

ICT Digital Strategy



2020 - 2023

ICT / Health Records / Information Services
Version 1.0

Safe & Effective | Kind & Caring | Exceeding Expectation

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Executive Summary

The landscape is changing rapidly, technology pace has increased significantly especially in light of the COVID19 crisis which has seen the need to accelerate platforms, solutions and strategic objectives. In addition we have a Secretary of state who is supportive of technology investment with an NHS Long Term Plan that acknowledges the urgent need for technology enablement in order to support large scale transformation of the way the NHS delivers care. Models of care have had to adapt rapidly to support remote care provisions for patients during the COVID19 crisis. Other factors include the promotion of healthy living, lifestyle changes within the home, workplace or via the education system, where ultimately a shift has occurred to focus on prevention with early intervention, rather than purely on resources assigned to direct disease management. This is seeing a shift in care outside of hospitals. Attempting to deliver all care services within a hospital setting for the future is just no longer viable; instead focus on a narrower, highly skilled set of services is needed complimented alongside the broader platform of care supported by evolving technological innovation. A move towards the wider platform of care and introduction of smart hospitals is critically dependant on effective integration, robust infrastructure and high performance interoperability. The sharing of data is key, structured datasets, aggregated / consolidated data hosting

provides a multitude of opportunities for the introduction of AI technologies and effective data analytics which underpin predictive care and automated decision making.

What Does This Mean For Us

In effect everything we are endeavouring to achieve can be mapped back to the following:

The Patient: I will have an excellent patient experience with consistent high quality clinical care delivered as I expect through modern technology that to some extent I already use in the home. I will be able to tell my story once and I will have a part to play in the empowerment of my own healthcare.

The Staff: Through technical enablement I will be able to make the best possible decision when caring for my patients or supporting patient processes. I will have access to accurate information all of the time and will not have to log into multiple systems that do not provide a patient centric approach. The Information will be consolidated where possible and accessible via a variety of devices / media depending on my role. I will always have access to workable Trust IT and will no longer need to duplicate data input or fill in basic information, where these will be pre-populated to save time. In addition I can be confident in both the software and hardware platforms provisioned across the domains



of care, irrespective of where I might be operating from.

Data: The data will be accurate, the data will be structured and as such the data will be consolidated for self-empowered data dashboards. Analytic and business intelligence tools will transform the way we access data, automated, self-serve options will be available, with interactive dashboards and drill down functionality. Overall accuracy of data will be robust, greater outputs and more transparency will allow data to be shared widely with more appropriate data visualisation techniques, population risk stratification and the implementation of Big Data / AI applications to improve patient care. The importance of data and appropriate data security cannot be underestimated. The trust will need to ensure robust levels of data governance is in place and that compliance with Data Sharing Agreements and Data Privacy Impact assessments are adhered to in line with data protection toolkit standards.

Platform: The platform will be a mixture of Hybrid Cloud, where all future procurement systems will be considered on a Cloud First Approach. All systems will be highly resilient, with business continuity also spanning cloud technology. An Internet first approach will aid this, web based centralised systems will always be the preferred option and any local installed system will be decommissioned accordingly. High levels of Interoperability and integration will be key for enablement of effective data sharing and the use of cloud technologies. Best of Breed systems approach may continue, but consideration in terms of Benefit v.s Value needs to be weighted for Enterprise Wide Health Care systems. The Trust will retain a localised high speed resilient dual data centre set-up with high performing solid state storage solutions and superfast network LAN and WAN connections. The saturation of WiFi across all care provider sites is essential where the use of mobile devices (with consideration to BYOD) is key to support a dynamic care workforce.

The Digital Vision

There is clear vision from this 3 year strategy based on extensive engagement and coverage of the technology objectives from the following: NHS Long Term Plan, Trust Strategy 2018-2021, The Topol Review, STP Digital Strategy, STP Clinical Strategy.

To deliver a digitally mature service through enablement of a patient centric view of information that harnesses a modernised IM&T platform that supports exceptional and integrated patient care.

This covers the following detailed further in the Vision section: Business Intelligence, Innovation, Agile and Dynamic IT enablement, Patient Empowerment, Future Fit Infrastructure, Interoperability, Patient Centric Electronic Records and Sustainability.

Digital Approach

There are 4 Strategic Pillars as detailed in Appendix 1 and Digital Strategic Framework Section of this document.

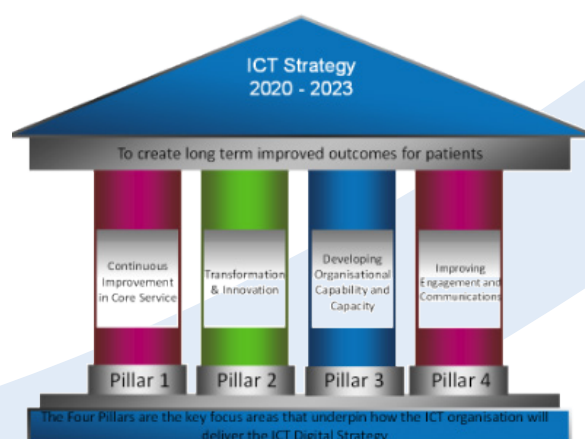
Strategic Pillar 1: Continuous Improvement in Core Services.

Strategic Pillar 2: Transformation & Innovation.

Strategic Pillar 3: Developing Organisational Capability and Capacity.

Strategic Pillar 4: Improving Engagement and Communications.

Each pillar has digital and technology enablers assigned to the various delivery functions and services within ICT, Information and Health Records services. For full breakdown of the enablers see the Digital Strategic Framework Core Enablers section of this document and Appendix 4 Core Enablers.



What Does Success Look Like / Our Desired Outcomes

To realise our vision and achieve excellence through technology enablement we need clear outcomes that act as indicators against our strategic success, measurable with drivers that will enable our vision and ambitions to be accomplished. The COVID19 pandemic significantly moved IT / Digital solutions and objectives with pace. Our need to operate an effective healthcare service virtually or with applied distance saw a massive acceleration of technology solutions never envisaged to be with us so soon! For example original NHS Long Term plan digital ambitions for remote patient consultations and patient digital choice by default was by 2023. The onset of COVID19 forced the rapid transformation to the way we provide our services; virtually and remotely was demanded to address the COVID challenge and the deployment of this technology was required with extreme pace. Remote consultations are now working successfully across a number of our care services, the "No going back" initiative will only serve to see evolution of these digital platforms further and the maturing of embedding these new virtual ways of working into our everyday lives for enhanced business as usual. Accelerated strategic national solutions for the provision of unified communications, like Microsoft Teams was never conceived as possible in the timescales given. However staff have worked brilliantly to overcome the challenges of COVID with the increased use of technology to host meetings; across various locations, working on-site and remotely. The capability to get together and make progress via virtual catch ups would have been considered prior to COVID 19 to be months, if not years away. Instead our ability to instant message, conduct agile working from home and meet via Video conferencing platforms is here and it's here to stay! It's been both a significant challenge and achievement to deploy these solutions and bolster the robustness of the ICT infrastructure needed for their enablement. Most of all it's been a fantastic shift in mind-set / culture for both our patients and our staff whom have adapted incredibly well to these new ways of working for the future. For more on COVID 19 impact, please see Appendix 7. COVID Impact - "Our New Technology Reality".

Seven outcome statements that align to the Strategic Pillars are used to define and measure that success:

1. To ensure a **high quality patient and user experience** where patients are empowered with their own health care and digital consultations to be made available as the default for patient choice, where these are now deployed as part of the digital solutions for COVID19. Staff to be empowered with self-serve reporting, single sign on technology is utilised across the Trust to avoid multiple logins and systems are provisioned to support dynamic and mobile ways of working. Unified communications such as MS Teams or remote MDTs will continue to feature hugely in terms of effective methods for communicating urgent alerting, patient care discussions and task management.
2. To **provision a modern fit for purpose Infrastructure platform** that enables systems to underpin the changing model of care and share information across a care ecosystem via **effective interoperability and seamless integration**. Ensuring patient centric information is integrated from multiple sources over high performance network connectivity, hybrid storage solutions and multiple system sources.
3. Be more of a data-led organisation with improved accuracy, wide spread availability and consolidated **high quality aggregated datasets** to enable **effective data driven care**. Establishing a range of analytic and business intelligence tools to provision automated, self-serve options with interactive dashboards.
4. To provision technology solutions that enable a **successful Integrated Care Alliance / Systems**, with collective responsibility for delivering high quality care, collaborative working, with consistent standards and **effective population health care management**. To implement platforms for data warehousing, localised and cloud based to unpin large scaled Business Intelligence solutions with automated processing and Artificial Intelligence applied supporting clinicians in understanding variations and risk stratification. To employ the use of predictive techniques, algorithms to allow operational planning, improved patient care and overall population health management.

5. To create **successful Digital culture**, tools and environments to enable our staff to exploit the use of technology advancement and innovation, such as MS Teams or remote MDTs will continue to feature hugely in terms of effective methods for communicating urgent, alerting, patient care discussions and task management to nurture our workforce in **accomplishing a digital capability** that can then flourish alongside the Trusts digital journey. To enshrine this with a future fit ICT support operating model for **proactive monitoring** of IT capability and enablement. To move the bulk of ICT accessibility towards mobile equipment solutions, so access to electronic data and **vital patient information can be provided anywhere** on the move.
6. To use **Digital technologies to drive Innovation** in clinical practice and research. It's extremely important to recognise the importance of innovation that the Trust can achieve for maximum benefit and embrace opportunities regarding potential repurpose of consumer technology into the Healthcare space. Well led and expertly structured groups such as the **Digital Innovation Forum** and the **Innovation Adoption Committee** complimented with highly effective processes such as **Digital Dragons**, will see the Trust excel with identifying and understanding innovation opportunities.
7. The establishment of highly integrated Digital Regional Networks for specialist services, diagnostic, Radiology and Pathology networks with Digital enablement to provision, where appropriate, large scale connectivity with a Cloud First approach. Readily available imaging, reporting with patient Information exchange will be at the heart of true case load sharing and successful collaboration across regional and cross regional partnerships.

Vision

To deliver a digitally mature service with a patient centric view of information harnessed on a modernised IM&T platform that supports exceptional and integrated patient care.

The Trust Digital Vision is focused on the following digital themes:

- **Business Intelligence:** To move towards true data driven care through effective Risk Stratification, Population Health Management and Predictive Analytics.
- **Innovation:** To nurture ideas or innovations within the digital arena and allow them to flourish with required support and investment to realise successful outcomes to defined problems and issues.
- **Agile and Dynamic IT enablement:** To provision wide scale solutions that integrates across care organisations and multiple care teams. To provision accessibility on the move with effective mobile solutions, devices and software platforms that informs patient centric clinical care for our mobilised workforces.
- **Patient Empowerment:** To utilise commercial product offerings, advancement in technical accessibility, wearable technologies, patient portals and home monitoring to empower our patients to contribute to their own health care.
- **Future Fit Infrastructure:** A robust platform for enterprise wide managed ICT services, to include effective high speed hybrid storage solutions (on premises and hosted cloud) and high performance interoperability at both the network level and software interfacing layer.
- **Interoperability:** Plans to enhance mobility, standardisation of messaging and enablement of cross system, cross organisational care with a single longitudinal view of the patient data via unhindered accessibility.
- **Patient Centric Electronic Records:** Tactical and Strategic, localised and Regional patient records assessable at the point of care provisioned and scaled across care organisations without geographical boundaries or digital islands.
- **Sustainability:** To strive in making appropriate changes to the way in which it can be sustainable and mitigate our carbon footprint. Green credentials are a key driver in procurement decisions of the future and how IT will use integration and consolidation of systems to create a net reduction in its carbon requirement across the estate. Further, we will work towards the proactive and environmentally positive way of dealing with redundant IT equipment and the by-products of packaging, as well as encouraging and supporting staff in conscientious ways of working to promote healthy environments.

Who we are

With an operating budget in excess of £640M for 2019/20 The Royal Wolverhampton NHS Trust (RWT) is one of the largest healthcare providers in the Black Country and West Midlands, providing primary, secondary, community and tertiary care services to a combined population of over 450,000 citizens. We are the largest employer in Wolverhampton, with nearly 10,000 staff, providing services across the following:

At an organisational level, the success of our strategy will be proven when digital is regarded as a key enhancement to every clinical pathway and is embedded as a way of working.

- **New Cross Hospital** - Secondary and tertiary services, Maternity, Accident & Emergency, Critical Care and Outpatients
- **West Park Hospital** - Rehabilitation, Inpatient and Day Care services, Therapy services, and Outpatients
- **Community Services** - More than 20 community sites providing services for children and adults, Walk-in Centres, and Therapy and Rehabilitation services
- **Cannock Chase Hospital** - General Surgery, Orthopaedics, Breast Surgery, Urology, Dermatology, and Medical Day Case investigations and treatment (including Endoscopy)
- **Primary Care** - GP practices have now joined us, and will be opening extended opening hours
- **Black Country Pathology Services** - We successfully implemented the hub for Black Country Pathology Services in partnership with other regional care organisations and from September 2019 secured our hosting of the West Midlands Cytology Service.

The Trust has previously consulted on the strategic objectives and has used the latest refresh of the Trust strategy to refresh these objectives to ensure that we are aligned to the Trust Vision and Values. The Trust strategic objectives underpin all of the work that is being done across the Trust and helps us to remain focused. All of the decisions identified with the Trust Strategy and the ICT Digital Strategy will support our Trust and the wider STP Digital Strategy / objectives.

Research and Development

The Trust's Research and Development directorate employs over 70 staff, and is committed to ensuring that all appropriate patients treated by us have access to clinical trials. It is the aim of the Research and Development directorate to grow both multi centre national and international trials, and local home account studies, so that we become the fifth largest NHS Trust in terms of study recruitment in the West Midlands, after the four main teaching hospital Trusts.

The Trust seeks to maintain the highest standards of research governance, and develop our staff in their research aspirations. It is our aspiration to develop local researchers to undertake studies aimed at improving the health of our local Black Country population. We aim to partner with the University of Wolverhampton and other local and distant universities to achieve our academic aims.

Our Digital Journey To Date

Usability, reliability and robustness of the infrastructure platforms have proven to be essential for the success and stability of the overall solution. Resilience with viable business continuity solutions is key – where existing platforms have already weathered significant storms successfully. We have built out our platforms to support increased mobility, connectivity and interoperability –scaled out our systems on a solid base allowing access to our patient information for any care provider, at any point of care, at any time across regional or organisational boundaries. Further expansion of services, with deployment of platforms and enhancement of our digital solutions as a result of COVID19 can be referred within Appendix 7 of this Strategy.

We have built a solid bedrock of integrated platforms complimented with best of breed systems to ensure our footing as a digital leader in the region

Future Objective: We must be prepared for a Zero day cyber-attack either direct or indirect.

Cyber:

We have grown our cyber security team from a single team member to a dedicated team of specialists; we are in a world of defence in depth with increasing level of cyber security threats on a daily basis, matched by increased complexity of potential attacks.

We maintain a high level of protection via proactive monitoring with CareCert alerts and we have implemented Advanced Threat Protection, as well as a highly efficient programme of software patching and anti-virus and malware protection. So far this is effective to date, however, the threats to our Trust remain active and this will continue to increase as organisations move further into the digital arena for agile working.

In the previous iterations of Strategies ICT cyber security featured merely as a footnote, going forward it must be at the centre of all that we do with technology and should not just focus upon the technical security but ensure our workforce is educated and aware.



Project Capability:

The ICT Programme Management Team has been principal in successfully delivering the project portfolio detailed under the cover of 'ICT Strategy 2013-2018' and the trust is more digitally capable as a consequence of this. We have an established team of Project Management Professionals and supporting analytical and clinical informatics specialists to ensure that projects are delivered to the required level of quality and time.

Future Objective: We will ensure a more effective model for post-delivery of Digital projects.

Data Analytics

The Trust has a wealth of data but lacks structure of the critical 'information' and needs to move towards a data driven healthcare service in order to target and prioritise interventions along the patient pathway, and monitor patients to intervene before they go into crisis. The current information management for the Trust is built on reporting of standardised sets of data that are being manually or automatically collated from across systems.

Future Objective: Move towards predictive analysis, transform reactive services and reporting methods and dashboards.

Future Objective: Establish Trust-wide, ICS scalable Data Warehouse for Regional patient data

Operational data and information requirements are generally readily available via our central reporting library, or can be quickly sourced through the information team. Managers have information management tools to support them with decision making but require deeper skills and competency to understand how to use the data appropriately to continuously develop insight that will drive improvement in the Trust operations and patient care.

The Trust currently utilises a number of key systems to capture patient level activity data and other key data within the organisation. These rich data sources can be analysed in order to provide insight into what is happening within the organisation, which enables managers, clinicians and executives to make well informed decisions. The data outputs from the vast array of systems utilised by the Trust currently sit in various database locations on the Trust's network, making it extremely difficult to utilise this wealth of information to an optimum level.

Data analysts spend a large proportion of their time extracting data from these databases and creating reports, with limited capacity for them to provide meaningful analysis and support to the requestor in interpreting the findings.

Progress has been made in 2020 to enhance current reporting with more data available for use and we continue to move towards the utilisation of technology to make data more accessible and useable, also developing self-serve reporting to enable day-to-day operational data and information available at manager's fingertips.

