the foundation, we will be able to use business intelligence to drive decision making and improve the care we provide to our patients.

Fundamental to success in these areas is the sharing of information with other institutions. Common problems of incompatibility due to differing applications remain therefore we need to have a clear understanding of how, where and by whom information is accessed at every point in the patient’s journey. Successfully achieving effective information sharing with our regional and local colleagues relies on having consistent processes and easy to use systems, and generating a collaborative approach.

In order to maintain STH’s position as a key contributor it is important that we align ourselves with national standards to exchange information in volume, securely and effectively.

The Trust has recently commenced a data quality baseline audit to assess data quality for the organisation. The initial findings of this work have been reported to the Trust’s Audit Committee with a recommendation that an Executive led Data Quality Steering Group is established to govern this programme of work. A national index for data quality was introduced in August 2016: Data Quality Maturity Index (DQMI).

The index has been designed as a data quality value index based on the completeness and validity of the core data items agreed by NIB working group. These include NHS number, date of birth, gender, postcode, speciality and consultant. It is communicated as a quarterly publication to highlight the importance of data quality in the NHS.27 The quarterly report provides timely and transparent information about data quality to health care organisations, commissions and regulators based on input from the National Information Board (NIB) working group.

Underpinning all of STH’s relationship with the wider health economy is the need for robust cyber security.

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What are the most significant digital threats?

Healthcare is rapidly becoming more digital, the benefits of which are evident already in that significant progress is being made in the quality of patient care which is resulting in more people surviving serious and life threatening illnesses or injuries. To become a fully digital NHS we need to be aware of our responsibilities and the potential threats to the integrity of our data and technology.  

“While rapid technological developments have provided vast areas of new opportunity and potential sources of efficiency for organisations of all sizes, these new technologies have also brought unprecedented threats with them. Cyber security – defined as the protection of systems, networks and data in cyberspace – is a critical issue for all businesses. Cyber security will only become more important as more devices, ‘the internet of things’, become connected to the internet.”

The responsibility to protect our patient data, whilst being able to share it appropriately has become a greater task due to the cyber threats which increase in sophistication exponentially and can be extremely costly. We need to be able to maintain a sufficient level of protection around our data. Key reports on cyber security in the NHS from the Care Quality Commission (CQC) and the National Data Guardian, Dame Fiona Caldicott, have found that there are challenges that must be factored into our future activities.

The NHS Digital CareCERT (Care Computing Emergency Response Team) Service went fully live January 2016 and aims to provide support to NHS organisations to enhance their cyber resilience, however further exploration of the issue is required.

Dame Fiona Caldicott, the government’s National Data Guardian, was commissioned by the Secretary of State for Health to review cyber security and data standards within the NHS. Published in June 2016, the report found that although there are many data standards in place and an Information Governance toolkit is in existence, the perception of many in the healthcare sector has been that it is a box ticking exercise and not adopted widely enough. As a result, recommendations have been made regarding new data security standards, methods for testing compliance with these standards and a new consent or opt-out model for patients.

- Leadership should demonstrate clear ownership and responsibility for data security.
- A redesigned Information Governance Toolkit that is utilised by all staff across the organisation.

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29 IT Governance Ltd (2016) “What is Cyber Security”
• Trusts and CCGs should effectively identify vulnerabilities and develop plans to remediate.
• Evidence must be provided that demonstrate plans are in delivery.
• NHS England should take steps to ensure data security is a key part of all financial contracts – failure to meet the desired standards should prevent the contract being extended.
• Data security should be audited internally and validated externally.
• CQC should revise their inspection approach in this area and make it more robust.
• Where breaches occur, sanctions should be firmer.

In parallel to these recommendations, the CQC was also commissioned under the same remit as Dame Caldicott by the Secretary of State for Health to undertake a review focussing on whether personal health and care information is being used safely and is appropriately protected in the NHS. The “Safe Data, Safe Care” Report, published in July 2016 found three key risk areas:

• Poor practice exists that could lead to data breaches.
• Complacency must be avoided.
• New technology increases risk.

The findings support those of Dame Caldicott and the report offers 6 recommendations on how the 10 standards can be delivered, including how its framework can be adapted to assess compliance across the Health Sector through CQC inspections, NHS England commissioning processes and any other possible avenues. Significant work will be required to implement these standards, ensure they are embedded within organisations and patients are safe in the knowledge that their data is held securely and shared according to their preferences.

The need for effective cyber security is recognised across all sectors and all countries and has resulted in countless initiatives to explore both the threats and measures available to preserve data security. This level of engagement has to continue, and even grow, to reflect the ever-changing nature of the threat. The significance of Cyber Security in the modern world cannot be overestimated.

31 Care Quality Commission (2016) “Safe Data, Safe Care”
What global learning is helpful to us?

Although the NHS is already undergoing changes to meet the vision of the 5YFV, a recent paper published suggests we need to amend our approach further.

Dr Robert Wachter’s book ‘The Digital Doctor’ precipitated an element of contemplation within the NHS. The key message of the book was that we (globally) must bring the worlds of medicine and technology into closer alignment, although there are caveats we must not overlook: “…we need to do it with our eyes open, building on our successes, learning from our mistakes, and mitigating the harms that are emerging”.