We will revolutionise data driven care and information consumption by establishment of self-serve dashboards and regional intelligence

As we move into mid 2020 the Information Services team are realising the data management vision for the Trust and building an integrated Data Warehouse repository, incorporating a multitude of datasets, clinical and non-clinical. This enables cross reporting, automated processing and predictive analysis to help support strategic decisions and patient care.

Future Objective: Enable effective population healthcare management through risk stratification tooling, with layers of AI on our foundation of BI data structure.

The enabling capabilities that will support this development include:

- Cohort identification – visual and real-time reporting and tools to prioritise a cohort to make sure time is made to deal with the most urgent cases.
- Patient monitoring – real time monitoring of patients and bed occupancy, through to data from self-management technologies
- Clinical decision support - driven through integrated patient data and enabled through Artificial Intelligence.
- Care management – data driven scheduling that coordinates the delivery of services and work queues. Also enabling the means for providing targeted managed care and care planning to identified patients' that might benefit.
- Outcomes and cost management – activity, cost and outcome data available to support integrated care planning and understand which interventions and pathways are most effective for cohorts and individuals.

This also aligns with the national driver to move to Population Health Management, which looks at all elements of a patient population, utilising risk stratification, notifications/alerts and trend analysis to move to proactive management of patients' conditions and preventative medicine.

Health Records Service:

The Trust is currently "paperlight" by the use of skinny files and access to records scanned in to Clinical Web Portal, we are still transitioning away from being a paper based culture. Our systems continue to be populated via scanned paper records, meaning the requirement to scan acknowledges the continuation of paper for source of patient information which isn't ideal.

Future Objective: Replace all paper in the patient record, decommissioning scanning and enable further structured data capture via e-Forms.

The scanning bureau ensures that all inpatient records are scanned and viewable on the portal within 24 hours of being received by the scanning bureau. This service provides quick electronic records to aid the patients continuing care. We currently scan 6000 records a month and house 12 scanners in total.

ICT Systems & Applications:

Future Objective: Internet First at the heart of what we do and the systems we provision.

Future Objective: Cloud First at the heart of what we do and the systems / storage we provision.

***Objectives above are subject to appropriate due diligence, system compatibility, business use case and costings.**

Overall our best of breed approach has led to a significant increase in the size of the Trust's applications portfolio. This diversity, in addition to the ongoing complexity of management and maintenance has created significant challenge in providing consistent operational management information to support clinical decision making. The multiple systems available for use are increasingly complex and nuanced according to the specific speciality of relevance. Additionally, support by the software vendors to standards means the existing systems do not easily integrate information, therefore effort and resources are being invested in 3rd party integration. As a result of these challenges, there has been a significant challenge to maintaining the functionality of systems to the latest releases and in particular in user experience has deteriorated while systems have had to wait for new releases installed.

To add to these technical and financial challenges, the digital technology landscape has been continually evolving and digital technologies have become an increasingly essential part of our personal and working lives. We also need to begin to pave the way for the Trust to lead the digital healthcare agenda for the Black Country and be a key player for digital in the West Midlands.

Further consideration in our work to become digital leaders is the need to recognise the value of digitally enabled innovation. To make the most out of innovation we need to establish a controlled environment of scalable innovation with potential to deliver a return on investment, rather than to continue with our current approach of working in silos with pockets of unconnected innovation.

Our new Digital Strategy will ensure that all staff, patients and partners can maximise the benefits of digital technologies in their day to day working.

Internal Analysis

SWOT (Strengths, Weaknesses, Opportunities & Threats)

Strengths

- Modernised platforms for ICT provision already established.
- Foot print for ICT Managed Service already embedded within primary, secondary and community domains of care.
- In-House capability that spans EPR development, Project / Programme Management, Infrastructure Services and Information Management.
- Robust processes and Forums that support Digital Innovation.
- Experienced visionary and supportive leadership within established Trust Board.
- Mature levels of Interoperability via in-house IT integration Engine.
- Defence in Depth – accredited Cyber Security function / team.
- Nationally recognised level of Digital Maturity and credibility / representation on STP Digital Board.
- Forward thinking partnerships, Innovation adoption and national visibility.
- Strong and committed workforce with a culture to embrace technology enablement for improvement to patient care.
- Clear and effective engagement processes for Capital and revenue Digital / IT Investment.
- Strong Reputation for delivery with success for national digital bid funding and compliance with national IT delivery deadlines.
- Established regional hub for Pathology Services and HPV service for West Midlands on Centralised / Cloud based IT technology.

Weaknesses

- Due to fiscal constraints and despite continuing effort to increase investment within IT Digital Services, the Trust lacks behind industry investment levels of around 3.8% of annual income. (Albeit current investment levels are reflected at other Healthcare organisations). (See below Investment model). The level of investment may not be achievable.
- Resourcing levels reflect a shortage of staff required to deliver all of the Trust priorities, IT projects and Innovation ambitions. This mirrors an overall Trust challenge, but also is reflective of competing with a buoyant private sector along with other regional care organisations seeking to secure similar talent & skills.
- Not all aspects of the Trust Infrastructure platform is complete in terms of our modernising programme for resilience and performance to provision the way for future digital ambitions.
- Whilst work in progress, there is no completed Trust provisioned data warehouse to host aggregated data across partner and services.
- Primary care is now inclusive within RWT and as such consideration needs to be given to ensuring consistency for technology and standards. This is to avoid inequality in patient care. This relates to primary care workforce digital skills, e-processes, e-workflows, data quality and patient engagement platforms.

Opportunities

- A digitised NHS recognises transformation via digital innovation and enablement.
- A national agenda and NHS Long Term plan now supports Trust / STP digital ambitions.
- Consolidation of aggregated data across NHS England for intelligence and data driven care.
- Consumer technology has seen significant progression around innovation and Artificial intelligence within the healthcare space.
- As a provider for Pathology services in the region there could be scope for scaling out our services further for consolidated diagnostics and digital pathology.
- Covid19 has provided the Trust with an opportunity of “No going back”. Many enhanced digital solutions and transformation to ways of working has been accomplished as a result of the recent COVID19 crisis.
- To become integrated both vertically and horizontally using IT as the main enabler leading at the forefront for this.

Threats

- The Trust infrastructure is undergoing modernisation to position the trust in an excellent position for the future, but there is still a window of instability as a result.
- The Trust could be attacked by a zero day virus or ransomware attack and this would significantly compromise our IT set-up and enablement ultimately causing harm to patients.
- Further fiscal constraints could be imposed that limits our Digital agenda and ambitions.
- In recent COVID times the threat of cyber attack has increased as the NHS becomes more dependent on Digital solutions with a rapid pace of deployment that may have unintentionally introduced vulnerabilities.

Driving Change National Priorities & Regional Partnerships

Superimposed on the variety of user expectations of IT, are government and economic factors and NHS England mandated initiatives such as the Sustainability and Transformation Plan. The national and local picture for the healthcare system is very much defined and directed by the needs of patients and the level of resources available to meet the demand. The NHS has clarified the challenges facing organisations, nationally with the 2019 publication of the NHS Long Term Plan.

Getting it [digital] 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". – Wachter Report, 2016

This document provides a synopsis of the key issues facing the health and care sector, and recognised that fundamental change is required across the health system in order to adequately meet the changing needs of the population.

The key drivers contained in this document are wider than individual organisational concerns. However, they do reflect the issues and concerns facing Wolverhampton as a city. They are:

- How we can work collaboratively to prevent illness and then support patients and users before they enter the acute care system, and, ultimately facilitating a smooth and effective discharge.
- How care is delivered across the city, and whether the formal distinctions between primary, secondary and community-based care need to be made more integrated.
- The level of resources that are available across the city to meet the existing and future demand needs to be put to best use to support the whole of the health economy.

Healthcare organisations throughout England are facing financial pressures resulting from a nationwide economic downturn, a reduction in public sector spending and rising healthcare demands. Consequently, the NHS has been mandated with developing collaborative sustainability and transformation plans to improve quality and efficiency whilst operating within our financial control limits. The Trust will need to ensure both its own financial control totals as well as STP system control total are met.

The NHS Long Term plan

The NHS Long Term Plan was published in January 2019 and includes a whole chapter on digital. 'Chapter 5: Digitally-enabled care will go mainstream across the NHS' highlights key aspects of healthcare IT and the way in which it is to be deployed will be the priorities for the NHS. Points of the NHS Long Term Plan for the ICT Digital Strategy are as follows:

"Technology will play a central role in realising the long term plan"

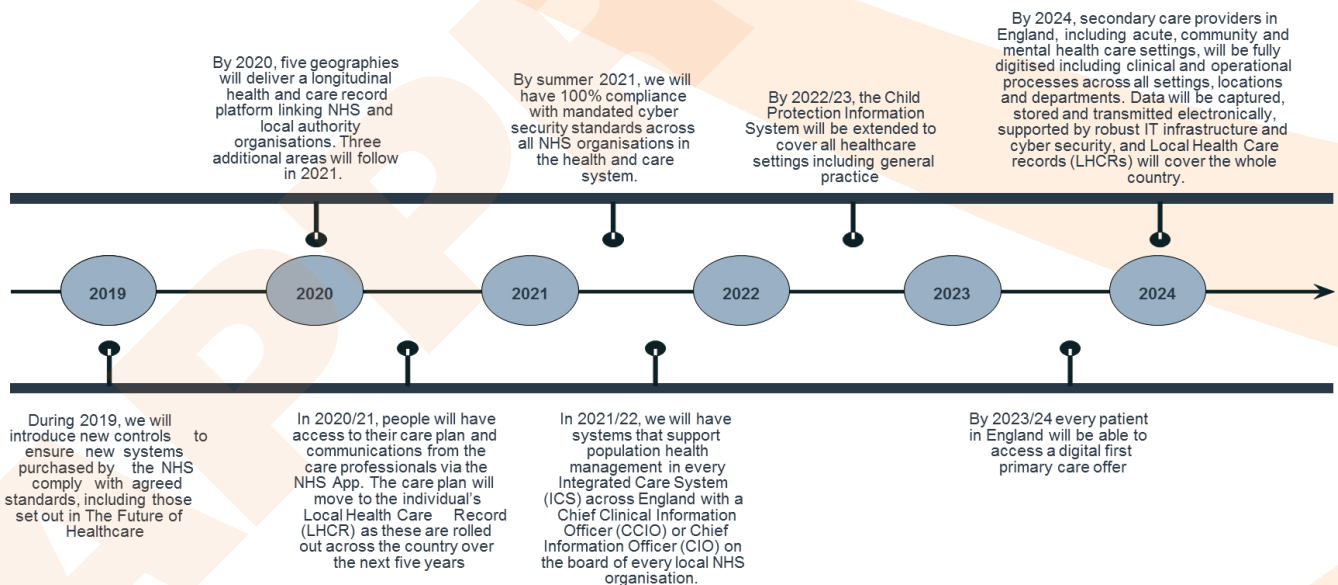
*NHS Long Term Plan
January, 2019*

- Every patient to have the right to a GP digital provider by 2023/24
- Outpatient reduction of face to face appointments by a third
- Increased use to telemedicine and technology
- NHS App –the standard online way for people to access the NHS and access own care plan
- Empowering people with greater access to their health records and care plan
- Diagnostic imaging and pathology networks rapid access close to the patient
- Increasingly focus on population health through Integrated Care Systems (ICSs)

Chapter 5 of the NHS Long Term Plan sets out a wide-ranging and funded programme to upgrade technology and digitally enabled care across the NHS. They will result in an NHS where:

- Digital access to services is widespread.
- Patients and their carers can better manage their health and condition.
- Clinicians can access and interact with patient records and care plans wherever they are, with ready access to decision support and Artificial Intelligence.
- Predictive techniques support local Integrated Care Systems to plan and optimise care for their populations.
- Secure linked clinical, genomic and other data support new medical breakthroughs and consistent quality of care.

Chapter Five of the NHS Long Term Plan identifies a series of milestones for these developments that are summarised below.



NHS Long Term Plan – Digital Outcomes Timeline

Similarly, Harnessing Technology for Personalised Care, a framework for action, described by the government the use of data and technology to transform outcomes defines the ways in which the NHS needs to incorporate digital into the future fabric of health and social care. Additionally, the Wachter Report and the Topol Review have provided a framework for both the maturity of digital healthcare and the organisation development required to build a digital workforce.

Collaborative Change

The Trust is progressing through a local transformation journey in developing an Integrated Care System (ICS) to drive up quality of care, and improve efficiency and productivity in the face of financial constraints and it needs to develop the right options to improve its chances of realising its transformation objectives.

A further challenge is that digital technology, particularly in the context of healthcare, is complex and rapidly developing. There has been a brisk growth of technology and keeping up with developments places a burden on the Trust's applications and technology functions. Digital capabilities and the scope and extent on the information technology offering needs to be evaluated in the face of this fast paced digital progress.

This all has to be achieved while meeting the higher expectations of all the Trusts users. Patients want effective Trust communication and information sharing through mobile devices, personal health technologies, online resources and new communication media like virtual clinics. Front line clinical and non-clinical staff are demanding digital technologies that not only improve efficiency but also clinical care through predictive analytics and new ways of working. Equally, front line staff, influenced by the use of consumer technologies in their homes and personal lives, now expect more from digital technologies in the work place. The Trust needs to consider new digital innovations that have a clear body of evidence to support them, finding ways to rapidly trial them and as appropriate deploy them at scale should outcomes and benefits be compelling!



Collaboration with primary care providers in Wolverhampton:

The Trust works with primary care providers, and operates primary care practices, to deliver personalised acute and long term care to the local population. As clinical transformation occurs, there will be a shift in the location of care delivery and a focus on mobile working. As a result, there will be a need to integrate technology seamlessly with the primary care providers. The ICT Digital Strategy is committed to supporting an approach to vertical integration based on a Primary and Acute Care system model.

As the Trust rapidly and successfully expands our programme of work within the primary care space, the ICT Digital Strategy will continue to support technical integration. This will overcome organisational barriers and enable an integrated care record for population healthcare risk stratification.

We will continue our commitment to supporting the patient digital journey from Primary care through to Acute. Technology platforms such as Babylon are already helping us bridge this gap and provide innovative solutions with accompanying AI that has been designed to provide accessible healthcare and understand our patients symptoms.

Collaboration across STP partners:

Working as part of the newly formed STP Digital board we will continue to align the Strategic Roadmap to the 2020 STP Digital Strategy and ensure through effective collaboration that smart procurement of aligned technologies, partnership bids and informed digital implementations are built into future roadmaps. For all aspects of healthcare, access to integrated data is a key foundation that leads to truly efficient integrated care which in turn improves patient outcomes. The STP Digital board is now linked into Digital Transformation Midlands and via this group expands our key stakeholder engagement with representatives from NHSE/I, NHS Digital and NHSx driving the national agenda in alignment with the strategic objectives of the long term plan.



In Wolverhampton we have already begun this journey by linking hospital records with the CCG's primary care record via an established extraction and integration engine. Strong governance protocols then allow clinicians at the point of contact, whether in a primary or secondary care setting, access to a pioneering single record.

We will provide an ICT and Information Services enabling / reporting platform to support the Trusts ambition to become a fully operational Integrated Care System.

The regional Sustainability Transformation Plan is underpinned by the implementation of interoperable systems which can be extended to join with other similar initiatives across the STP with increasing diverse geographies. 'Care without Borders' and working towards a single view of the record continues to be the focus of the partners in the STP and the ICT Digital Strategy fully supports the interoperability and development of integrated technologies.

Future Objective:

We will provision integrated platforms and robust data storage to support ICS ambition.

Future Objective:

Align Trust ICT Digital Strategy and roadmap to STP Strategy & NHS Long Term Plan.

Future Objective:

Standardise interoperability with consolidated systems or consistent integration standards.

Future Objective:

To continue to work towards a single longitudinal view of the patient record across health and social care.

Future Objective:

To commit to continued sharing of information working together as a single health community.

The Case for Change

The landscape is changing rapidly, this was brutally acknowledged with the rapid COVID19 challenge that saw the need to massively accelerate our strategic digital objectives within the defined road map. Digital enablement resulted in deployment at pace on many facets and across many tiers of ICT. The introduction of AI triaging and our ability to conduct remote consultations only reiterated the importance of encompassing information intrinsic to true data driven care. Our landscape was changing and the so called "Smart Hospitals" was emerging as a term that sees alignment of the way a hospital operates with changing models of care, patient expectations and technological innovations in terms of the art of the possible. Models of care are adapting to promote healthy living, lifestyle changes within the home, workplace or via the education system, where ultimately a shift has occurred to focus on prevention with early intervention, rather than purely on resources assigned to direct disease management. This is seeing a shift in care outside of hospitals where digital platforms are being established in alignment with the evolution of care models. Focus on data driven care and the accuracy of data including error reduction / elimination is key to quality clinical outcomes. Fundamental transformation to improve the quality of care provided needs to be at the heart of every Strategy. New ICT Digital technologies are a key component to move and provision care to locations never considered historically, such as "Approach & Use" Health Booths for example in the likes of retail outlets or Gyms, effectively these are locations where general accessibility to Healthcare technology would be welcomed but normally available outside of traditional care settings or the home.

New technologies that make possible online consultations, multidisciplinary team support, and other new models of care delivery are helping hospitals become more patient-centric. Empowering patients with their own care and provisioning information and education allows them to be part of informed decision making for their treatment. Today there is an ever-expanding part of society with an expectation of "always on, always connected". Although please note this also encompasses a small section of society, and, equally, the expectation of 'always on, always connected' needs to be considered in terms of workable service models to support as this may drive up demand or impact operationally on any service delivery (eg spreading current resources thinner, loss of human contact and rapport, and loss of continuity). We thus need to be cautious when developing systems that we also do not exacerbate/ alter inequalities.

Attempting to deliver all care services within a hospital setting for the future is just no longer viable; instead perhaps focus on a narrower, high value set of services is needed complimented alongside the broader ecosystem of care supported by evolving technological innovation. A move towards the wider Ecosystem of care and introduction of smart hospitals is critically dependant on effective integration, robust infrastructure and high performance interoperability. The sharing of data is key, structured datasets, aggregated / consolidated data hosting provides a multitude of opportunities for the introduction of AI technologies and effective data analytics which underpin predictive care and automated decision making. Automating workflow process within a Trust improves accuracy, turnaround times and will replace manual activities currently requiring "human" intervention, freeing up more time for staff to spend on direct patient care.

“Big data” Analytics will require the platform and integration for consolidating data across the wider ecosystem of care – i.e STP and LHCRE (Local Health and Care Record Exemplars). Clinical risk scores based on statistical regression models have been used for decades, however moving forwards, the Trust needs to build on the tools already used to create or implement additional models that proactively manage patient care. The Long Term Plan has particular focus on preventing hospital admissions where possible by managing their care in other settings and by increasing our data capacity and capability. Big data or BI analytics of patients can be used to identify the need for early intervention and care provision. In both developed and developing markets, it’s feasible to build predictive models based on lifestyle, medical and family data to identify high-risk patients likely for readmission or chronic disease progression.

Achieving the scope and ambition of the ICT Digital Strategy will have a significant impact on multiple user groups. Through meetings and discussion with various stakeholders, including patient consultation groups, Innovation Research and Adoption committee, along with review of published information we have to captured broad views on what our key stakeholders would want to experience as an outcome of our ICT Digital Strategy.

Care of patients will be transformed by using systems that provision data driven care into graphical formats that allow trends to be identified quickly and easily often through the use of internet enabled wearable tech!

“Technology will play a central role in realising the long term plan”

NHS Long Term Plan

January, 2019



The Patient Perspective:

Patients will only need to tell their story once to us. Technology will be used for individuals to self-care and self-monitor proactively, enabling them to return home more quickly. Patients, families and carers will be able to interact digitally with professionals involved in their care. Joined up, integrated, safe care is enabled through a co-ordinated approach across the whole Black Country using dynamic digital care plans that aid communication, prevent duplication and support a much more efficient patient journey.

Digital Ready Workforce:

Key Objective: To review leadership and staffing structures and enable a digitally ready workforce fit for the future.

Future Objective: To address skills gaps in the workforce and prioritising methods, space and time to learn digital technologies.

We strive towards achieving a position where our Staff have access to everything they need to treat their patients effectively, wherever they need it. Staff's experience of technology in work is as good as, if not better than, their experience at home. Care is more joined up and with less duplication through readily available information and automation. Ownership of the system will enable how staff will work in the future creating a supportive and engaging environment for staff.

Digital transformation should no longer be viewed as something created by "the IT department" and then delivered to the clinical and operational areas. Successful digital transformation cannot be made in isolation and requires people from all areas of the Trust to challenge their current ways of working and become part of the change.

"Accomplished change will only come through collaborative and creative working between the clinical and digital teams".

Fundamental changes will need to come from both disruptive technology implementations and process transformation; this will require input from all those impacted in patient care and operational support.

To an extent COVID19 has already forced the onslaught of strategic disruptive technology with positive outcomes for our workforce and patients.

If digital working is to be at the heart of everything the Trust does, the board needs to consider how this is to be delivered throughout the organisation. COVID19 has already seen a major significant cultural change in the ways of working, rippled throughout the organisation to the Trust Board itself. This has resulted in further digital awareness for applied and effective leadership to embrace new ways of working. The board awareness, with support from appointed CCIO, CTO, or CIO is essential in order to consider any impact related to digital developments within the Trust.

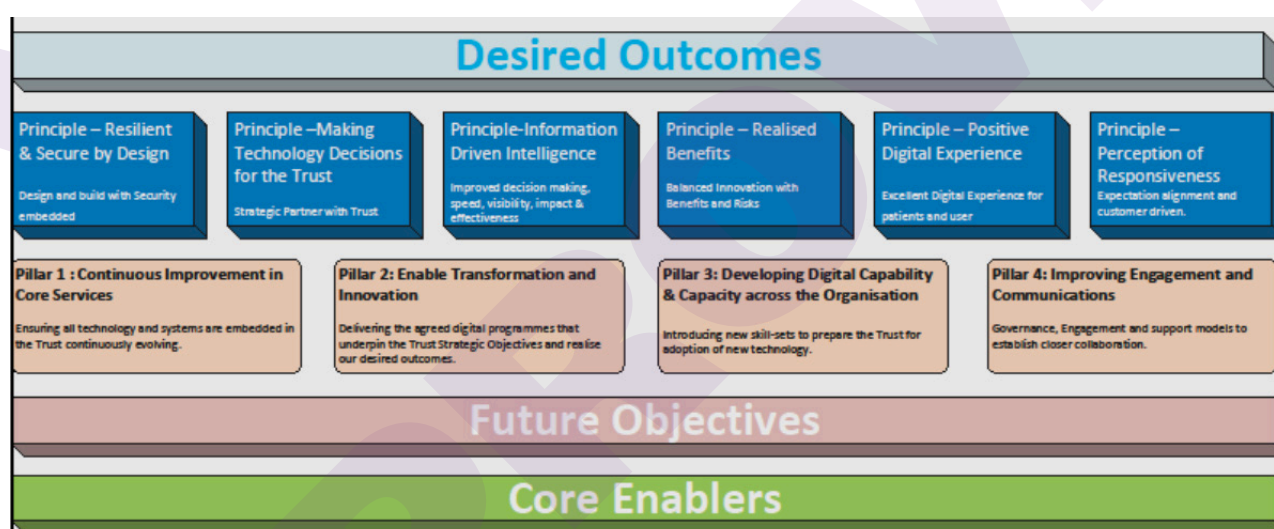
Our Hospital, City and The Black Country: Acting as one across the whole system, a Universal approach and delivery. Cross organisational pathways are introduced and facilitated and the patient record data shared, reducing time and improving quality of health and care delivery. The flagging of patients suitable for research leading to quicker identification of patients and associated trials. Improvements in population-health monitoring and planning, and high quality risk stratification.

Digital Strategic Framework

To achieve the strategic outcomes an overarching approach is needed that is both ambitious and focused. The approach should be based upon the desired outcomes to be met by Strategy Principles, Strategic Pillars and Objectives / Enablers. The following diagram depicts the Strategy Framework and our approach to enabling our desired outcomes.

As a bridge between our desired outcomes and our principles we have defined four focus areas of our approach. These are the Four Pillars which are the key focus areas that underpin how the ICT organisation will deliver the ICT Digital Strategy. These Strategic Pillars are then underpinned by future objectives and our core enablers.

A critical point to recognise is that becoming a digital healthcare leader will take time and resources there will be trade-offs to be made against the specific budget and capacity constraints with IT and the Trust as a whole. In particular, embarking on any innovation will only occur once it is proven the budget and capacity are truly available.



The pillars have been broken down further into the core enablers that have specific initiatives and actions against them. Each of these Core Enablers is then fully described in the Appendix 6 Core Enablers section of this document by delivery service.

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Digital Strategy Principles

The starting point of the ICT Digital Strategy was to secure input of a combination of stakeholders including executive board members, the IT workforce, clinical representatives and public consultation. The evidence underpinning the inputs took the form of local, regional and national documentation, a range of stakeholder engagements (workshops, meetings and interviews) along with an evaluation on the current state of IT and the technical demands placed.

To this we have set out six ICT Digital Strategy Principles

Principle	Description	Outcomes
Resilient & Secure by Design	Providing a consistent environment of availability, performance and resilience of systems that is aligned to the requirements of the Trust giving confidence in business continuity in all but extreme circumstances.	<ul style="list-style-type: none"> • Deliver resilient and high availability infrastructure platforms in an efficient way • Pursue consistency, simplicity and standardisation - through clear architectural standards • Technology solutions are secure by design – not just an after thought • Secure clinical and corporate systems, data and infrastructure from cyber and physical attacks
Making Digital Technology decision for the Trust	We will create the environment for staff and patients to adopt digital technologies in their day to day working as they evolve, using multi-channel learning tools such as webinars, that go beyond standard IT training to support learning at the point of need	<ul style="list-style-type: none"> • Choose flexible, adaptable solutions that meet both current and future needs • Fit for purpose and not “gold plated” • Interoperable solutions • Prefer strategic over tactical, Trust-wide over business unit specific • Construct for multi-division capability • Use existing solutions – expand capabilities where necessary
Information Driven Intelligence	Be a more data-led organisation with improved data accuracy, timeliness and availability to all staff and patients at the right point of care to make effective clinical, performance, and research decisions	<ul style="list-style-type: none"> • Design consolidated solutions that provide deep integration of data, ensuring that data collected in one care setting is available to all other care settings • Ensure that analysis of clinical data from across the Trust allows for improvements in care delivery • Enable data and information availability for research analytics to reinforce the Trust’s position as a world leading research institution.

Principle	Description	Outcomes
Realised Benefits Balance innovation with benefits and risks	Increase clinical and corporate efficiencies and value for money in line with regional and national priorities:	<ul style="list-style-type: none"> Design solutions that always bring improved quality of care and financial benefits Clear ownership and accountability throughout the delivery lifecycle Tracked business benefits and risks throughout the project lifecycle
Positive Digital Experience	Ensure a high quality patient and staff user experience to make it as easy as possible to “do the right thing” by moving towards a high quality, simplified experience that meets the majority of needs of all staff and patients	<ul style="list-style-type: none"> Drive the right behaviours at all stages of their operation by making them the easiest things to do Provide issuer with an engaging experience and easy to use functionality Being simple and clear to understand Enable systems to seamlessly interact with each other.
Perceptions & Responsiveness Customer Driven Innovation	Trusted advisor, easy to do business with, creating the culture, tools and environment to allow front-line staff and patients to adopt new and enhanced digital technologies in their day to day lives as they evolve	<ul style="list-style-type: none"> Drive digital innovation to maximise business opportunities Effective management of ‘supply’ and ‘demand’ of IT services Continuous improvement to optimise service and cost-effectiveness

Strategic Pillars

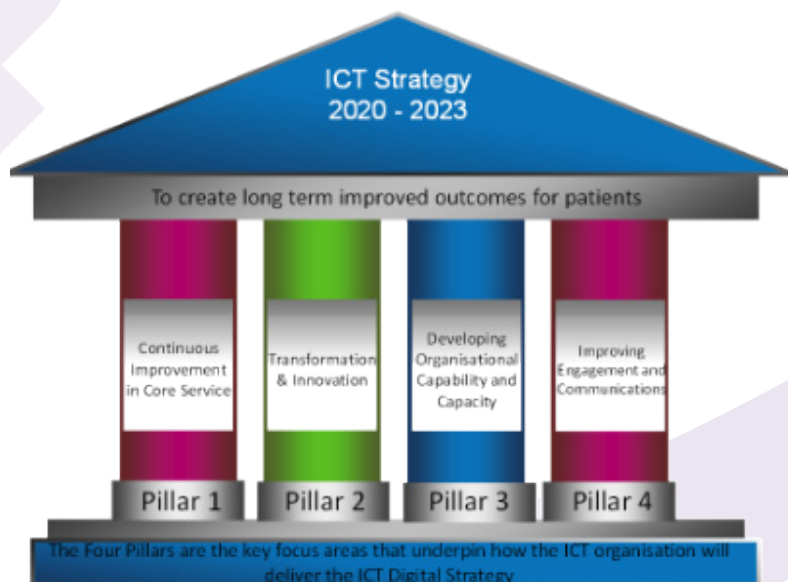
There are 4 Strategic Pillars as detailed in Appendix 1 of this document.

Strategic Pillar 1: Continuous Improvement in Core Services.

Strategic Pillar 2: Transformation & Innovation.

Strategic Pillar 3: Developing Organisational Capability and Capacity.

Strategic Pillar 4: Improving Engagement and Communications



Core Enablers

ICT Digital Enablers				
Strategic Pillars	Continuous Improvement in Core Services (P1)	Enable Transformation & Innovation (P2)	Developing Digital Capability & Capacity across the Organisation (P3)	Improving Engagement and Communications (P4)
	Clinical Systems (Electronic Patient Record)	Clinical Systems (Electronic Patient Record)		
	Digital Enablement / Digitisation -Internet of Things			
		Administrative Patient Portal	Administrative Patient Portal	
		Clinical Patient Portal	Clinical Patient Portal	
			Mobile Apps / Agile Working	
		Wearable Technology	Wearable Technology	
			Digital Workforce	Digital Workforce
		AI & RPA		
		Digital Pathology	Digital Pathology	
				Interop- Integ & DM
			Corporate Systems - Non-Clinical Systems	
			Cloud First	
	Online Digital Consultations	Online Digital Consultations	Online Digital Consultations	Online Digital Consultations
			Digital MDT Enablement	
	Single Sign-On (SSO)			
	End User Compute		Shared Docstores & Cloud Office	
	High Performance Integrated Network Patient/Public/Partner Wi-Fi			
	Telephony			
	Unified Communications			
				Service Management
	5G Cellular Data Connectivity			
		Data Driven Care		
		Data Capacity and Modelling		
		Data Storage and Management		
		Data Visualisation and Access		
		Risk Strat, Pop Mgt & Predictive Analytics		
			Analytics & Development	
				Information Services Support Model
	Health Rec Policy, Process & Protocols			
	Legacy Records Scanning			
	Community Archiving and Storage			
	Disaster Rec-Switchboard			
		Clinical Web Portal [EMR / EPR]		
		Data Portability		
			Patient Rights GDPR	
				Access to the Patients Health Record
	Cyber Security	Cyber Security	Cyber Security	Cyber Security
	ICT Digital (PMO)	ICT Digital (PMO)	ICT Digital (PMO)	ICT Digital (PMO)

Great technology makes complex things simple. If we do it right then these enablers can be used without thinking or considering what it takes to deliver that capability.

The table details the various core enablers mapped back to the Strategic Pillars for delivery of our future objectives and desired outcomes. For a detailed description of the Core enablers please see **Appendix 4 Core Enablers and Components.**

As detailed in Appendix 7 COVID Impact - "Our New Technology Reality", some of these Core Enablers have been significantly accelerated with positive outcomes despite a challenging pace of deployment.

Investment Model –Run, Grow, Transform

Future Objective: To review and increase levels of ICT investment

Future Objective: Consider dedicated resources for Trust bid capability to scan and secure national ICT / Digital funding opportunities.

Future Objective: Consider incorporating Grow and Transform as separate “budget pots” aligned to Digital Innovation or other enabling teams.

“The benefits of investment in digital technologies are Initially seen in improved safety and quality; it can take up to 10 years to realise cost savings.” – Topol Review 2019

Often an organisation’s IT service can be perceived as a supporting administrative service, rather than a key strategic partner for enablement. As a result of limited competing resources this can then be reflected in the levels of annual investment committed to the service and the financial envelope is set omitting strategic digital aspirations. Strategically the challenge is to shift this perception from a supportive service to a strategic partner with associated enablers and appropriate levels of investment. The focus of managing business-as-usual operations — also known as “run costs” needs to expand and acknowledge the strategic need to pursue “grow” and “transform” activities as a priority. Evolving Digital needs with “grow” and “transform” functions are critical to ensure that the holistic view to investment is provided which aligns with the Trusts strategic intent, ambitions and objectives.

The investment for IT platforms within 19/20 has in effect seen over 95% of IT Capital directed to Core platform renovation or replacement. (i.e. Run only). This then leaves very little scope within any dedicated IT Capital Allocation for the purposes of grow and transform, needed to map with Trust ambitions and expectations. In order to expand and enhance our services, plus extend our healthcare platforms with the strategic intent desired then we need to consider further investment opportunities above

and beyond that of maintaining existing operations (BAU). A more detailed plan of delivery priorities will be required in order to take this into account and likewise be reflected in any profiled bid allocation for future dedicated IT Capital spend.

An analysis of data collected for Deloitte’s, Global CIO Survey shows that technology spending as a percentage of investment ranges from more than 7 percent of an organisation’s annual income in the banking and securities sector to an average for all industries of approx. 3.8% of annual income for the likes of construction and manufacturing.

At The Royal Wolverhampton NHS Trust, we undertook a breakdown of IT related spend for FY 19/20, in the wider sense to include Directorate spend outside the immediate remit of IT Services. This included where it was felt appropriate operational budgets and any contributing pay costs, where contribution was reflected in terms of the wider digital / data function. This detailed exercise achieved a balanced view for overall IT / digitally related costs, Trust wide, including accounting for asset depreciation.