Dr Wachter’s report titled “Making IT Work: Harnessing the Power of Health Information Technology to Improve Care in England”, as commissioned by the Department of Health, published in September 2016, included some powerful insights that must be incorporated into our way of thinking.

Two Transformational Trends

There is ever increasing pressure on the NHS to deliver high-value care. Dr Wachter predicts that although this is the dominant issue today, it will be surpassed in 10 years by the drive to digitise.

Adaptive problems of change

In adaptive problems, people are the problem and people are the solution. Mobilisation and engagement of the workforce through strong leadership is key to success and overcoming the ‘productivity paradox’.

Digitisation vs. Improvement

Digitisation should be utilised to improve quality, safety, efficiency and the patient experience. It is not always appropriate to digitise everything.

Clinical Support and Engagement

Having the support of the clinical workforce, supported by extensive engagement is fundamental to delivering effective digitisation.

Don’t disregard the lessons from NPfIT

Although the programme has been heavily criticised, there are still positive lessons to be taken away. Successes such as the Spine and a single ID should be built on, not disregarded.

Resist Governmental Overregulation

With the NPfIT in mind, it is important to resist interference at a national level.

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34 Wachter, R. (2016) “Making IT Work: Harnessing the Power of Health Information Technology to Improve Care in England”
Interoperability is key  Interoperability is becoming ever more important within individual organisations and the wider health economy so it is important to invest effort appropriately to increase this capability.

User-centred Design  Making systems easy to use should be a primary motivator.

Clinical IT Workforce  We need to increase the numbers of clinicians who can contribute to technological development. A drive towards increasing the number of Chief Clinical Information Officers (CCIOs) is needed.

Culture of Change  IT systems are just the backbone, we need a culture that embraces technology and has the space to innovate and adapt ways of working for the better.

Productivity Paradox  A productivity Paradox can often be found post-implementation of technology. If this is not catered for the technology can get in the way and decrease productivity, despite the intention being to help. Implementing change is not just about making a system live: it impacts on the way we work.
What is our current Digital and Data Quality Maturity?

To understand how the NHS can close the gap around the technology available NHS England introduced a measure to quantify the **Digital Maturity** of organisations across the system. This is defined as the extent to which healthcare services are supported by the effective use of digital technology. Assessing levels of maturity helps to identify key strengths and gaps in a healthcare providers’ provision of digital services at the point of care and offers an initial view of the current ‘baseline’ position across the country. An organisation’s digital maturity will become part of the CQC inspection regime from March 2018 and we strive to be part of a Trust that is rated as Outstanding for our patients.

Trusts undertake these assessments themselves and will score against a set of criteria evaluating readiness, capability and infrastructure. The paperless at the point of care by 2020 goal, as set out in NHS England’s 5 Year Forward View, requires a level of **digital maturity of capability** that we at STH – and the majority of provider organisations - have not yet achieved.

The overall Digital Maturity scores for Sheffield reflect the journey we have been on since 2013. The headline scores from our self-assessment at the start of 2016 are as follows:

- **Our readiness** is at 82% and reflects the efforts the Trust has made to build robust clinical leadership of technology and to manage its introduction. In this respect we are a leading Trust across the NHS.

- **Our infrastructure**, on which we have to and will need to continue to invest, scores 68% - just below the level at which it would be considered to be mature. We still have much to do here, but we have made solid progress.

- **Our technology capability** (the technologies that are available at the front line) scored lowest in the assessment at 35% but does take account of the significant investment that we have made and which will now rapidly lead to our rating in this area – something that the T3 programme has given us.

There is national recognition that whilst digital maturity is important it is necessary to understand data quality through a similar measurement index, hence the introduction of the **Data Quality Maturity Index (DQMI)**. Digital maturity alone will not deliver improvements to quality and reduction in costs if data and technology is not implemented or used correctly by end users. Our strategy has therefore ensured that we understand the need to focus on both these measures going forward.

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Overall, the picture this paints is that, whilst not quite in the same bracket as the leaders in the NHS, we are solidly positioned now compared to where we were in 2013. Being paperless at point of care by 2020 is therefore achievable and we are well placed against our peers. Our journey is illustrated below:

Digital Maturity Self-Assessment: Key Findings (Capabilities Theme)

There were only 7 providers with an overall score of 70% or above for the Capabilities theme, which indicates they’re doing very well in all or most areas.

109 providers had a self-assessed score of between 40 and 69%, suggesting they’ve made good progress in some areas but still have gaps in a number of key capabilities.

Key:
- Red = Infrastructure score 0 - 39%
- Amber = Infrastructure score 40 - 69%
- Green = Infrastructure score 70 - 100%

Blue lines reflect the bandings applied in MyNHS.