It was established that historically a creditable total 4% level of investment was seen when measured against Last year’s Gross income budget. A large proportion of these costs could still be attributed to enablement of the

“CIOs are under mounting pressure to address digital needs with “grow” and “transform” functions” – Suzanne Adnams, research vice president at Gartner”

Run & Grow elements for Trust services and therefore considered as business as usual. Dedicated (NEW INVESTMENT) IT Capital allocation levels continue to remain on average between 0.5% and 1% per annum, with historically only a small proportion of these considered available investment for true transformation.

In summary the majority of all IT new investment today is still mainly directed towards “keeping the lights on” for “Run” & “Grow” (Where considered growth is related to increased service demands on the IT platforms).

The approach to setting targets for future IT investment levels to meet Trust expectations, ambitions and the NHS Long Term plan objectives needs to be fully understood. Dedicated levels of IT Capital should be considered for increased levels of investment during the next 3 years. Exact investment levels are assumptive at this stage (where more detailed priority planning would be needed) but as a minimum these should accommodate the key strategic enablers identified in the Strategic Roadmap, as set out in Appendix 6 of this document.

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Table Summary

The table below reflects a forecasted investment level spanning the next 3 years where it should be noted that the Profile of investment for FY 20/21 is not reflective of the actual agreed 20/21 Capital Allocation supporting current IT related business cases. The listed Digital Enablers are mapped to their Strategic Pillar in a separate Trust business plan. Hence this table only shows the estimated costs profiled across the next 3 years mapped to their aligned categories of Run, Grow and Transform.

Further to this, the identified forecasted profile of investment linked to our strategic enablers indicates a desired increase in terms of IT dedicated Capital investment, certainly evident for Years 2 and 3. Whilst current allocation levels could be considered generous by comparison to the overall available Trust capital spend, a consideration should still be given towards increasing investment levels to around 1 to 2% for IT new capital investment per annum. Further to this it’s highly recommended that Innovation investment (which can often be attributed to high monetary value) be nurtured as a separate and dedicated cost line within overall Trust budgets for effective management. This would not only allow that function to flourish, but would also streamline and empower funding opportunities required in order to realise successful innovation progression.

(RN) – Run (G) – Grow (T) - Transform

*Note costs are assumptive estimates only at this stage and these would need formal quotations from suppliers to inform the Trusts business case process.

Category of Investment	2020-21	2021-22	2022-23
Run - Business As Usual / Operational Requirements	£1,480,394.00	£1,442,887.00	£2,045,000.00
Grow - Expansion of Existing Platforms / Solutions	£1,005,476.00	£1,415,000.00	£1,530,000.00
Transform - True Transformation to Platforms and Services	£1,620,179.00	£2,406,220.00	£1,232,614.00
Investment Total - New Capital Funding	£4,106,049.00	£5,264,107.00	£4,807,614.00

In addition to localised vehicles for funding and investment, any national funding opportunities including bids, grants or exemplar programmes should continue to be explored to the fullest. Enterprise wide Health Care systems, whilst a strategic desire for the future, prove to be unobtainable within localised funding capability only. Instead these systems that can often amount to investment levels exceeding £20M have in most cases with other Trusts required national funding opportunities to make them a viable and affordable option.

Appendix

Appendix 1: Strategic Pillars

Pillar 1 – Continuous Improvement in Core Services.

Ensuring all basic technology and systems are embedded in the Trust, readily available to users and continuously evolving to meet the expectations of stakeholders. Systems and Integration encapsulates the core clinical, non-clinical and corporate systems that make up the IT portfolio. There needs to be some focus to consolidate functionality and improve systems performance with further integration as the ambition and scale of requirements grow.

A. Systems & Integration

Business Systems encapsulates all of the core clinical, non-clinical and functional systems that make up the IT application portfolio today. At the moment there are over 300 applications documented in the Trusts Information Asset Register, many of which service specific directorate needs, whilst others provide the range of basic desktop functionality like email, word processing, spreadsheets and presentations. There must be a particular focus on the efforts to consolidate and improve system performance – specifically to meet strategic objectives related to an improved user experience and data integration. It is important to note that these actions sit outside those related to the EMR – which is explicitly outlined in the next pillar. The development of the Trust's Records Management Policy must ensure processes are embedded to support new ways of working. The delivery of a truly integrated electronic health record is dependent on the smooth transition from a paper based system. At the system layer, effective Integration and Interoperability is essential to minimise the impact of organisational boundaries in



Health and Social Care. Localised and bespoke integrations must not come at the expense of effective interoperability and creation of so called "Digital Islands".

B. Data Driven Care and Research analytics

A major part of the strategy highlights the need for greater data integration and transforming the organisation into a data-led organisation. A critical component of this is the underlying data analytics platforms. Although some of these data analytics platforms already exist this strategy identifies the need to both improve the existing platforms and create new integrated platforms (specifically aligned to the EMR) to drive greater use of data (aligned to strategic outcome related to data integration).

C. Core infrastructure

Improving the core infrastructure is absolutely critical to satisfying all of the strategic outcomes. Without high quality core infrastructure it will be impossible to support a quality user experience, data integration within or outside the Trust. There has already been an enormous amount of work on the core infrastructure just within the last 12 months – including radical overhauls of the Trust Core Network, Edge Networks, WiFi, Data Centres equipment and Storage Area Networks.

Pillar 2 – Enable Transformation & Innovation.

To deliver the agreed digital programmes that underpins the Trust Strategic Objectives and the deployment of innovative technology. There is a recognition that more focus is required on service transformation programmes that the Trust is to develop and can be informed by the introduction of innovative technology. We will work with internal / external partners to enable future technology for the Trust and support at scale, deployment of proven innovative healthcare technology solutions within the Trust and regionally, or nationally.

A. Primary Care Integration and other Transformation programmes

A key element of this strategy is the recognition that existing transformational initiatives must continue to be supported, both within the scope that is recognised today and those strategic transformations expected in the future. Most of the current transformational activities centre on Integrated Care System and community transformation programmes. However, as the three year period progresses it is likely that new actions, projects and initiatives will be required. In budgeting for these actions, we have assumed some dedicated funding will be available for these actions, and that the future transformation initiatives will be supported by the improved core infrastructure already created, or will be supported with dedicated funding from new programmes.

The Trust will continue with its **Digital Innovation agenda via Digital Dragons, Digital Innovation Forum and Sub Board Innovation Groups**, where this will be supported by the ICT, Information and Health Records services. Each transformation programme already sets out its own objectives and goals – the ICT function will need to determine how to meet these objectives on a case by case basis to fit with this strategy and the enterprise architecture of the Trust.

B. Electronic Medical Records (EMR)

One of the most significant single programmes within this strategy is the Electronic Medical Record (EMR). The actions in this strategy are only the beginning of the EMR Strategy – beyond these a more formal decision on the EMR would lead to a strategic review of the options dictating the specific actions, projects, and investments that will be required. Our strategic budget estimate for the EMR incorporates only the current proposals as set out in Pillar 1 – Continuous Improvement in Core Services. With a formal decisions to develop an EMR strategy a business case would be required recognising a significant difference in approach could be chosen and the amount of business change that could be applied, would dictate a long-term investment plan requirement.

The EMR strategy and further programme will provide benefits to the Trust – however, most of these benefits will not materialise for a number of years. In the interim period, there are likely to be a number of small improvements required, in-year cost savings, and small continuous improvement projects required on the existing systems that make up the current EMR. These could take the form of innovations from transformation programmes or CQUINs that are applied to the Trust.

Pillar 3 – Developing Digital Capability & Capacity across the Organisation

IT leadership, business, service and change capabilities

Improving existing and introducing new skillsets to prepare the Trust staff and patients to adopt and support new technology enabled process change. With the support of ICT, skillsets in service, support and business change will act as drivers of change and create more formal ways of working to improve the adoption of new technologies more rapidly in the Trust and with our patients. A user centric and patient centric approach is at the heart of everything we do and will be embedded in the approach to deployment of new healthcare technology.

“CIOs are under mounting pressure to address digital needs with “grow” and “transform” functions” – Suzanne Adnams, research vice president at Gartner

The diagram in the ICT Governance section of this document provides the strategic direction for many of the changes in the governance model and suggested actions and considerations that arise from that direction.

As recommended in the Wachter report and accepted for adoption as best practice by NHS Digital, it's expected that digital leadership roles including CCIOs, CIOs, CTOs, Digital Directors and further leads from other professions will carry forward the challenge of shifting to digitally led transformation with our clinical digital leadership teams key in challenging the culture of the organisation and for creating convincing messages as to why change is needed.

Clear definitions for the roles of Relationship Managers and the trust-wide Change Leads are needed. Additionally, putting in place and taking advantage of leadership development programmes for key roles within the ICT, Information and Health Records functions to grow the future delivery skills required i.e. Agile, Data Science, etc.

Pillar 4: Improving Engagement and Communications

To use existing governance, engagement and support models to establish closer collaboration with the key stakeholders to maximise available resources. We will work across the Trust and health economy, both regionally and nationally, to identify resources to support the Four Strategic Pillars. To promote a communications culture and tools that support the adoption of new technologies which align with our users and patients, but also to act as a catalyst for more rapid deployment of new ways of working and the use of new healthcare technologies.

A. Engagement and communications

There has already been an improvement to the communications mechanisms delivered by Trust ICT and the evolving communications team, with much closer working relationships to structure, support, and develop the Trust communication media outputs with overall branding. This strategy endorses that improvement and recommends it continues throughout the future three year period.

A dedicated communications strategy with supporting ICT Digital Strategy will be needed utilising Internet, Intranet, Social Media and Digital Innovation to incorporate the key messages from this strategy as well as the specific communications from the EMR programme and other digitally enabled transformations.

B. Learning and development

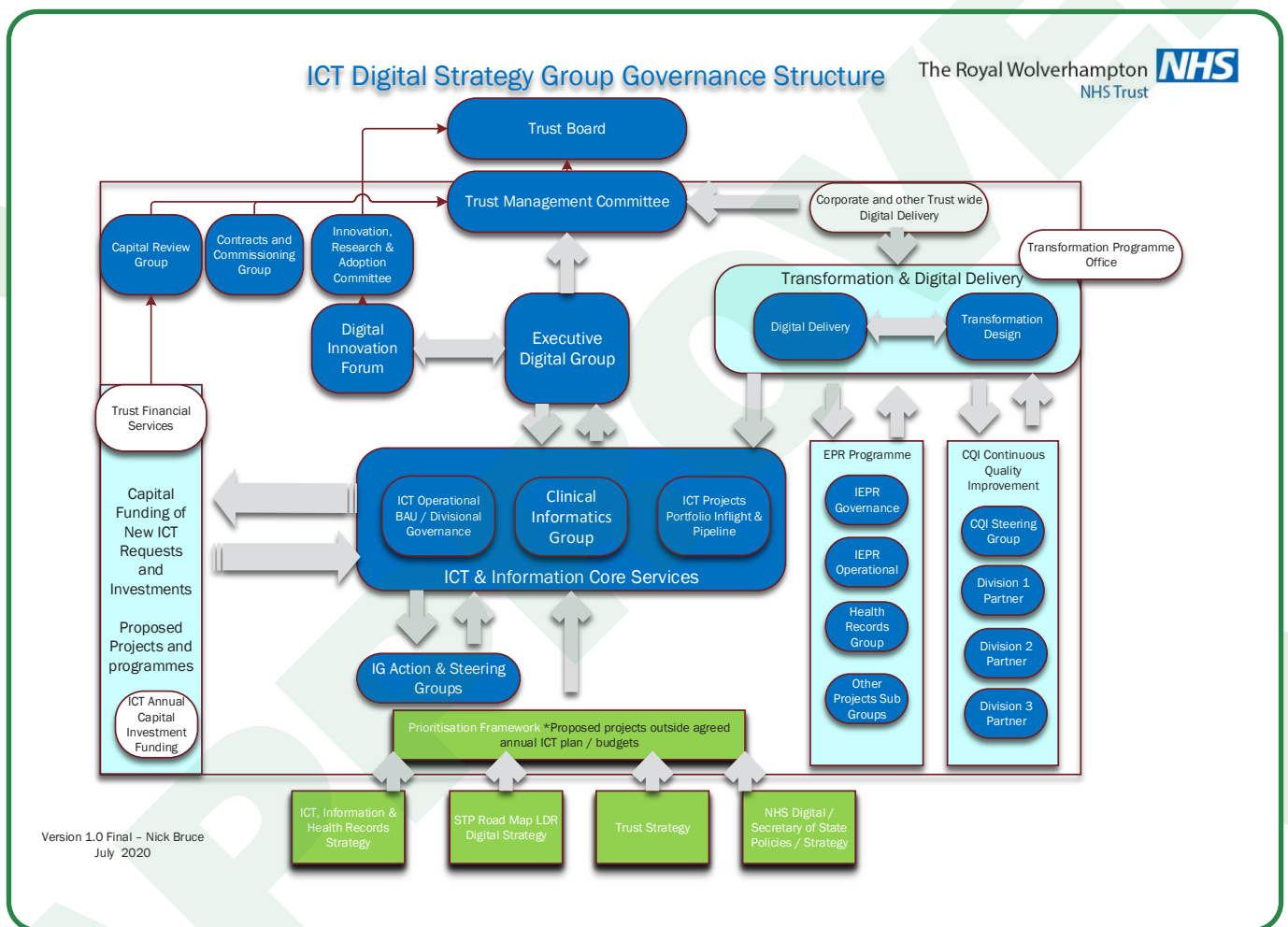
Our strategy will be to increase the number and spread of clinical and operational staff who are directly engaged in digital transformation. They should be appointed from across all professions including nursing, doctors and allied health professionals. We should ensure that our organisation takes advantage of the NHS Digital Academy and supports the formal development of its clinical and digital leadership by ensuring regular enrolments. This will have the benefit of providing a clear professional development pathway and of involving key decision makers within the national digital healthcare networks.

“Within 20 years, 90% of all jobs in the NHS will require some element of digital skills” – Topol Review 2019.

Central to the Trust strategic objectives and highlighted in the Topol Review, the Trust as a whole must improve the culture and tools for front line staff to adopt digital technologies, and recognising that over the next three years patients will start to play a bigger role as direct users of the Trust's IT systems.

Appendix 2: ICT Digital Strategy Governance

The governance chart below sets out the ICT Digital Strategy Governance Model for the Trust. The core groups for ICT consist of the ICT Digital Strategy Group, the ICT & Informatics Core Services Groups, the Digital Innovation Forum and the Information Governance Action & Steering Groups. Key programmes such as the Electronic Patient Record, Quality Improvement and Cost Improvement programmes report through the Transformation Programme Office into the respective ICT & Informatics Service Groups.



Appendix 3: Risks for the ICT Digital Strategy

As part of the overall ICT risk management we have identified a number of specific risks in delivering the proposed ICT Digital Strategy. Through the ICT Strategy Group and ongoing risk management in ICT we will manage these risks. The following is a summary of the key priority risks identified for the delivery of the ICT Digital Strategy and proposed mitigating actions.

Risk (There is a risk that the ...)	Proposed Mitigation
Levels of investment funding, both Trust and STP – large deficits; service delivery always trumps digital investment	<ul style="list-style-type: none"> The ICT Digital Strategy Group will enable the alignment of the ICT Digital Strategy with the competing investment decisions at the Trust. The ICT Digital Strategy Group will engage with the STP leadership to build alignment at a regional level.
Prioritisation of digital investment – innovation v’s legacy or core systems solutions	<ul style="list-style-type: none"> The ICT Digital Strategy Group with the Digital Innovation Forum (DIF) will balance the prioritisation of innovation, legacy and core systems investment. Increased target of investment to 1% of Trust income will allow significant run, grow and transform investment.
Resourcing to support delivery of complex solutions	<ul style="list-style-type: none"> IM&T skilled project resource should be retained rather than the circular approach of fixed term, re-advert and recruit. 1% investment target will allow more resources to be on-boarded for complex delivery.
Other regional care organisations at differing level of digital maturity	<ul style="list-style-type: none"> The ICT Digital Strategy Group will engage with the STP leadership to build alignment at a regional level. Pillar 2 of the approach looks to collaboratively build share care records and plans across the integrated care system.
Lack of integration or interoperability (technical, individual organisation drivers, Governance, Data Security challenges)	<ul style="list-style-type: none"> Pillar 1 of the approach builds on existing technical integration and interoperability. Pillar 4 of the approach uses the existing engagement and communications to create alignment both regionally and nationally.
Potential lack of shared vision, standard design principles or governance process – Bottom up v’s Top down how the two can co-exist	<ul style="list-style-type: none"> The ICT Digital Strategy provides strategy principles and a governance process. The terms of the reference for the ICT Digital Strategy Group are to ensure alignment to the strategy or to agree exceptions and amendments.
‘Wood from the Trees’ – market is saturated with solutions, strategic fit is needed, viability with existing set-up	<ul style="list-style-type: none"> The ICT Digital Strategy provides strategy principles to support decision making on strategic Trust wide solutions. The ICT Digital Strategy Group will provide decisions making and ensure alignment to the strategy. The Trusts newly appointed Digital Innovation Forum (DIF) will vet solutions in a Dragons Den style approach (Digital Dragons). Overseeing this process will be Trust Management Committee and Innovation Sub Board Committee.

Appendix 4: Core Enablers & Components

ICT Systems and Applications

Each section of this ICT Service Roadmap specifically highlights which of the Pillars that it relates to.