123 respondents (more than half) had a self-assessed score below 40% for the Capabilities theme as whole. This illustrates the significant amount of work most providers still need to do in order to progress towards becoming paperfree at the point of care.
The gaps in our technology capability are also very well understood, and the following table shows how we are positioned on this dimension only compared with other organisations included in the CCG, is provided in the table below.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>National Average Score</th>
<th>Sheffield CCG Score</th>
<th>STH (at Jan ‘16)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Records, Assessments &amp; Plans</td>
<td>44%</td>
<td>42%</td>
<td>29%</td>
<td>STH currently has low levels of digital records available, though EDMS will start to support this, along with work on care planning likely to progress to Lorenzo.</td>
</tr>
<tr>
<td>Transfers of Care</td>
<td>48%</td>
<td>28%</td>
<td>21%</td>
<td>For both internal and external care handovers, very few of these processed are currently digitised at STH.</td>
</tr>
<tr>
<td>Orders &amp; Result Management</td>
<td>55%</td>
<td>33%</td>
<td>62%</td>
<td>Internally &amp; via Primary care, STH has done well with ICE, but room to improve on non-Lab and Rad services.</td>
</tr>
<tr>
<td>Medicines Management &amp; Optimisation</td>
<td>30%</td>
<td>32%</td>
<td>18%</td>
<td>IPPMA will be a step change in this area. Then remaining areas will be focused on.</td>
</tr>
<tr>
<td>Decision Support</td>
<td>36%</td>
<td>27%</td>
<td>17%</td>
<td>IPPMA will again improve this area. Ability to use further support via the use of Lorenzo will evolve over time.</td>
</tr>
<tr>
<td>Remote &amp; Assistive Care</td>
<td>32%</td>
<td>36%</td>
<td>42%</td>
<td>To be addressed in coming years with focus on Video conferencing and Test Beds.</td>
</tr>
<tr>
<td>Asset &amp; Resource Management</td>
<td>42%</td>
<td>50%</td>
<td>55%</td>
<td>Medical staff scheduling solutions and equipment tracking are the key elements required.</td>
</tr>
</tbody>
</table>

These figures relate to a self-assessment completed by Informatics in January 2016. We would expect these figures across all red scores to substantially exceed the national average by early FY2017/18 due to the completion of the implementation of remaining T3 components, notably EDMS, Lorenzo and IPPMA.

Gaps have been identified between areas for improvement and the work we have scheduled into our Informatics Capital Plan. STH’s digital maturity assessment has shown that although in some respects we exceed the national average, there are other areas in which development is needed. There is a worry that the 5YFV drive towards being paperless at the point of care by 2020 has caused worry that inadequate funding, spent in the wrong way and too quickly could cause trusts to fail.38

- Records, Assessments and Plans
- Transfers of Care
- Medicines Management and Optimisation
- Decision Support

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38 Wachter, R. (September 2016) Presentation in support of the publication of “Making IT Work: Harnessing the Power of Health Information Technology to Improve Care in England” at NHS Health and Care Innovation Expo, 7th September 2016.
Although the T3 Programme has started STH on a journey forwards that addresses some of these criteria, its infancy means that some benefits have yet to be realised. There is still progress to be made and as the programme embeds further, these will become more apparent.

It is anticipated that by next year, when the Digital Maturity Assessment is completed again, that our scores will increase as we maximise on changes the T3 Programme has introduced:

- Lorenzo will have had more time to develop and collect data and its scope as an EPR enlarged in line with our original intent.
- EDMS will have scanned significantly more case notes, meaning that there is greater availability for clinicians and smaller need for paper records.
- The Integrated Clinical Portal will be utilised by more staff.
- Single Sign On will have saved time for clinicians
- The Xerox solution will have minimised printing costs.
Although Digital Maturity is an indicator, it is not yet a sophisticated science that has clarity around the qualification for and allocation of additional funding. Lord Carter’s 2016 report investigated productivity and efficiency in non-specialist Acute NHS hospitals in England discovered areas of unwarranted variation in 15 areas, which gives us focus as to which areas require our immediate attention\textsuperscript{39}.

In addition, the Data Quality Measurements have shown STH has work to do. The initial reports have assessed key datasets as identified by National Information Board’s (NIB) framework\textsuperscript{40}. STH’s scores are as per the table below:

<table>
<thead>
<tr>
<th>Dataset</th>
<th>DQMI Score Jan ’16 – Mar ‘16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Admitted Patient Care</td>
<td>99.9%</td>
</tr>
<tr>
<td>Outpatient</td>
<td>100%</td>
</tr>
<tr>
<td>Accident and Emergency</td>
<td>99.8%</td>
</tr>
<tr>
<td>Mental Health Services</td>
<td>0%</td>
</tr>
<tr>
<td>Improving Access to Psychological Therapies</td>
<td>0%</td>
</tr>
<tr>
<td>Diagnostic Imaging</td>
<td>99.7%</td>
</tr>
<tr>
<td>Maternity</td>
<td>99.1%</td>
</tr>
</tbody>
</table>

The first publication of the DQMI, based on data from 2015, showed STH’s overall DQMI score was at 98.5% however later iterations of the report have shown a reduction 96.5% as further submissions and analysis have been completed.