Clinical Systems (Electronic Patient Record)

Strategic Pillar 1: Continuous Improvement in Core Services

Strategic Pillar 2: Transformation & Innovation.

The Trust Electronic Patient Record (EPR) should be the main source of consolidated clinical and non-clinical information pertaining to the patient. This function is an in house developed application which will continue to be developed in-line with the requirements of the Trust and its patients. Further to its current status as a “consumer” application, the EPR will enter the next phase of its evolution into a system which will be bi-directional, providing information for consumption and allowing end users to submit information for integration and/or other uses.

As part of the development of the EPR, it is recognised that the EPR itself will require a significant update and overhaul in order to make best use of new and emerging technologies. To that end, it is planned that the EPR will be taken to the next level of functionality within the next 3-5 years. Whilst there are a number of Commercial off the Shelf Solutions available, the level of capital investment and subsequent revenue required to support such a deployment would be prohibitive for the Trust, to that end the Trust will look to enable an enhancement of the existing solution utilising appropriate modern technology.

Further, the Trust will move to consolidate its estate as far as is practicable in order to assist in the amalgamation of data into the EPR for patient management purposes as well as the economies of scale that consolidation bring, in addition to the quantitative and qualitative benefits that would also be possible.

The IEPR and latterly IPZ programmes of work have helped to transform the Trusts electronic working and development of an electronic patient record. However, as a consequence of this and other initiatives across the health economy, an enhancement to the current provision and approach to the Trust EPR and associate services is required.

Data Consumers start to become Data Contributors.

With the on-going development of the EPR, the Trust is now in a position to launch itself into an evolutionary and revolutionary period of enhancement. The previous development of the EPR took the Trust from a paper based solution into a new arena of the digitisation of those paper records and processes. However, with the advent of new technology and the changing nature of the services of the Trust, over the next 3 years, the EPR will move into the domain of Digital Capture and interaction so as to enable clinical and non-clinical staff to cease to become “data consumers” and start to become “data contributors”. This will not only reflect the digital maturity of the product and the ability of clinical and non-clinical staff to engage in a meaningful way with patient data, but it will also help to build the reputation of the Trust as being innovative and fully committed to electronic provision of patient data, empowering Clinicians and helping to release more time to care.

Through the EPR, the Trust has achieved many milestones from the collation and representation of various elements of the patient record (including appointments, test results, plans) through to on-the-fly recording of patient notes and in-system applications for recording service specific content through to the integration at the granular level with 3rd party supplier systems such as Electronic Observations, Cardiology and Radiology systems. The mass of information made available through the integration of Community Services has been gradually included as will be further information from Primary Care and potentially from Mental Health and Local Authority information all of which support the Local Digital Roadmap and will further help to underpin potential strategic directions by the STP.

The EPR has constantly moved forwards to include more and more information to the point that it is now accessed by neighbouring NHS Trusts and authorised 3rd party organisations involved in the care of Trust patients wherever they may be located. This has helped the Trust to achieve national compliance with a number of standards and mandatory requirements including GDPR and as well as the Trusts' own OP07 Health Records Policy. This expansion across borders will continue as more GP Practices and external services become part of the wider Trust remit.

The EPR's ability to audit and provide a secure environment for the clinical use of accurate and timely patient data is significant; however, as part of the future direction of the EPR, it requires further enhancement to meet the various needs of the Trust.

These enhancements will accompany other radical changes to the way in which the EPR is operated and further developments orbiting the application are managed and communicated. Over the next few years, new ways of working will be developed for the management of the EPR which will in turn help to drive new innovations such as full mobile working and patient portal application development. This will help to deliver quality of care through the quality of data and how it is both presented and captured at the point of access and use.

The EPR will evolve to enable greater interaction between clinicians, non-clinicians and patients in a more expedient manner. This will come from a number of innovations including the inclusion and/or consolidation of native systems into the EPR, the ability to submit rich data for data mining and trend analysis. The latest technology shall be employed accompanied by the latest technology standards and regulatory requirements. Community systems will see their systems also more closely aligned with the core product and full integration and interoperability across the estate including the development of internal API's and the inclusion of the NHS new API standard.

Communication into and out of the EPR will also be a key driver for the next 3 years with the ability to store disparate information and data within the EPR without the need for complex ways of working. One of the most significant ways forward will be in the creation of a new data architecture to enable all of the aforementioned as well as providing a further rich source of data for the Trust



and its reporting capabilities through partner departments such as Information.

An evolved EPR will also align itself with enhanced data workflows through the Trust irrespective of clinical setting. New mechanisms for correspondence creation, authorisation and delivery will be developed allowing for streamlined communication between clinical staff and the patients in their care. This will again rely upon integration and the safe transmission of patient information through secure mechanisms and which in and of themselves, allows further processes to occur as a result of their delivery. This would be common across the Trust including in Primary and Community Care.

During the period that the aforementioned enhancements to the Trust EPR system will take place, a parallel review of the EPR strategic position needs to occur. This review will focus on the future direction of the EPR and how it can utilise many of the benefits of the existing and planned ICT infrastructure to deliver value added advantages to the Trust but also to consider the wider implications and consequences of implementing an Enterprise-class EPR.

Part of this Strategic review will be to present findings in a progressive manner so as to best inform the Trust as to the long-term view of an EPR and whether that should remain an in-house bespoke solution or a more extensive commercial off the shelf offering (COTS).

Local Health Care Record Exemplars (LHCRE)

In line with the NHS Long Term Plan, the redevelopment of both the data structure and the application layer of the Trust EPR will be built with extensive layers of interoperability and integration as key deliverables. Currently the organisations within the Black Country and West Birmingham STP use different Electronic Patient Records (EPR) solutions with limited integration. Levels of integration are however increasing, with successful projects for a shared Pathology solution having been completed and work on an integrated maternity system that is viewable across the STP currently being developed.

We will enable via defined data feeds and enhanced levels of Interoperability the wider regional Electronic healthcare record along with National scaled LHCREs which will have an important role to play with safeguarding the vulnerable and provisioning the full longitudinal patient centric record. Ensuring we have compliant information governance frameworks in place and enabling digital solutions. To an extent the work conducted for data sharing and integration under COVID19 to support the establishment of the Nightingale hospitals will put in place the technical mechanisms needed to support LHCRE data exchanges.

Looking globally at other healthcare systems we should learn from the likes of Estonia where 99% of patients have a countrywide digital record and 99% of health data is digitised. Their Electronic Health Record is a nationwide system integrating data from Estonia's different healthcare providers to produce a common record accessible by every patient online. This functions as a centralised, national database retrieving data as necessary from various providers, underpinned by Block Chain Technology using different systems, and presents it in a standard format via the e-Patient portal.

Digital Enablement / Digitisation - Internet of Things

Strategic Pillar 1: Continuous Improvement in Core Services.

Internet First

Internet First is a key NHS strategy that has followed on from the Cloud First philosophy. Internet First means that externally accessible health and social care digital services must be securely accessible over the public internet by default. This has a number of pre-requisites which ICT suppliers and NHS organisations need to engage in to make this viable. However, from a Trust perspective, this is a journey that needs to be travelled, in that some of our services are already being accessed remotely such as Clinical Web Portal and such access is only going to increase given the complexity of some of the service provision and the distributed nature of patients and their data.

Internet First applies to digital services such as the systems, applications and services used by Trust staff and partners/other NHS organisations, who require them to be accessible remotely. Local area networks are no longer sufficient to support the Trust's activities, especially given the activity of Community Services and increasing care at home.

There are however, exceptions to this approach where specific needs do mean that the Internet cannot fulfil requirements. However, for the most part, significant number of services across the Trust will be affected by this approach especially those that have high volumes of users or where high volumes of data interchange are required.

There are 9 principles associated with Internet First which the Trust ICT will need to embed in working practices to achieve this objective. These principles are:

1. Design and Develop digital services to be securely accessible over the internet by default.
2. Where a digital service can be migrated or performed by a shared service presented over the internet, the application should be retired, and the functionality provided by the shared service.
3. Internet facing digital services should be designed to be shared and re-used. They should avoid bespoke features that constrain re-use.
4. Existing digital services should be developed to be accessible over the internet at the earliest opportunity. Near-term opportunities to achieve this within planned development lifecycles should be exploited to achieve early delivery over the internet.
5. Transforming digital services to be presented over the internet must not introduce additional risk to live services.
6. Data sensitivity analysis must be carried out prior to exposing digital services to the internet.
7. Investments in new and existing digital services must support universal access for consumers.
8. Users must be kept informed to ensure business continuity is maintained during migration to the internet. In particular, application sub-component dependencies should be managed carefully where systems are integrated.
9. Ensure users are sufficiently prepared to access the digital services they need over the internet (for example have sufficient bandwidth, resilience and quality of service).

By creating such digital services that interface through Internet connectivity, this will allow the Trust to continue its programme of electronic improvements and enhancements, especially where an interface between both local and remote systems are required.

The Trust will deploy enhancements to its existing web services with emphasis on greater control and flexibility in how such services are delivered and the capabilities that are possible to deploy. This will see the Trust enable an internal function for externally facing communication through websites and other applicable technology such as web applications and web apps. Furthermore it will upgrade its internal capabilities, providing an enterprise-class Intranet site to match the already successful Trust external Website.

Administrative Patient Portal

Strategic Pillar 2: Transformation & Innovation.

Strategic Pillar 3: Developing Organisational Capability and Capacity.

The Trust will deploy a solution allowing for the automation of certain correspondence to be received by and managed by patients within their own setting. This would also include the ability to manage their own appointments thus empowering the patient to become more responsible for the direction and management of their own care and support. This would supplement the continued use of additional patient orientated tools such as text reminders so as to provide the patient with a holistic approach to how they are communicated with.

This is also linked to a clinically orientated patient portal which would complement this capability. It is envisaged that this would be an externally sourced solution that would fully integrate with the Trust's key systems in line with the overall IT strategy of interoperability and integration. In line with the NHS Long Term Plan, this approach will complement the Summary Care Record.

By 2020, every patient with a long term condition will have access to their health record through the Summary Care Record accessed via the NHS App. The Trust will supplement this with both the Administrative and Clinical Patient Portals to provide the patient with the most comprehensive view of their health record possible.

Clinical Patient Portal

Strategic Pillar 2: Transformation & Innovation.

Strategic Pillar 3: Developing Organisational Capability and Capacity.

In addition to the administrative patient portal, a complementary clinical version will also be made available. To enable this, new technologies shall be employed so as to enable patients a range of options so that they can access their own clinical information online, in their own care setting and at a time of their choosing. This would provide patients with a full range of information relating to their care and enabling them to take greater responsibility for educated decision making in conjunction with their clinical carers.

This portal would be developed internally so as to meet the specification of the Trust and its patients and within the cost and timescales appropriate to it. It would also benefit from the data work aforementioned in terms of how data would be made available and under existing legislation, how the patient would then have the ability to fulfil their right to data portability between care providers. In line with the NHS Long Term Plan, this will create simple digital access to NHS Services and information and help patients and their carers manage their health in a collaborative manner. This will be achieved in a way that protects the patient's privacy and give them control over their medical record.

In line with the NHS Long Term Plan, the NHS is developing a standard online way for people to access the NHS and the data that it holds through the use of NHS Login, NHS App and the NHS Apps Library which the Trust shall utilise to enable easy access to personalised content and digital tools and services. Part of the ability of viewing unified patient records in this manner is that a range of information is available, such as Care Plans which both patient and clinician can view helping to ensure clinically that care is not duplicated, tests are not repeated and appropriate actions will be taken in a timely manner.

Mobile Apps / Agile Working

Strategic Pillar 3: Developing Organisational Capability and Capacity.

As per the core tenants of the NHS Long Term Plan, apps will become a key utility in the ability of health care to deliver in the future. The Trust will embark on developing its own internal, clinically orientated apps for both internal and mobile usage, further enabling both ward and community based staff to bring enhanced decision making to the patient. This will include the creation of a suite of apps to interface with new NHS App along with the Trust EPR for advanced clinical access and data recording as part of the patient care.

This will be further enhanced through the wider use of NHS Apps Library in the development of new systems so that Trust systems and apps become both compatible and normalised using NHS coding standards. This will assist in the wider integration approach to making all systems interconnected and contributing towards the whole patient record both for strict clinical use and wider patient consumption. In line with the NHS Long Term Plan this will ensure that clinicians can access and interact with patient records and care plans wherever they are, mobility being key.

As part of this approach, there will be the development of appropriate technical environments and architectures to support remote working through the use of apps and associated technology as mobility will be a key factor in the overall IT strategy.

This will also include the development and deployment of advanced IT tools in the capture of data in various clinical and non-clinical settings. Tools such as third party rapid form generation engines will revolutionise the way in which clinical areas can quickly specify, develop and deploy the means for data collection without the need for lengthy development cycles.

This will further lead to specialist applications being developed and evolved to support certain conditions which update the EPR. Overall systems and applications will undergo evolutionary cycles of development and deployment with the vision being one of developing smaller numbers of applications but with wider use and flexibility so that focus on quality and accuracy can be maintained.

The Trust requires an agile workforce in order to adapt to the future needs of our patients. To that end, the onset of COVID19 crisis has seen the significant deployment of agile working equipment and investment into the remote working infrastructure. IT will continue to deliver further innovative ways of mobile working and remote access solutions, including implementation of Soft phones (added onto laptop Windows) which will seamlessly and easily allow health care professionals to use or log into their phones from whatever location they are needed. Overall expansion of remote working including Radiology remote viewing will continue to revolutionise the way in which staff operate and free our workforce from being location-bound with the ability to communicate in real time with colleagues over distances. This has already been proven successfully as part of COVID19 agile ways of working under lockdown, proving positive with the workforce without any detriment in connectivity or productivity.

Wearable Technology

Strategic Pillar 2: Transformation & Innovation.

Strategic Pillar 3: Developing Organisational Capability and Capacity.

By 2021, 10% of people who use wearable technology will have changed their lifestyle to some extent, in turn lengthening their lifespan by an average of six months. This claim has been made by Gartner, which highlighted the benefits of wearable technology in its recent

report **'Predicts 2018: Personal Devices'**. One of today's biggest trends to develop from wearable tech is the emergence of corporate wellness programmes. Wearable technology is an emerging but still significant market which will and does affect both patients and staff alike; as the market for wearable technology increases and the capabilities of such devices evolves, the Trust will want to harness the power of these personal and personalised devices. The wider global market for wearable medical devices is expected to reach £3.2bn by 2030, driven not only by an increasing need to manage chronic diseases of a growing population, but also by a rise in health awareness and innovation in health management devices. With it we are seeing advancements in health technology including devices that monitor patients at home, more protective headphones, smart watches that monitor heart rate, physical activity, food consumption etc. At a minimum, wearables are improving overall awareness of fitness and activity. Yet the technology has the potential to have a far greater importance for the diagnosing of ailments, particularly in the case of sleep apnoea and heart arrhythmia, conditions that would otherwise likely go undetected for some time. This is technology that Trust IT will look to leverage in support of clinical activity, not least on the basis that it is becoming increasingly apparent that this technology "walks through the door" and is already readily available for the Trust to interact with and make use of. The Trust should look to integrate data that is available from such devices into its Warehouse and repositories as appropriate so that further clinical systems and clinicians can benefit from access to it for clinical judgement and trend analysis / research. Wearable technology will become increasingly central to the future application of clinical personal monitoring and as such, the Trust and localised IT should build the structure needed to support those activities including assurances that any solutions are secure by design given the exposure and high visibility of this tech, it's purpose and personal data contained which can be exploited by cyber criminals in terms of hardware or software vulnerabilities. It should also be noted that Trust staff will also be engaging with such technology and as such, there is an opportunity for the Trust to operate a corporate wellness programme which IT can then provide the infrastructure and integration to support.

Digital Workforce

Strategic Pillar 3: Developing Organisational Capability and Capacity.

Strategic Pillar 4: Improving Engagement and Communications.

Digital workforce whom have adapted incredibly well to these new ways of working for the future! Furthermore, we will continue to increase training in digital capabilities for the health and care workforce, focusing a growing element of the training on the newer digital fields so that the Trust workforce can continue to deliver the technology strategy of the Trust.

Technology and the method through which it is taught will enable this process with technology itself proving the means for engagement through surveys, feedback, questionnaires etc. which can be delivered conveniently through existing facilities such as the Trust Intranet. The delivery of the training itself will no longer be location specific. Whilst classroom based teaching will always be part of any training offering, IT will also enable compute based training from remote locations, self-directed learning through information packages/courses and the media itself will change to utilise the latest technology in this area so that newer staff who may have greater exposure to such technology will be able to engage with and gain fulfilment through their training options.

As noted in the NHS Long Term Plan and Trust Strategy 2019-2021, the NHS as an organisation has an aging workforce. The challenge for IT is to provide the latest innovative IT tools for younger NHS employees whilst still engaging with an aging workforce who may experience difficulties in adapting to the increasingly rapid rate of technological change. Again the onset of COVID19 has to an extent forced aspects of the workforce to embrace the technology change. In most this has been hugely successful and key to ensuring ongoing support is to demonstrate the benefits which the likes of MS Teams and other aspects of remote working is already doing. The Trust IT will continue to provide training in pertinent areas and will continue to strive to provide innovative and convenient means of educating staff of all ages and abilities so that the Trust will be assured that they have a digital workforce fit for the future!

Artificial Intelligence & Robotic Process Automation (RPA)

Strategic Pillar 2: Transformation & Innovation.

The Trust already employs Robotic Process Automation in the management of patient data through the community. This has proven successful and as such, lends itself to further utilisation. As such, the Trust will capitalise on systems which can make use of machine learning and its further enhancement into true Artificial Intelligence. AI is an emerging technology was also accelerated due to the COVID19 Crisis. Major AI providers such as Babylon for patient online triaging was deployed at the Trust to assist patients remotely during the period of lockdown. This has proven successful but further opportunities with this platform needs to be explored and this is currently ongoing. AI is constantly evolving as its accuracy improves, thereby making this a more attractive and accurate solution in a number of guises and arenas for clinical application. To that end, the Trust IT will continue to explore options in regards to where such technology can be utilised across the estate, capitalising on AI platforms such as Babylon already deployed under COVID 19. In particular and in line with the NHS Long Term Plan, the Trust will evolve current AI capability for decision support and the artificial intelligence will help clinicians in applying best practice, eliminating unwarranted variation across the whole pathway of care. We will look for opportunities to increase levels of automation and the utilisation of AI in order to make such facilities and services "smarter", IT will also appreciate that "in person" services will always be available to those that need or want them and as such, the implementation of AI systems will not be seen as a means to an end of the removal of the human element. This is demonstrated with current Babylon deployment under COVID19 that sees patients being passed onto a face to face clinician when the AI decides this is the best outcome for treatment.

Furthermore, the deployment of AI within the Trust will also lend itself to integrative work within the Information arena allowing for patient level automated trend analysis, decision making assistance for clinicians and wider reporting at a number of different

levels, thus enabling both the clinician to improve individual patient care but also for planning purposes at a more strategic level within the Trust.

It's unlikely that further introduction and opportunities for deployment of AI, RPA or Machine Learning will be derived from any in-house developments, as it's acknowledged these areas are extremely specialised. Instead IT, Information and Health Records will now continue to work towards identifying further opportunities, supporting expanded implementation and ensuring successful integration.

The further use of AI and Machine Learning within the likes of Radiology imaging is being pioneered by a team in Warwick. The team have developed an artificial intelligence system that can cut the time it takes to assess critical chest x-rays from 11 days to less than three. This system has been developed to recognise radiological abnormalities in chest x-rays. In addition the system can assess how severe the abnormality is and, therefore, how quickly a patient needs treatment. Alongside the AI system, the team have also developed a natural language processing algorithm which can read a radiologist report, understand their findings and automatically prioritise cases based on their severity. This is the future and a true application of AI / Machine Learning within Radiology imaging!

Digital Pathology

Strategic Pillar 2: Transformation & Innovation.

Strategic Pillar 3: Developing Organisational Capability and Capacity.

Trust IT will be supporting, enabling and administering the key objective of Digital Pathology. This national initiative, to be implemented on a regional basis, enables the reviewing of slide images of suspected cancerous cells. Traditionally, this has been achieved using microscopes at the local level; however, this initiative will allow both local, MDT and remote clinicians to review in near real-time, slides that have been created using a digital methodology. This will mean that slides generated can be shared amongst clinical colleagues as and when they need to without incurring the delays of the traditional

method of slide production and sharing which has often been time intensive and dependent on physical transportation. Additional benefits include the ease with which digital slides can be compared with one another leading to more accurate and quicker results. The consequence of this, are that it will fast track the diagnosis of cancers, for which time is critical. This will have profound implications not only for patients and clinicians but also for Trust IT, in that the IT requirements to enable this technology will be significant in terms of infrastructure, communication and storage capabilities. This technology also lends itself to a "cloud first" strategy as advocated by NHSD and NHSE as part of their overarching strategic approach for the NHS as a whole. Trust IT will be embedding the technology needed into its infrastructure further providing a robust, resilient and advanced platform from which to launch further developments in this area. One example of this will be the potential for the development and deployment of Artificial Intelligence. The NHS (and Private Sector) already run Labs which are engaged with AI in slide review and cancer diagnosis with significantly successful results. Digital Pathology will be the first significant step towards enabling that AI integration within the foreseeable future. Finally, the Trust has been committed to the support of the 100000 Genomics project which utilises results such as these in the research and understanding of both cancer and other exotic diseases, this initiative, enabled by Trust IT will help to support that interface in the future and thus regionally and nationally support and promote the ability of the Trust to contribute to such high priority and high profile objectives.

Interoperability - Integration and Secure Data Management

Strategic Pillar 4: Improving Engagement and Communications.

One of the key elements of the consolidation and/or normalisation of systems across the Trust is the opportunity for integration. A core element to the IT data approach will be the integration of systems using a common and universal API. This approach is consistent with the NHS guidance on future system interaction and places the Trust in a strong position for ensuring good data management in the

transmission and utilisation of data from and to various systems. These systems would include the EPR which will become a wider ranging universal application for the display and recording of the electronic patient record. This will assist clinicians in the use of patient data and therefore, in the care of the patient through accurate and timely access to the information they need at the point of request.

Adhering to national standards will also assist in the integration of Trust systems to the wider and national community, where appropriate. As other Trusts start to implement similar integration using NHS API standards, so the ability for the Trust to provide and consume pertinent information from others Trusts will grow. Nowhere will this be more prominent than in the ability to integrate 3rd party applications from suppliers who will also be mandated to utilise these same standards.

Part of the approach to such integration is the creation and maintenance of secured mechanism for storage and delivery. The Trust will continue to enforce security best practice across the systems estate and in the transmission and access of patient level data. This will allow the Trust to provide certified assurance in its transactional activity with both regional and national partners where patient level data is required to be shared as appropriate. This will ensure NHS systems and data are secure through the implementation of security, monitoring systems and the education of staff. Using the NHS login this will provide a secure access mechanism and a seamless digital journey for all end users and promoted within the technical developments of the Trust.

In line with the NHS Long Term Plan, this would enable the linking of clinical, genomic and other data to support the development of new treatments to improve the NHS, making data captured for care available for clinical research and publish, as open data, aggregate metrics about NHS performance and services. The Trust IT will ensure Trust systems and data are secure through the continued implementation of security and monitoring systems across the whole estate, the education of all staff and the design of systems and services to be resilient and recoverable.

Trust IT will also ensure that innovative technology is introduced in areas not typically associated with IT such as wearable devices,

physical assets such as “Smart Beds” and the ongoing development of existing solutions such as patient tracing devices which will become increasingly integrated into data workflow systems to present the Trust with quantifiable benefits in terms of efficiencies and the wide-scale engagement of staff with new technology that ultimately will benefit patient care.

Integration and interoperability will be a key enabler for the Trust over the next 3 years and as such innovation will drive how that will develop. To that end, IT will support innovation where pragmatically possible including the participation and promotion of appropriate forums for the development and discussion of ideas and agendas.

Corporate Systems - Non-Clinical Systems

Strategic Pillar 3: Developing Organisational Capability and Capacity.

The Trust operates a number of high profile systems in non-clinical areas e.g. Finance Ledger and Staffing systems which are key and critical to the operational status of the Trust, especially in relation to the staff employed within. The Trust will continue operate such systems but will be encouraged and assisted by IT, where possible, to consolidate those systems into a smaller number of providers, offering greater functionality, flexibility and interoperability, not limited to but including the opportunity to interface with clinical systems if required utilising NHS interfacing standards.

It must however be acknowledged that these Corporate systems are bespoke and specialised, where consolidation intent could be compromised as a result. Therefore where this applies, the requirement for effective interoperability is even more important.

The NHS Identity service also provides clear guidance that these systems should be integrated into the IT mechanisms for providing the single access and/or self-service approach to system access. The Identity Service is used to deploy smart cards across appropriate staff within the estate to both manage access to systems as well as their own profile content and that of their various teams. This does help to centralise such functions whilst empowering managers in

their staff management and provide assurance to staff that any actions are undertaken in a timely manner.

In line with the NHS Long Term Plan, in order to facilitate the consolidation and more importantly, the integration of systems within the Trust, any new procurement will require vendors to meet usability standards to match best practice in the human-machine interface arena. This will require every technology supplier to the Trust comply with published open standards to enable interoperability and continual improvement. Part of this will be the requirement for any commissioned solutions to be provided as 'open source' to the developer community so that they can build on and enhance them to meet the evolving needs of the Trust, patients and wider NHS.

ICT Systems & Applications 3 Year Outcome - What Does Success Look Like?

Over the next 3 years the ICT Systems and Applications Services Department will implement:

- The re-development of the Trust EPR data repository and associated structures. This will form part of the wider EPR enhancement and refresh including a new GUI and moving the basis of the EPR experience from a data consumer only perspective to that of being a data provider also. This means that a structured data capture regime will also be provided allowing end users a rapid mechanism for collecting pertinent data and storing it as such, rather than via scanning into Portal. This will allow for a feature rich EPR with the ability to data mine and report comprehensive on activity and patient care.
- The development of both an administrative and clinical Patient Portal. Outward facing from the Trust, this will empower patients in their care and the knowledge they have around the guidance being provided to them. It will include the ability to receive pertinent correspondence and enter into informed discussions with clinicians so that patient care becomes more of a partnership than ever before.
- Embedding of the "Internet First" Principles into all newly procured ICT systems and applications as well as ensuring that they are also a standard part of any in-house, bespoke system specification. This will also support the cloud-first philosophy of moving systems into a distributed cloud environment making Internet-First a more realistic possibility whilst offering potential for financial efficiencies. This will mean that where possible, systems provide services securely and safely through the Internet for easier access by all who need authorised access.
- Review and options appraisal in regards to the long term strategy for the Trust EPR which will also have significant impact on integrated systems. This will specifically review the possibility of implementing a Trust-wide, Enterprise-class solution that would remove the need for a significant number of existing systems including the EPR in preference to a fully matured and integrated holistic solution.
- Further integration and consolidation of existing systems. Where a business need or patient care need is present, existing systems will continue to be integrated into the wider Trust systems architecture for easier data transfer and use between connected systems and where opportunity and funding presents itself, the consolidation of disparate systems into single entities. This will/may have positive financial impact long term and again presents the opportunity for effective data usage across the estate in the pursuit of patient care. In line with earlier points, this includes the transfer and or transformation of systems into Internet-first enabled systems.
- Complete refresh of the Trust Integration Engine with the latest hardware and software so as to maximise potential for future expansion and possible use.
- Complete redevelopment of the Trust Intranet capability, completion of the amalgamation of the various microsites into a single corporate presence. Both of which will lead to and enable the replacement of the Trust Content Management System and external service

host providers which in turn will support and promote the Internet-first approach into the future.

- The enablement of a Digital Workforce and remote working. Greater flexibility in the field allowing further integration with Trust systems remotely. This will include the deployment of appropriate “apps” rather than applications to support both a corporate and clinical workforce. This will require the deployment of a mobile apps platform which can be used for multiple purposes.
- Development and deployment of a universal API in line with NHDD and NHSE guidance and directives. This will allow the implementation of FIHR across systems for the future, potentially reducing the cost of interfacing whilst at the same time making a plethora of systems truly interoperable. This would also present the opportunity of potentially interfacing IT systems into medical devices for further enhanced data use by clinical staff as well as being a constituent part of cross-platform compatibility and usability.
- The completion of the eObs expansion into key areas of the Trust, or where this is not possible, the interfacing of native systems in those areas into the Vitals system so as to avoid duplication of effort and to provide a holistic view of patient care.
- In support of Community Services, the completion of the integration of the Clinical Document Suite into the Trust EPR. CDS was the key system utilised by community under the PCT and as such, whilst remaining effective, needs to be decommissioned.
- The embryonic deployment of AI, RPA & machine learning, for decision making tools within the Trust. This will be highly dependent on the nature of the work such a tool would support, but it would also benefit from the Internet First philosophy in that it would have access to results and data from other similar projects from which to learn and base its own decision making or decision supporting algorithm.

Technical Services

Cloud First

Strategic Pillar 3: Developing Organisational Capability and Capacity.

The Trust currently hosts its own IT infrastructure on site, in highly resilient computer rooms; uptime and service availability are excellent. However, market trend in IT is towards Cloud computing. The SAN infrastructure was refreshed in November 2019. Cloud Computing allows users to access applications and data hosted and managed offsite, removing the requirement for onsite resources; users can access and share information and applications securely from any location. Cloud infrastructure is consumed, and paid for on a “pay for what you use” basis, it can be quickly scaled up, or down, to meet the changing demands of an organisation. This is much more difficult with on-site infrastructure. These features are fundamental to help underpin more efficient and resilient ways of working and to deliver the integrated care services that are required by the NHS 5 year plan.

Cloud Computing offers the potential to help transform working practice, there are many benefits to cloud, but for the move to be cost effective, the Trust will need to undertake an exercise of scoping, to fully analyse the requirements, and to plan how any cloud offering will fit in with these. A move to cloud computing will require significant initial investment, much more initially than to continue with the current infrastructure arrangements. The IT Teams will work with public cloud providers, to determine appropriate time lines and processes for the Trust to move to cloud based infrastructure. It is expected that the move to cloud computing will be a migration exercise more likely to be taken on a system by system basis, rather than a “big bang” approach; as each system is procured, or upgraded, the Trust will undertake exercises to determine if the systems are best hosted in public cloud, or onsite – various factors will affect this, including cost effectiveness, feature sets, availability, and integration into existing infrastructure and systems.

In all cases a “cloud first” attitude will be applied, and it is expected that during the lifetime of this strategy, could well become the norm, and possibly, the only option. Certainly, vendors are beginning to price their products to incentivise a cloud approach, however the Trust will retain on premise technology where this is more cost-effective and the best choice but link it to the Cloud where possible and leverage the scalability available, achieving the best of both worlds. Due to the Trust’s early adoption of the Cloud, many of the other developments proposed can be delivered with an initial low investment and cost scaling incrementally as use and benefits increase and as revenue is released. This is one of the main advantages of a “Cloud First” approach as it allows the Trust to rapidly deploy and test developments to understand benefits and then scale up to realise these benefits quickly. It is expected that when the SAN is due for replacement in 2026 the majority of services could well be delivered from the cloud.

In line with the NHS Long Term Plan, where systems can be safely, securely and pragmatically located in the NHS Cloud, such an approach will be taken which will have a significant impact on the architecture of the existing technological solutions. Not all systems will be able to adhere to this approach, mainly due to age and legacy conditions, however, newly procured systems will take a cloud-first and Internet-first approach as its main option unless there is good reason not to do so. This will also see Software as a Service models (SaaS) being employed whereby externally hosted solutions will be augmented by locally created apps in line with the rest of this strategy.

Online Digital Consultations

Strategic Pillar 1: Continuous Improvement in Core Services.

Strategic Pillar 2: Transformation & Innovation.

Strategic Pillar 3: Developing Organisational Capability and Capacity.

Strategic Pillar 4: Improving Engagement and Communications.

This is one of the COVID19 accelerated enablers where we now have the capability

to provide the promotion of online consultations in secondary care, meeting the ambition of avoiding a third of all hospital outpatient appointments, where 40%+ of current outpatient appointments over the COVID19 period are now being offered as a remote digital consultation. In addition this has laid the path for patient choice with ‘digital first’ options now having the potential to be offered as default. This has required new ways of working to provide effective business / service process, but remote digital consultations have also been adopted across Primary care and secondary care services. In addition the best of 3rd party offerings, such as Babylon Healthcare has been utilised to transform the way triaging care is delivered to our patients. Currently partially deployed given its full potential, further work is ongoing as part of this core enabler to exploit opportunities it can provide for the future. Process transformation is key and clinical services will need to adapt their own working practices to pro-actively embrace the advantages of virtual / digital appointments. The NHS Forward Plan had set out the objective that all patients would have the right to opt for a digital service from their existing GP, or secondary care provider with a target date by 2023. The onset of the COVID crisis has forced the rapid deployment of this technology and adoption by services with positive outcomes in the much shorter term.

Digital MDT Enablement

Strategic Pillar 3: Developing Organisational Capability and Capacity.

This is one of the COVID19 accelerated enablers where the trust has now rolled out Video Conferencing equipment on a large scale along with Cloud based solutions such as Convene for large scale MDT amongst services given the COVID Crisis. The Trust already delivered Primary HPV Screening services for the West Midlands with technology supporting RWT staff to contribute to regular Colposcopy Multi-Disciplinary Team (MDT) meetings across the West Midlands. However the Trusts capability for remote MDT has now significantly grown where staff no longer need to attend these meetings in person, which isn’t an effective use of resources and exposes staff to COVID risk. Going forward as

we expand care regionally and in partnership, the urgent need for effective technology enablement allows participation and contribution to Multi-Disciplinary Teams (MDT) will only increase. The remote/virtual capacity to allow provision of these meetings across locations and to share digital information for clinically informed discussions is critical.

Single Sign-On (SSO)

Strategic Pillar 1: Continuous Improvement in Core Services.