Business Intelligence (BI) is fundamental to driving appropriate decision making; therefore the ability to provide a ‘single source of the truth’ based on standardised data is paramount. This relies on standardised processes to capture data and appropriate, easy to use technology to support it.

To ensure that Sheffield can continue to be at the forefront of improving national digital and data quality maturity, funding was secured to create a regional Test Bed, which allows Health and Care workers across England and global innovators to explore issues and evaluate technology that could deliver better patient care and avoid admissions to hospital. The Perfect Patient Pathway (PEPPA) Test Bed covers the Sheffield City Region and will start to deliver at trial sites in the second half of 2016.

PEPPA has facilitated discussions between frontline Health and Care workers across 14 of Sheffield’s services and 15 global technology innovators. The goal is to discuss requirements, evaluate and test technology that will help patients stay well by self-managing their long term conditions safely at home and avoid admission to hospital. This forum allows us to engage with our regional colleagues to improve collaboration, share learning, test technologies in the appropriate setting and develop a creative, progressive and joined up approach to how we deploy IT to enable the best patient care\textsuperscript{41}.

\textsuperscript{40} National Information Board (2014) “Personalised Health and Care 2020: Using Data and Technology to Transform Outcomes for Patients and Citizens. A Framework for Action”
\textsuperscript{41} NHS England (2015) “The PErfect Patient PAthway (PEPPA) test bed (Sheffield region)”
STH has been involved in the **Working Together Programme (WTP) Acute Trust Vanguard** since its inception. By working in partnership with 6 other Trusts in the area, the aim has been to improve and sustain the quality of our clinical services whilst also providing them more efficiently and effectively. The **benefits** of this are already being seen in significant savings on procurement. The **Informatics work stream** within the Programme aims to identify the potential areas where collaboration on Informatics systems, services or infrastructure between Trusts could take place with the benefits of developing good practice, information sharing, and cultural change across the Trusts, and improving regional digital maturity.

This strategy will set out how we plan to improve over the next 4 years to make sure we achieve 100% maturity in these capabilities. The technology arm of the **regional Sustainability and Transformation Plan (STP) and the CCG’s Local Digital Roadmap (LDR)** is there to map our route and progress towards achieving this target around the cohesive vision discussed above. At present the LDR is recommending that, in order to remain consistent with our local priorities and achieve national standards, we increase our focus in the immediate period on:

- Shared records
- Remote working (incorporating Wi-Fi and Mobile devices)
- Transfers of Care
- Medicines Management
- Prevention (incorporating Risk Stratification and data analytics)

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What do patients and clinicians want?

In common with many healthcare organisations worldwide we have learned a significant amount from the introduction of EPR technology challenge\(^43\). Amongst other things, the T3 Programme has taught us that our infrastructure needs to be made significantly more robust to meet the demands placed on it by increased use of electronic communications. We also have to manage significant technology change in a tighter budget.

**Embedding change in an organisation this size is a big challenge**, therefore we need to manage our approach and collaborate effectively with our colleagues around the Trust to make sure the benefits are realised and that the investment was worthwhile. And we have learnt a lot about how to work in partnership with the major suppliers. All of this learning needs to underpin our future delivery.

On top of this, many **clinical and operational information and technology needs remain**. In addition to consulting with our clinical colleagues we want to engage with patients to garner their views on our current information and technology provision and what obstacles they experience when attending hospital.

To properly understand today’s post T3 landscape within STH in the near term we have undertaken a prioritisation exercise and capital planning process to focus our approach for the next year. Our Capital Plan for 2016/17 starts the delivery of further enhancements and build upon T3 has been agreed and Informatics is working at full capacity. Unavoidable ‘must dos’ have already been identified and planned in, and therefore Informatics capacity over the next four years is expected to be significantly less than 100%. This chart illustrates how we expect Informatics capacity to be used over the coming years.

The work currently underway includes end of life system replacements, such as the Renal System, essential infrastructure reinforcement, replacement of priority contracts (such as the Trust’s Telephony system), and the creation of software interfaces, but there are still areas in which our clinical colleagues want focus. We have therefore undertaken an engagement exercise and

spoken to clinicians and managers across the Trust to clearly identify initiatives for patient care, waste reduction and increased activity levels, as well as reviewing existing strategies and plans for care groups and attending care group IT meetings. The outcome of our discussions resulted in a selection of requirements, which have been grouped as follows:

**Patient Views**
Making sure we can assure patients that the data we hold about them is kept confidential, has high integrity and is only shared where appropriate and when consent is given is a high priority. Accessing amenities such as Wi-Fi when an inpatient will improve the patient experience.

**Technology Fundamentals**
Providing a good IT service is fundamental to the smooth running of the hospitals and community sites, therefore getting the basics right is really important. We also need to be confident the technology is up to date and works when we need it to.

**Electronic Communications & Collaboration**
Ensuring clinicians can always access to systems they need both inside and outside the Trust and have the right tools to work together. A focus on communications and collaboration technology, and better integration at health economy level, could yield significant clinical benefits.