The offering of a single sign-on (SSO) solution will enable clinicians to eliminate the need to repeatedly type usernames and passwords. Single Sign-On will allow clinicians to quickly and securely access clinical and administrative applications, which streamlines clinical workflows and the use of electronic medical records. Not only does this save clinicians significant time on shift when using the IT enablement, but it will improve our staff satisfaction levels and drive further the roadmap for Electronic Health Record adoption. Other benefits of a "tap on" "tap off" solutions is risk mitigation for security breaches with staff writing down passwords or utilising generic login accounts. Likewise reduced time on the user side is reflected with reducing calls to the IT Helpdesk and call fault logging for password lockout will see a dramatic and positive impact. At national level this has been identified as a priority quick win and therefore the Trust is working within the STP Digital Board to secure appropriate approval for national funding to which the total of 40M is being made available.

End User Compute

Strategic Pillar 1: Continuous Improvement in Core Services.

Investment within this area has ensured technology is readily available and fit for purpose. This has ensured users have reliable access to applications, in both acute, and community settings. In order to make full use of the current Microsoft licensing agreement the Trust is moving to a Windows 10 desktop environment currently the latest desktop operating system available from Microsoft, the target date for completion is October 2020

over 5700 devices have been replaced to date.

This will provide the Trust with a significantly improved security layer, whilst providing more functionality, particularly for remote workers. Recent investment in an endpoint management solution (Ivanti) provides the advantage of centrally managed and deployed software and operating system provisioning, allowing the IT department to be more agile and efficient. We will continue to review End User Computing (EUC) solutions to deliver desktop virtualization including single sign on functionality.

Shared Document Stores & Cloud Based Office Suite

Strategic Pillar 3: Developing Organisational Capability and Capacity.

Currently the Trust is largely licenced for Microsoft office 2010, but this is due for replacement. The Trust has committed to implementing cloud based N365 enabling staff to access information from any device. This offering is supported by NHSX and the Department of Health and Social Care (DHSC), and delivery will be managed by NHS Digital .This represents a £1.5M investment over three years including a 50% central funding. IT teams have undertaken analysis work to identify how this will be implemented. In the shorter term Office 2019 will be the option for ward locations who do not have a requirement for agile working, but this is expected to be the last on premise version of office that Microsoft will produce.

High Performance Integrated Network

Strategic Pillar 1: Continuous Improvement in Core Services.

The network infrastructure is a critical backbone in support of access to all internal and external clinical and none clinical applications, interconnectivity for the Trust's wireless infrastructure and future developments such as the imminent IP telephony roll out.

The network infrastructure will provide stability and robustness for a purpose both wired and wireless integration for systems,

users and devices. The existing network infrastructure at New Cross Hospital was originally installed in 2011 with an expected life span of 5-7 years and this has now reached the point for replacement. Replacement and migration of systems onto a new infrastructure backbone is now ongoing where services, performance, interoperability and overall quality of service for the future is intrinsic to every part of the new underlying infrastructure. IT Services have put significant effort into re-engineering the Trust's internal infrastructure and remote mobile access solutions, so that they are ready not only for the mass rollout of video conferencing to enable digital consultations for patients, but this platform also forms a rock solid foundation for hosting all future ICT requirements, expectations and ambitions. Continuing investment will still be required to ensure the trust network remains modernised, but we will ensure appropriate level of support and investment is profiled accordingly within the Trust IT plans.

Further to this, the new network infrastructure will support new demands such as patient and visitor network access, the increased levels of connected medical devices and sensors, and the cloud first strategy. During this strategy period, the legacy N3 connections now viewed as unfit for purpose for the evolving National Health Service will be replaced with the Health and Social Care Network (HSCN). HSCN has been designed to provide a reliable, efficient and flexible way for health care organisations to access and exchange electronic information while at the same time reducing costs and complexity, standardising networks, enabling service sharing, and extending the parameters of collaborative working.

In terms of wide area network (WAN) strategy, this will be redesigned to coincide with HSCN transition period. All community circuits will be relocated to terminate at New Cross in order to consolidate and improve resilience, with increased bandwidth and reducing unnecessary complexity future proofing the network for further growth and the expansion of services. This innovative technology supports both partnership working and "joined up care" as staff will be able to access systems and resources over partner networks at the point of care.

In addition the Trust has replaced its Firewalls; ensuring appropriate measures are in place applicable and relevant to the latest security controls and guidance / standards defined by NHSD, and NHSE. Security Policy is implemented in a consistent, timely and cost effective manner with ongoing reviews and timely upgrades as part of our effective management of the Trusts perimeter security.

Patient / Public / Partner Wi-Fi

Strategic Pillar 1: Continuous Improvement in Core Services.

Increasingly Trust staff and visiting staff are requiring access to high quality, secure and reliable Internet access. Also, patients and their relatives whether visiting our community premises, or on inpatient wards require Internet access for communication and social inclusion. Using the existing Wi-Fi infrastructure implemented to securely delivery high quality Internet access tailored to the needs of different groups including staff, partners, patients and the public. Once the network redesign is complete, (July 2020) patient Wi-Fi will be expanded further to all community locations due to the increased bandwidth. We should not overlook the fact that WiFi Capability will be as important as overall Network capability and availability. This will be a crucial foundation for Unified communications, e-Bleep and much more as we transition workforce and our ways of working towards a mobile and dynamic direction. The ability to connect devices and work in that dynamic way could also see the need for extensive WiFi connectivity outside of the Trust buildings. Therefore solutions need to consider the provision of consistent connectivity in Trust open spaces, or between buildings for IT enablement.

Telephony

Strategic Pillar 1: Continuous Improvement in Core Services.

The Trust Telephony strategy was completed in December 2017 and is currently scheduled for completion April 2020. This business case proposes to standardise the systems on to the Cisco IP Telephony platform to provide a reliable, feature rich, future proof and resilient system replace traditional technologies with the latest to improve communications.

The Trust is already successfully managing the solution in house means there wouldn't be any of the usual complexities and cost associated with replacing a large legacy voice infrastructure in an acute environment. Further phases will include integrating GP practices and community expansion.

Key to this technology going forward would be the opportunities this presents in terms of IPT functionality and how this is intrinsically linked into overall unified communications as listed overleaf.

Unified Communications

Strategic Pillar 1: Continuous Improvement in Core Services.

Unified communications best describes the expectation of most millennials, to be always on and always connected. In Healthcare the integration of enterprise communication services such as instant messaging (chat), voice including IP telephony, mobility features (including extension mobility and single number reach), audio, web & video conferencing, desktop sharing, e-Bleeps, automated alerting, data sharing (including interactive whiteboards), call control and speech recognition are all deemed as UC is not necessarily a single product, but a set of products that provides a consistent unified user interface and user experience across multiple devices and media types.

As part of the COVID crisis the demand for UC to allow video conferencing, remote meetings and mass gatherings on a virtual platform was higher than ever. MS teams was negotiated as the consolidated UC platform of choice at a national level. Versatile on a number of fronts this platform provided the workforce with a complete transformation to the way they



worked enabling agile working from home under the COVID lockdown. However despite being a major step forward in accelerating this Core enabler, this UC doesn't cover every facet of overall UC solutions.

In sense UC can encompass all forms of communications that are exchanged via a network to include other forms of communications as they become an integrated part of the network communications in some cases acting as interoperable feeds into systems. Deployment maybe directed as one-to-one communications or broadcast communications from one to many. However UC allows an individual to send a message on one device and receive the same communication on another device. For example, tasks, alerts can be sent from a PC or automated system trigger to a clinician, Porter or other member of staff for action, received on an e-Bleep, tablet or mobile phone device. If the sender or system is online according to the presence information and currently accepts calls, the response can be sent immediately through text, voice or video. Otherwise, it may be sent as a non-real-time message that can be accessed through a variety of media or audits, even processed by another system i.e. Response to a call for Bed Cleaning from Hotel Services. The principle of UC within a Healthcare organisation needs to be urgently considered as in most cases communication takes place, but in a disjointed and fragmented way utilising a hybrid approach of manual process and technology enablement.

Service Management

Strategic Pillar 4: Improving Engagement and Communications.

IT Services are responsible for the maintenance and support functions of the ICT delivery service - this is managed through a service level agreement. The Trust is currently performance monitoring processes that are fundamental to the delivery of the strategy and the day-to-day support of the Trust and shard service partners. This will be reviewed to ensure they are reflected in the changes for enablement of the strategy. Calls to the Service Desk have increased on an annual basis reflecting the increase in technology utilisation, first time fix levels remain high at 75% reflecting the focus on delivering a service that meets customer's needs and high levels of satisfaction.

The Service Management system has recently been upgraded during the review period a plan will be implemented to ensure the new features are implemented i.e customer portal. There will be an increasing focus on self-service solutions to increase customer satisfaction and this will include software installation with a review of password reset tools.

It's recognised for the future that proactive operating support models is required in order to meet the needs of the Trust, in recognition of increasing reliance on technology and in light of diminishing effectiveness of paper business continuity plans. Proactive monitoring for equipment on the ground, as use of mobile devices increase and accessibility to IT becomes ever increasing in terms of importance. The device is the gateway and that gateway needs to be effective and monitored, almost real-time with a newly proposed and designed proactive operating model. This does not relinquish accountability on staff to report issues once noticed, but it will ensure more frequent identification of problems on the ground and ensure staff experience is heightened in terms of improved IT relationships and IT support visibility.

5G Cellular Data Connectivity

The idea is to monitor patients in their own homes rather than visiting a hospital. Fewer hospital admissions promise a more efficient use of NHS resources and, potentially, better healthcare for patients. The goal is to develop ways in which health professionals can remotely monitor important changes to a patient's health including Heart rate and blood pressure monitoring while alarms can also apparently be raised if a patient takes a fall. In addition provide health and social care professionals in the community with 5G technology enabling more effective access to patient records. Given assumed use of Wi-Fi in the home, the benefits of 5G for Wearable technology is more for the patients when out and about thereby having a dependency on cellular connectivity. In this usecase the claimed speed of 5G matches that of home broadband and where there is a lack of home broadband then 5G can supplement this within a patient's own residence. In some cases 5G cellular "sim card" mini hubs could be issued to the patients in most need who have no connectivity from their residence, negating the need for full broadband installation.

3 Year Outcome - What Does Success Look Like?

Over the next 3 years the ICT Technical Services Department will implement:

- Completion of the Network upgrades which will pride a resilient and robust foundation. Architectural enhancements will support the centralisation Primary Care data. This will include enhancement to support new projects e.g. Digital Pathology and the increase of connected medical devices and sensors, and the cloud first strategy.
- IP Telephony fully embedded in all community and Primary Care locations with full consolidation of reception and call centre operations. Collaboration tools will be fully utilised improving flexible working and communication across the organisation. Extension mobility and soft phone capabilities will be in use across the organisation.

- Office 365 will be rolled out across the organisation creating an opportunity to collaborate more easily with other organisations regionally and nationally across O365 s improving delivery of healthcare services.
- With a cloud and digital first strategy, now being not only an aspiration, but a standard for the delivery of technology in healthcare the majority of applications that are on premise will be migrated to the cloud. A “cloud first” attitude will be fully embedded and reaching maturity. Cloud backup will ensure quick recovery in a disaster recovery scenario and avoid significant downtime.
- At the point the SAN is due for replacement in 2025 the hosting requirement will be much reduced due to the cloud hosting strategy.
- Implementation of 5G technologies and identification of appropriate opportunities.
- BOYD will be a standard service offering enabling cost and resource efficiencies as the staff improve flexible working and improved access to hosted systems.
- Self-service tools for account creation, password management and software installation will be fully implemented providing and improved service offering to staff improving operational efficiencies. The rollout of collaboration tools such as Webchat will further enhance this offering.
- Implementation of Single Sign On, this is something that will significantly save time, prove more effective for account management and improve overall staff experience.
- Consolidate accessibility across the region, alignment of access rights for partner trusts and enablement of increased accessibility to platforms that promotes data sharing for clinical care.
- Implementation of Unified Communications, with expansion of current MS Teams and utilising opportunities within Office 365. In addition the implementation of IPT telephony will allow deployment of soft-phone technology on remote working devices to support the trusts ongoing agile working approach as adopted under COVID19 lock-

down. To review feasibility and viability for Bleep replacement and scale out solution to encompass overall UC requirements to include cloud based messaging apps and capitalise on BYOD.

- To implement proactive operating model for ICT support. In acknowledgement of the growing dependency on IT enablement and device usage for IT accessibility.

Information Services - Data Management and Analytics

As outlined in the NHS Long Term Plan, “...the burden of managing complex interactions and data flows between Trusts, systems and individuals all too often falls on patients and clinicians. Digital services and interoperability give us the opportunity to free up time and resources to focus on clinical care...” (p92).

Data Driven Care

Strategic Pillar 2: Transformation & Innovation.

The NHS has a wealth of data but lacks critical ‘information’ and needs to move towards a data driven healthcare service in order to target the most needing, prioritise interventions along the patient pathway and monitor patients to intervene before they go into crisis. By automating and standardising the generation and storage of data, it will reduce the burden on frontline services, reduce duplication and enable better management planning and design of patient pathways. It will also free up analytical resource to focus on critical modelling and analysis to support the priorities of the Trust in targeting well-being and prevention in the population.

We want to move to place where general operational data and information requirements are automated and readily available via a central reporting library, at the fingertips of managers and other decision makers - reducing delay and enabling decisions to be made with critical information available on an easily accessible platform which is refreshed as near real time as appropriate. We want to give managers the

tools to support decision making but also the skills and competency to understand how to use the data appropriately to continuously develop insight that will drive improvement in the Trust operations and patient care. In the future the informatics team will be working alongside directorates and managers to understand the data that they have and “mine it” to develop more robust insight to support the re-design of services and the planning of care.

In the future we would want to utilise our data to create effective demand and capacity modelling, using trend analysis and real time reporting, to enable better use of resources. More robust data and modelling would help managers to understand the flow of patients through the system and the services needed to deliver the requirements. Also focussing on outcomes for patients and understanding the variation in care and its impact in terms of resources.

Clinicians and managers will be able to see the patient journey through the health economy, linking not only acute and community interventions, but also having the scope to potentially include primary care, ambulance conveyances, social care and mental health, in order to see a holistic view of the patient and take all factors into account when planning the patients care. The Trust needs to move away from subjective and static reporting, towards integrated highlight reports which flag risks, issues and other clinical factors that require action. Core capabilities that we are aspiring to provide moving forwards include:

- Cohort identification – visual and real-time reporting and tools to prioritise a cohort to make sure time is made to deal with the most urgent cases.
- Patient monitoring – real time monitoring of patients and bed occupancy, through to data from self-management technologies
- Clinical decision support - driven through integrated patient data and enabled through Artificial Intelligence.
- Care management – data driven scheduling that coordinates the delivery of services and work queues. Also enabling the means for providing targeted managed care and care planning to identified patients’ that might benefit.

- Outcomes and cost management – activity, cost and outcome data available to support integrated care planning and understand which interventions and pathways are most effective for cohorts and individuals.

This also aligns with the national driver to move to Population Health Management, which looks at all elements of a patient population, utilising risk stratification, notifications/alerts and trend analysis to move to proactive management of patients’ conditions and preventative medicine.

Data Capacity and Modelling

Strategic Pillar 2: Transformation & Innovation.

The Trust needs to drastically change its approach to data storage, analysis and reporting if it is to make full use of the vast array of data at its disposal. There is a wealth of information waiting to be tapped into, providing we can structure it better and have more advanced tools for analysing and presenting it into meaningful informative reports. The digital age will result in even more data becoming available and we need to ensure that we store our data sources in a well architected structured data universe, for use at frontline care via the EPR and also for AI and advanced data modelling and analytics.

Moving forwards, we will still need to fulfil and explore the following:

- Clinical and quality outcomes
- Predictive modelling and analytics
- Impact analysis for new models on care
- Workflow planning and scheduling
- Population health management
- Patient centric data analysis, including interventions and cost

It is felt that these are the areas where analytics can add the most value. So the Trust needs to automate as much of the current items as possible to free up resource to complete the areas that can directly influence change and assist in improving services and patient care.

Data Storage and Management

Strategic Pillar 2: Transformation & Innovation.

The Trust has recently invested in the development of a Trust Data Warehouse solution. Great strides have already been made in building the foundations and platform for an integrated and adequately structured data universe. This development is being managed in house and its development will be tailored to the Trusts needs and priorities. It will consist of a rolling programme of work, continuing to build and expand over time to meet the Trusts reporting requirements.

By linking a range of data sources together, cross reporting of subject areas will be possible where only silo views are currently available. The Trust will be able to look for correlation and causation between differing data subjects in ways that are just not feasible presently. This is imperative when moving towards the holistic view of patient care and population health management. Being able to link multiple data sources is a key component to driving better patient care, as clinical staff members are then able to make more informed decisions about healthcare for patients, tailored to their individual needs. Likewise, it similarly allows managers and executives to utilise cross-reported data to highlight and better understand key areas for investigation or development through balanced scorecards.

The Trust will also implement analytic data models (business cubes) to standardise reporting for key metrics and performance indicators. This will also enable drill down functionality to allow service users to mine and delve into the data at more granular levels when needed, thus giving oversight and transparency at user's fingertips.

Currently, the analytics team only access data via an overnight feed making real time reporting unfeasible. The intention is to move to real time data feeds where applicable, in order to represent the true picture as near to real time as possible. Whilst this approach will not be relevant for all areas, it will be able to revolutionise the way we notify staff of patient requirements and for resource planning purposes. It will be possible to notify community staff when a patient has been discharged from hospital to trigger their

out of hospital care plan, or notify booking clerks and service managers when test results are available and a follow up appointment is required. This will improve patient safety and quality of care, as well as day to day management of patients with live waiting lists and alerts and notifications.