**Easy to Use Systems**
Making sure the information we have is reliable and easy to use is fundamental to how we work. Being able to capture and edit this easily is crucial to helping have the best picture of a patient’s history as possible.

**Clinical Information & Decision Support**
Making sure that we get the clinical information we need in one place in order to provide the best care and make the right clinical decisions is paramount.

**Core Clinical Platforms**
There has been a necessary focus on T3, but we need not to lose sight of the critical platforms that clinicians use today and how they will evolve too as they coalesce, interoperate and, ultimately, are retired and replaced.

**Managing Assets & Resources**
Developing and introducing systems that enable more effective management of our clinical workforce, improved clinical safety and enhance our management of devices is becoming increasingly important.

**Business Intelligence**
Ensuring that we understand and take collective ownership of our data collection processes and that these are fit for purpose. Developing data standards allowing data to be integrated and analysed. Developing technical analysts that can support prescriptive analytics to drive improved patient health care outcomes.

This chapter of the strategy explores these requirements in more detail.
What have our patients have asked for?

To ensure we captured the views of our patients we consulted with the Patient Governors and Healthwatch Sheffield to understand the experiences of inpatients, outpatients and visitors to the hospitals within the Trust and how technology could make that experience better.

Access to Wi-Fi

- Inpatients want to have access to the internet and social media from the wards.
- If a patient feels well enough to work from their beds IT needs to be able to support this.

“"We can only get internet access when the number 52 bus with free Wi-Fi goes past the hospital!”

Easy to use systems

- As the hospital/patient relationship becomes more electronic, systems that patients interact with need to be user friendly.
- Patients want to be confident that their clinicians can use the systems correctly.

Medical Record Access

- Accessing our own medical records and taking ownership of them is important.

Personal Identifiable Data Security

- Reassurance needs to be provided that the Trust is taking steps to make sure personal information is kept safe and only shared when permission has been given by the patient.
- Informatics needs to bolster the Trust’s IT security to protect it from cybercrime.

Navigating the hospital sites

- We need help via a smartphone app to navigate the hospital sites as they are large and it's difficult to find where you need to go.

“It's so easy to get lost. Sometimes even staff can't direct you because they don't know”
What does our staff need?

Technology Fundamentals

Providing a good service to our colleagues is vital to ensure the Trust runs smoothly, therefore getting the basics right is really important. Clinicians feel that the basic technology they have at point of care frequently lets them down and they are frustrated by that.

Improving response times

- Informatics needs to do things better: faster response times for calls logged, better communication with the Trust and improvements to relationships with key stakeholders is needed.
- Basic requirements and moves and changes (e.g. data ports) that would make life so much easier just don’t get progressed – often the feedback is “we don’t have the funding” or “it’s out of scope”.

Improving our IT Infrastructure

Despite efforts to improve our IT infrastructure, we are still experiencing problems with our service:

- Patchy mobile network coverage throughout Trust sites
- Technical faults inhibiting access to information when it’s needed
- The wireless bandwidth is not always able to cope with the volume of images sent, which causes delays
- We are not always set up to enable the effective use of mobile devices e.g. not enough power outlets to allow devices to charge overnight

Universal Technology

- Universal technology would mean that staffs on rotation in the Trust don’t need retraining on technology each time they move.
- Providing reliable and consistent technologies to all staff is essential.

Improving performance

- Because some hardware and software have proved unreliable, wards are still resorting to paper and physical whiteboards. This has an impact on business processes and the adoption of new technologies.
- Functionality should come second to reliability.

“We had a broken ICE printer for 2 weeks and heard nothing from IT”
- Staff Nurse

“We really want to use the technology but sometimes it just doesn’t work”
- Consultant
Electronic Communications & Collaboration

Ensuring clinicians can always access systems they need both inside and outside the Trust and have the right tools to work together. A focus on communications and collaboration technology, and better integration at health economy level, could yield significant clinical benefits.

Accessing key applications from outside the Trust

- Accessing key applications can be complicated when outside of the Trust. Sometimes it’s not possible at all.
- When using digital dictation in a satellite clinic, clinicians will have to wait until they return to the Trust and dock the Dictaphone before the files can be uploaded and transcribed.

Health Economy Integration

- We are not yet integrated with the wider health economy, or with other Acute Trusts. However, the Test Bed and Working Together Programme represent real opportunities to make substantial progress.
- New Transfers of Care targets and the financial penalties of failing to meet them are adding to the financial pressures felt by the Trust.

E-mail used for information sharing

- If patient information is required urgently, the information may be e-mailed from outside the Trust. NHSmail is secure; however this is not universally available.

Primary Research

- Engaging with other institutions to collaborate on research would be beneficial.

“Accessing key systems outside the Trust can be really difficult”
- MDTs

How we approach change

- Adopting a “continuous improvement” approach to IT change will make the journey smoother.

GE recently imagined, designed and implemented what we believe is the largest and most sophisticated command centre in global healthcare – The Johns Hopkins Hospital Capacity Command Centre went live in January 2016. It brings together and co-locates 6 operational functions across the hospital and community provision and provides them with 13 real-time and predictive apps. These apps communicate with more than 10 clinical and operational systems through 18 concurrent interfaces to provide targeted, focused information that informs decisions and drives action.

The theme of communication continues closer to home with the introduction of electronic histopathology within STH. Super high definition images can be shared and analysed in minutes rather than days or weeks. This delivers savings for the NHS, whilst improving outcomes for patients.

Sheffield Teaching Hospitals NHS Foundation Trust - CONFIDENTIAL
Easy to Use Systems

Making sure the information we have is reliable and easy to use is fundamental to how we work. Being able to capture and edit this easily is crucial to helping have the best picture of a patient’s history as possible.

Population of EDMS

- Dealing with our paper records is a monumental task. We’re making every possible effort to populate EDMS as soon as possible but it will take time.

Intuitive and easy to use systems

- Some systems are complex and can be difficult to navigate. We need to make these easier to aid time poor clinicians.
- Enabling greater engagement with suppliers to provide feedback on systems and steer product development.
- Having intuitive systems would reduce the training overheads and change the way training is delivered. We should training people to do their jobs using IT, rather than as an addendum to their roles.

Consistent formats

- Creating files and forms in consistent formats is important to achieve the level of quality data we need and minimise the time taken to input it.
- This will also improve standardisation and reduce training requirements.

Standardised data

- Creating more forms that are standardised and electronic will help to pull data together into one place.

“We’re time poor, systems need to be easier to use so we have more time to spend with our patients”
- Clinicians

“Digital dictation uses multiple formats, which takes time to convert, rename and file appropriately”
- Consultants

Providing Mobile Access to Patient Data for Clinical staff

Cabrini Health is a not-for-profit health system in Melbourne, Australia, and has been a long-term user of CSC’s healthcare IT software. Cabrini was a strategic customer for iSOFT, and has continued to work closely with CSC since CSC acquired iSOFT in 2011.

Cabrini is not a “mega-healthcare” group with vast IT resources, but it is exceptionally innovative. A key aim for their IT strategy was bringing together the various systems in use to provide a single patient view, accessible from mobile devices, both inside and outside the hospital.

This integrated system now allows clinicians to view PACS images, diagnostic results, order pathology tests and prescribe, administer or review medication information, all from a single, mobile view.
Clinical Information & Decision Support

Making sure that we get the clinical information we need in one place in order to provide the best care and make the right clinical decisions is paramount. The shortage of doctors and nurses means that we need to help them in every way we can in their decision making.

Clinicians struggle to find a full view of a patient’s history

- Accessing multiple applications simultaneously causes problems and often prevents a holistic view of a patient’s record.

Clearer vision of what is meant by a single patient record

- We need to be clear what we mean by a single patient record and chart a course towards that. We are still a long way from a full EPR, and nowhere near the maturity of hospitals in the US, South Africa and elsewhere globally. However, we have a real opportunity to “stand on the shoulders of giants” if we get past the painful birth of T3 and start to look to emulate best in class globally.

Access to real time data

- Currency of information may be an issue in Lorenzo. We need to better understand which information is real time, and which is updated overnight in batches.

Greater ability to trace patient outcomes

- There is more work around developing useable, real time clinical outcome measures through our IT but it is critically dependent on upping our game on information and intelligence, and better coding.

Clinical Decision Support

- Building guidelines into support functions could be really beneficial. Having the ability to edit these and maintain the most up to date information will support best practice. It will also be critical as workforce pressures – for example in nursing – materialise to be able to support nurses with things like clinical observations.
Core Clinical Platforms

There has been a necessary focus on T3, but we need not to lose sight of the critical platforms that clinicians use today and how they will evolve too.

T3 going forwards

- We have made a huge investment in the technologies implemented by the T3 programme. To make the most of this we need to ensure we develop the systems to best meet the needs of users.
  - Expanding the number of systems using Single Sign On
  - Module and functionality review, development and implementation
  - Creating more interfaces into the Clinical Portal

Outside T3

- Even though T3 has been a strong focus for the last few years, we cannot forget the needs of other specialist areas within the Trust. Our capital plan for the coming years incorporates as much of the extra work as possible.
  - More system interfaces – e.g. a gap has been identified between ICE and the renal system.
  - Development of other key platforms - we need to understand the roadmap for our other key platforms, such as ICE, Infoflex, and SystmOne.
  - Taking a proactive and collaborative approach to replacing or retiring systems that have become end of life will enable us to have a joined up and current application estate.
  - We have multiple platforms performing the same function that need to be managed and maintained. Having one that serves all the necessary purposes would reduce costs.

“Single Sign On is great – we want more!”

Designing a hospital and its services from scratch

This newly built multi-speciality facility located on Al Sowah Island in Abu Dhabi, will service around 6 million citizens. Using a model pioneered in America, the hospital plans to offer advanced tertiary medical services in the region; Cardiovascular, Digestive, General Medicine, General Surgery, Head/Neck, Speech, Language, Nephrology, Neurosciences, Ophthalmology, Orthopedics, Pulmonary, and Urology.

The project plans to implement 25 systems, design and implement the integration across all hospital IT systems and manage the hospital wide testing and training on the systems ready for hospital opening.

IBM has provided a solution that implements the Lawson ERP systems & Agfa RIS/PACS, other financial, administrative and clinical systems. To ensure this is of the highest quality, IBM has collaborated on the design of the integration solution, working with the EMR team (EPIC). A comprehensive testing and training strategy has also been developed.
Managing Assets & Resources

Developing and introducing systems that enable more effective management of our clinical workforce, improves clinical safety and enhances our management of devices is becoming increasingly important.

**eRostering**

- Enabling the more effective management of our clinical workforce would be hugely beneficial.
- It would also help reduce clinical risk e.g. a system for managing anaesthetist time.
- ED use an existing system however it is complex and based on SharePoint. There is a need to move to a better and more flexible system.

**eWhiteboards**

- We already have this equipment in place however there is huge potential to expand and enhance further.

**Device Management**

- We have an opportunity to employ RFID (Radio Frequency Identification) technology on our devices which will help us track and locate mobile equipment.

**Room Booking**

- The Service Improvement department has an initiative underway to harmonise the room booking approach as part of the Making It Better Programme. Informatics has an opportunity to collaborate on many of the projects.

**Internet of Things (IoT)**

- The Internet of Things is where objects are connected to the internet and can provide information of their status and location. We could use this to improve our bed management.

“We still use paper systems to manage what is essentially a small team”
- Specialist Nurses

“We have increasingly complex requirements and targets to meet, such as reporting. This is difficult with our existing technology”
- ED
Business Intelligence

Providing real time operational information to support health care delivery and using prescriptive analytics techniques to drive decision making and achieve the best possible outcomes for our patients whilst ensuring data confidentiality, integrity and accessibility.

A single version of the truth

- Often multiple statistics are presented that provide conflicting views of performance and therefore, affect our understanding of the real problem and the action that is required.

“I don’t recognise those numbers – that data doesn’t look right”
- Ward Clerk

Automating data collection

- We should take opportunities to automate data collection and processing through investment in appropriate technologies.

Improved data quality

- If the data is incomplete and is not gathered on a timely basis then we are likely to make the wrong decisions; for example if we do not book our operations on the theatre system we cannot determine if lists are full and hence we may be losing the opportunity to see more patients.

- We need to ensure that we have robust information governance in place to keep patient information safe, but that the information is used for its intended purpose whilst maintaining confidentiality.

Utilising the data we collect

- Currently staff spend a lot of time entering data into systems. We don’t always use the information to tell us how our services are performing. This activity then becomes less important and erodes its value.

Connected data

- Collect data once and use it many times through connecting data sources.
- Much of the analysis currently undertaken is performed on data held within Lorenzo. There is a need to join the activity information we hold with the clinical interventions undertaken to understand clinical variation and clinical outcomes.

“I am trying to understand how many patients we treated in the last 6 months that acquired infection in the hospital but I never know who to ask and how to find out.”
- Duty Matron
Conclusion

The environment the NHS is functioning in and the technology available to us is changing at pace.

The Trust has made significant progress since the publication of its Technology Strategy in 2013. It has largely delivered against that Strategy. However, much has changed nationally, regionally and locally for the Trust since 2013 and this refreshed Information and Technology Strategy will take us forward focussing on the vision outlined in the 5 Year Forward View of a fully interoperable electronic health record that is paperless at the point of care by 2020.

The Strategy takes into account:

- The significant changes in the way that the NHS is organising itself for success and adopting a new technology direction and approach to digital maturity for provider organisations and more widely embracing innovation.
- The recommendations made by the National Advisory Group on Health Information Technology in England report.
- The changed needs of our clinical, operational and management teams.
- The Trust’s corporate strategic objectives and how this strategy aligns.
- The technology platforms that we now have in the Trust as a direct result of our strategy and the T3 programme and which is starting to bring significant benefits.
- The significant experience that we as a Trust have of introducing that technology.
- The changes in the technology landscape itself.

Understanding the external and internal requirements, alongside the drive towards greater digital maturity will inform how we move forward as a Trust. This chapter of the STH Information and Technology Strategy 2020 has focussed those needs into specific areas. The next two chapters of the Strategy examine our vision for how our technology will respond to these challenges, and the roadmap for getting us there.
References


Working Together Programme (2014) “Informatics Workstream Aim” at http://workingtogethernhs.co.uk/workstreams/informatics/
Appendix A: Acknowledgements

Sheffield Teaching Hospitals would like to acknowledge the contributions made by Trust staff, external suppliers and individuals in the preparation and publication of this Information and Technology strategy. Special thanks are extended to:

External

Colin Lewry, Partner at GE Finnamore
Joel Haspel, Partner at GE Finnamore
Mike Broomhead, Industry Architect for Healthcare & Life Sciences at IBM
David Clarkson, Client Executive at IBM
Stephen Boyle, Clinical Consultant – Watson Healthcare at IBM
Giles Norman, Workplace Consultant at IBM
Solomon Barron, Collaboration and Content Management Specialist at IBM
Claire Pinny, Intelligent Buildings – Watson Internet of Things at IBM
Sarah Remington, Associate Partner for Healthcare at IBM
Mike Lee, Account General Manager at CSC
Mr Ben Bridgewater, Clinical Consultant at CSC
Guy Lucchi, Director: CTO Healthcare & Life Sciences at CSC
Femi Ladega, Global Healthcare Industry Technology Officer at CSC
Sean O’Shea, Sales Manager for Healthcare UK at Microsoft
Matt Bedingham, NHS Client Director for Yorkshire & Humber Region at Trustmarque
Nick Gage, Chief Technology Officer and Business Architect at Trustmarque
Professor Winston Hide, Professor of Computational Biology at University of Sheffield
Ashley Brook, UK Director at TPP
Tom Gausden, Senior Account Manager at TPP
Dr John Parry, Clinical Director at TPP
Holly Whitehurst, Senior Product Specialist at TPP
Mike Badham, Solutions Architect, UK Health and Local Government at Cisco
Adrian Baker, Collaboration Specialist at Cisco
Andrew Green, Account Manager at Cisco
Andy Mellor, Client Manager at 360 Assurance
Carrie McKenzie, Manager at Healthwatch Sheffield
Sheffield Patient Governors Group
The Citizens Reference Group

Authors:
Andy Vernon, Informatics Associate Director, Head of Technology Architecture, Strategy and Planning
Balbir Bhogal, Performance and Information Director
Jude Lewis, Senior Technical Strategy Analyst
Michael Rodgers, Senior Relationship Manager

Additional thanks go to:
Mr Chris Gaddy, Consultant in Plastic Surgery, Oral and Burns
Rev Dr Mark Cobb, Clinical Director in Therapeutics & Palliative Care
Dr Chris Deery, Consultant in Paediatric Dentistry and Dental Services
Mr Luke Durham, Consultant in Ear, Nose and Throat
Dr Nick Fardon, Consultant Physician in Renal
Mr Athur Harikrishnan, Consultant in General Surgery
Mr Ken Hastie, Consultant Urological Surgeon in Urology
Dr Tom Locker, Consultant in Accident & Emergency
Dr Priya Madhuvrata, Consultant in Obstetrics, Gynaecology & Neonatology
Mr Francis Morris, Consultant in Accident & Emergency
Dr Smitha Rajaram, Consultant in Radiology
Dr Ganesh Rao, Consultant in Neurophysiology
Dr Adrian Scott, Consultant & Clinical Lead for Diabetes in Diabetes & Endocrinology
Dr Karen Selby, Consultant in Obstetrics, Gynaecology & Neonatology and Informatics Chief Clinical Information Officer
Mr AJ Stephenson, Consultant in Plastic Surgery, Oral and Burns
Dr Guy Veall, Clinical Director for Anaesthesia
Mr Stephen Winder, Consultant in Ophthalmology
Deanne Driscoll, Innovation and Technology Lead Nurse
Hannah Hudson-Lee, Informatics Asset Analyst
## Appendix B: National and Regional Initiatives

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<th>Level</th>
<th>Initiative</th>
<th>Abbreviation</th>
<th>Description</th>
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| National| NHSE 5 Year Forward View                        | 5YFV         | ‘Harnessing the Information Revolution’
In its drive to deliver the highest quality of care for patients, the NHSE information technology and informatics agenda is directed at enabling commissioners, providers and suppliers to make informed decisions about the investments and approaches to adopt technologies that will best support this outcome. |
| National| Digital and Data Quality Maturity                | DMI / DQMI   | A self-assessment that reveals the organisation's position in relation to all other hospitals in the NHS. Review of maturity performance and improvements is set to be included in CQC assessments as of 2018. |
| Regional| Sustainability and Transformation Plan           | STP          | As of January 2016, 44 national 'footprint' groups had been established across England. STH falls into the South Yorkshire and Bassetlaw group and will serve 1.5 million people across 5 CCGs. Built around the needs of local populations, these plans outline how local services will evolve and become sustainable over the next five years to deliver better health, better patient care and improved NHS efficiency. |
| Regional| Test Beds                                       |              | Health and Care workers across England and global innovators congregate to explore issues and evaluate technology that could deliver better patient care and avoid admissions to hospital. |
| Local   | Local Digital Roadmap                           | LDR          | Taking steer from the STP, the LDR is defined around our local communities and the scale of services needed to deliver the public health programme transformations required, and assess how they fit with other footprints. |
| Local   | Working Together Programme                      | WTP          | A partnership of 7 Acute Trusts working in collaboration to deliver safe and sustainable local services, improve the health and wellbeing of citizens by effective care, and making collective savings via joint procurement where appropriate. |
| Local   | Perfect Patient Pathway Test Bed                 | PEPPA        | Frontline Health and Care workers across 14 of Sheffield’s health and care services have met together with 15 global technology innovators to discuss requirements and evaluate technology that will help patients stay well by self-managing their long term conditions safely at home and avoid admission to hospital. |
Appendix C: High Level STH As Is Architecture of Major Systems