Data timeliness and accurate data capture at source will still be imperative for the reporting to be an accurate reflection of the true position. Implementation of the data warehouse will help in identifying these issues quicker and enable rigorous information for monitoring, identifying areas that may require additional training and performance management where applicable. It will also enable automation routines and algorithms to be built, to assess quality of records against previous data entries and trend analysis to highlight any issues for investigation. The integrated repository will also enable cross comparisons of data sources and flag anomalies quicker and more efficiently.

Data Visualisation and Access

Strategic Pillar 2: Transformation & Innovation.

Whilst the requirements of the Trust are largely being met currently, we are only really scratching the service as to what is possible with the data we have at our disposal. Traditionally reports have been static snapshots of a point in time, without the ability to delve further and fully investigate the reasons for variances without the need for further work items. Whilst great inroads have been made in the presentation of data into a more meaningful format, including a number of self-serve options published recently, the Trust still has the ambition to vastly improve the way it makes information available to its users within the organisation.

Over the next 3 years, the Trust will undertake a review of its current reporting processes and utilise a range of analytic and business intelligence tools to transform the way users access data and information. For operational day to day information requirements, we will look to create automated, self-serve options where possible, with interactive dashboards and drill down functionality, giving greater outputs and more transparency. We will utilise more appropriate data visualisation

techniques, to make information easier to understand and make use of.

As part of the review exercise, the Trust will also look to produce balanced scorecards, giving cross reporting of multiple subject areas to give a holistic view of a range of areas, such as performance, income, staffing and quality outputs. This will enable managers, clinical staff and executives to understand potential patterns and correlations between areas that are currently reported in silos and highlight areas that may require further investigation.

A number of reports are currently available via the Information Portal on the Trusts' intranet site. As part of this strategy, we will also be moving to a new enhanced platform, which will become the central library for standard reports which will be easily accessible and simple to navigate. This will become the 'go to' platform for day-to-day operational information and data requirements, enabling users to have what they need at their fingertips, reducing delays and enabling quicker decision making.

As outlined in pillar 3, the Trust will need to improve organisational capabilities to move to a position where managers and other key stakeholders are able to access and utilise self-serve reports for standard questions which will free up organisational technical capabilities to focus on other key projects.

Risk Stratification, Population Health Management and Predictive Analytics

Strategic Pillar 2: Transformation & Innovation.

As outlined in the Topol Review, predictive analytics and modelling are not new to the NHS. Clinical risk scores based on statistical regression models have been used for decades. The Trust currently uses risk stratification for understand cohorts of patients that are most likely to require an intervention, which enables us to proactively manage their care plan in the community and other settings. Moving forwards, the Trust needs to build on the tools already used and create or implement additional models to proactively manage patient care. The Long Term Plan has particular focus on preventing hospital

admissions where possible by managing their care in other settings and by increasing our data capacity and capability, we will be able to utilise it to much greater effect in this area.

As stated in the NHS Long Term Plan, over the coming years these solutions will become increasingly sophisticated in identifying those groups of people who are at risk of adverse health outcomes and predict which individuals are most likely to benefit from different health and care interventions, as well as shining a light on health inequalities. We will be able to routinely identify missed elements of pathways of care for individuals and ensure that those gaps are filled. This will also support greater transparency of health and social care data on population health outcomes and organisational performance.

Analytics & Development

Strategic Pillar 3: Developing Organisational Capability and Capacity.

In order to achieve the 3 key themes outlined above, the Trust will need to build capacity and capability with the analytics and development functions, as well as all other staff groups across the Trust to enable us to create and utilise the innovative tools that will be embedded in future years.

There will be a requirement to broaden the spectrum of staff that has knowledge and expertise in Information Management technical Data Warehousing capabilities and likewise, it will be necessary to enhance the Trusts analytics and data modelling capabilities in order to fully utilise the vast array of datasets at our disposal.

In addition, it will be essential to enable the organisation to become self-sufficient in terms of data interpretation and understanding. We will need to move to a position where the Trust enables staff members to answer standard data queries themselves using interactive business intelligence tools and other data platforms, freeing up analytical resource to focus on other key priorities. This moves a level of competence away from technical experts into the day to day functionality of relevant staff groups and facilitates the technical staff to focus on adding value by completing more complex levels of modelling and analysis to support the

priorities of the Trust in areas such as patient flow, well-being and preventative medicine for the population we serve.

Information Services Support Model

Strategic Pillar 4: Improving Engagement and Communications.

A key component in delivering this strategy will be collaborative working between the Information and IT departments of the Trust. Significant steps have already been made to improve communication between these areas and we are committed to working in partnership over the coming years to enable delivery of the objectives outlined in this document and enable the Trust to embrace the digital agenda moving forwards.

Engagement and consultation of all business intelligence projects will be critical to ensure successful delivery and that they meet the needs and requirements of users. This will take the form of facilitated workshops and the development of dedicated workstreams for large scale items. Progress updates and decisions on key priorities will be discussed at the ICT strategy Board, to ensure all developments are in line with the Trusts vision, objectives and priorities.

It will be imperative that all data warehouse, analytics and business intelligence developments are communicated effectively, with relevant training and guidance shared across the organisation. This will be achieved through a dedicated update news page on the new reporting portal, as well as other communication methods and forums across the Trust.

3 Year Outcome - What Does Success Look Like?

Over the next 3 years the Information Department will implement:

- A phased implementation of a Trust Data Warehouse, initially incorporating key Trust systems, but with the ability to include additional systems and data sources in the future
- An easy to use intranet reporting portal with routine information readily available in a structured library
- Improved reports with drill down functionality to enable self-serve and enable quicker decision making and more efficient use of time
- Improved visualisation of information to make data easier to understand and increase the ability to draw conclusions
- Creation of additional analysis and reports into a wider breadth of topics than those currently delivered
- Begin to utilise automated processing and Artificial Intelligence to support clinicians in understanding variation, support risk stratification and patient care
- Use predictive techniques to support operational planning and population health management in the future

Health Records Services

Health Record Policy, Process and Protocols Review

Strategic Pillar 1: Continuous Improvement in Core Services

The current OP07 Health Records Policy has completed a full review and re-write to ensure it is comprehensive, fit for purpose, in line with statutory obligations (GDPR and DPA 2018) and the local STP vision. We have engaged with end users across the Trust to develop and implement processes and protocols. The new policy fully integrates electronic records and paves the way for future paperless systems.

Legacy Records Scanning

Strategic Pillar 1: Continuous Improvement in Core Services

Due to the retention and destruction periods as per policy and IGA guidance, all records must be appraised and archived or destroyed accordingly. The length or retention of some records, for example Obstetric records is 25 years and the current embargo of Paediatric records all these historical paper files will need to be retained for a substantial period of time. Due to the size and capacity of our onsite library these long term retention records will need to be scanned in to the patient's electronic record. The scanning of legacy records would also reduce the requirement for offsite storage, such as deceased records which

are currently held at Restore.

Once “paperless at the point of care”, fully implements then the scanning bureau workforce resource will focus on the scanning of these longer term retention legacy records where we feel this could be appropriate.

The scanning of legacy records will also facilitate the future management of records appraisal and subsequent destruction, ensuring we are compliant with retention and destruction legislation. Once space is created in the closed library onsite we will look to repatriate archived records and as such make further reductions to offsite storage costs. This project will include a review of electronic records scanned in to portal to ensure any records falling out of the retention period are deleted from Clinical Web Portal, as well as any manual records destruction.

Community Archiving and Storage

Strategic Pillar 1: Continuous Improvement in Core Services

Community archiving is currently stored offsite by a document management company, for approx. 20 services. These records will also be reviewed in line with the above legacy scanning project. Community records management has always been managed separately (bound by OP07 Policy). The Health Records Services will provide support to areas to ‘go noteless’ and ensure information is accessible and retrievable if required for a Subject Access Requests (SARS) or for destruction. The aim is to reduce off site storage costs and improve access to data and also reduce IG incident risks.

Disaster Recovery Area - Trust Switchboard

Strategic Pillar 1: Continuous Improvement in Core Services

By 2020 the switchboard will have a disaster recovery area, in the event of evacuation from the current location. This has already proved essential in providing business continuity for the Trust in maintaining a critical service. This area will be utilised alongside the existing Switchboard and provide additional capacity to manage a large influx of calls and maintain social distancing as per events of the COVID19

pandemic. This will be implemented through an already approved Capital bid. A full review and update of the business continuity plan will be updated in line with lessons learned from the 2020 COVID -19 pandemic which includes a trained contingency team for cross-cover should a further pandemic occur.

Clinical Web Portal [EMR / EPR]

Strategic Pillar 2: Enable Transformation and Innovation

Over the next three years the service plans are to realign the administration for Clinical Web Portal to Health Record Services. As the patient record becomes electronic and paper records become obsolete, further quality checks, monitoring and audit will be undertaken by the Health Records Service, to improve the quality of the patient record. This links with the Patient Facing Portal project. The Health Records workforce will evolve into electronic ways of working and roles will become more IT based, training needs will also change. We will ensure these training needs are met and the workforce is given the tools to fulfil their roles effectively. Technical / software support will remain with ICT services.

Paperless At the Point of Care

Strategic Pillar 2: Enable Transformation and Innovation

The Black Country STP digital roadmap strives to achieve ‘paperless at the point of care’ by 2020. We must keep this at the centre of our service planning and our vision for the Department. Over the next 5 years we will entirely modernise our health records management systems and processes. This will significantly impact the way in which Health Records Services works today. If all template documents that form part of the current health record were populated electronically, there would be no need to create skinny files, and as such dramatically reduce the amount of scanning required. Currently we scan approx. 6000 records a month. The impact of this system would be to maximise clinical time by removing the need to continually duplicate information, and removes the risk of lost records. Due to the significant reduction in the amount of information to be scanned by the

scanning bureau, these staff will be retrained and utilised in other service areas and projects for example access to health records, retention and destruction, legacy scanning and quality assurance for portal/patient facing data. The service will work closely with ICT services to scope and develop this project.

Whilst striving to achieve paperless at the point of care clear effective two-way communications incorporating all staff within the Health Records service and the Trust is paramount to its success. Also working relationships and links with managerial colleagues in other relevant organisations/localities, both internally and externally to the Trust/locality are vital in the move towards electronic records.

Data Portability

Strategic Pillar 2: Enable Transformation and Innovation

We need to enable data portability to patients. The service will focus on identifying a platform for data transfer in a readable format. This will enable the patient's record and any supplementary information such as emails to be sent to the patient in an electronic, downloadable and usable format. This will support the NHS long term plan of allowing patients to better manage their own health and care. Processes would need to be developed for data quality checks before transfer, redaction and review before disclosure. Work has already commenced on a data extraction tool which downloads all data held within the Clinical Web Portal system. This is far more efficient than navigating portal to download information individually. This has also helped to maximise the number of requests that are processed and helped minimise Subject Access Request breaches.

Once we can offer information to patients in an electronic readable format this will reduce non-pay costs ie paper, printing costs (currently 12500 sheets per week) and reduce recorded delivery costs to the Trust.

Patient Rights under General Data Protection Regulation (GDPR)

Strategic Pillar 3: Developing Digital Capability & Capacity across the Organisation

Over the next 12 months we will ensure that the Access to Health Records Team has adequate management, processes and protocols in place to facilitate and deliver patient rights under GDPR. We must understand the new role of the access to Health Records Team within the current climate, post GDPR. To provide training to current staff and further develop the team to ensure all staff have the skills and processes in place to manage all types of patient rights requests.

We must ensure there are adequate staffing and an appropriate management structure within the department to meet current and forecast demand, being mindful of the complexity of some of the requests received. To provide training as required to staff in relation to Data Protection and Patient Rights.

We must also develop an electronic solution, such as a requests database, and remove any manual workarounds where possible to maximise effectiveness.

Current patterns indicated an upwards trend, with an increase in number of requests received per month however we seem to have stabilised in numbers but there has been an increase in their complexity and scope. We foresee as patients become more aware of their rights through communication and advertisement we may see a further increase in capacity and complexity of requests. This will be closely monitored and managed.

Access to the Patients Health Record

Strategic Pillar 4: Improving Engagement and Communications

The STP envisions empowerment through the use of IT, enabling patient access and contribution to their health and care record. Our aim over the 12 months is to develop a Patient Facing Portal where patients can view / read only access to their data online. This project aims to give transparency and control to patients over their own data.

This may reduce the number of Subject Access Requests as it will enable the patient to have direct access to aspects of their medical records. On the other hand this may result in an increased number of rectification requests. We will still need to maintain the administration and quality control of this service, for example validating access requests to the portal, and password generation and management (provided by the Health Records Service). So although we may reduce Subject Access Requests we would expect to see a high number of requests to access the patient portal. The current Health Records workforce will require training and development in order for the Health Records Service to become the administrator of the Patient facing Portal.

3 Year Outcome - What Does Success Look Like?

Over the next 3 years the Health Records Department will implement:

- Develop, implement and monitor compliance against the new OP07 Health Records Policy ensuring processes are written and embedded to comply with GDPR and DPA regulations
- As “paperless at the point of care” progresses and increased levels of electronic documents are created to reduce scanning, the Health Records Services will focus on legacy scanning of long term retention records where appropriate. Retention and destruction must be maintained yearly on site to minimise space used for storage and comply with legislation
- To provide support and advice to community services in transitioning to electronic records. This will enable the off-site storage which currently provides a monthly collection service and long term storage to be reviewed. Retention and destruction must be maintained yearly to minimise costs and comply with legislation.
- The implementation of a Switchboard disaster recovery area, in the event of evacuation from the current location to provide critical business continuity to the Trust. To utilise in addition to the existing Switchboard to increase capacity of call answering and maintain social distancing

as realised during the recent COVID19 pandemic.

- On implementation of the patient centric portal, enabling patient access and contribution to their health and care record. The Health Record Services will become CWP owner and provide the administration role ie provide access, quality assurance and monitoring.
- To provide data portability we will identify a platform for data transfer in a readable format. This will enable the patient’s record and any supplementary information such as emails to be sent to the patient in an electronic, downloadable and usable format.
- We will ensure that the Access to Health Records Team has adequate management, processes and protocols in place to facilitate and deliver patient rights under the General data Protection Regulation (GDPR) and the Data Protection Act (DPA) 2018 requirements
- Will contribute in creating a modern and comprehensive health records management system; in line with the NHS long term plan, the Trust strategy and the STP Digital Roadmap.
- Looking at approaches to improve the uptake of online access, this applies across the domains of care, including Primary Care; as patients can access their own records via online platform functionality.

Key Supporting and Enabling Services for Delivery

Cyber Security

Strategic Pillar 1: Continuous Improvement in Core Services &

Strategic Pillar 2: Enable Transformation and Innovation &

Strategic Pillar 3: Developing Digital Capability & Capacity across the Organisation &

Strategic Pillar 4: Improving Engagement and Communications.

The Cyber Security Team at the Trust exists to ensure that the Trust is actively protected against all Cyber Security Threats. We provide assurance on adherence to the standards

which are set by the Trust and Nationally. When called upon we provide advice on best practice and viability of security within software applications and digital services in line with standards issued from NHSD that good data security and personal information is handled correctly. The Cyber Security Team will also ensure effective response in the event of cyber-attack in order to avoid impact on delivery of services for patients and service users. We do this through multiple layers of defence which include:

- Malware protection – Sophos Intercept X to protect from ransomware and zero day exploits.
- Windows Advanced Threat Protection protects endpoints from cyber threats, and compliments the on premise arrangements.
- CareCERT continue to issue alerts, all of these alerts are recorded centrally and progress against the object maintained.
- A new patch management solution and process – responsibility for patching includes third party applications and now rests in Cyber Security Team.
- Penetration testing, application vulnerability assessment
- New IT Security policy aligning with national NHS standards
- Mobile Control for iOS, Android etc. devices
- Encryption of data across devices and removable media
- Web Filtering, prohibiting access to specific Web sites or categories of information they deemed in appropriate
- Routine auditing of passwords for strength

3 Year Outcome - What Does Success Look Like?

Over the next 3 years the Cyber Security Team will focus and/or implement:

Investment – work with the Trust to ensure investment secured to support the Cyber Security team in tools and resources.

Update – We will ensure that our estate is updated with the latest Security patches thus protecting the Trust from Cyber Security threats.

Mitigate – Where a known security frailty is identified then a risk based approach will be adopted in order that all high security risks have an appropriate and agreed level of mitigation actions in place.

Monitoring – Cyber Security at the Trust will be monitored utilising the active monitoring tools we have at our disposal. E.g. Advanced Threat Protection, Intercept X, Anti-Virus and Web Filtering.

Secure By Design – will ensure that security is implemented as part of the design of the agreed product.

Assurance – information will be provided to the digital strategy and governance groups on the level of patching efficiency within the Trust. Rewrite and implementation of revision to OP12 IT Security Policy reflecting the ever changing complexity and change to the cyber security threats in order to protect the information asset we hold through effective technical security.

Culture – Establish a culture with technology security at its heart, ensuring that there is a focus upon the valuable data that we process and store.

Education and Training – ensure the Trust invests in training of end users to ensure that user behaviour is not at odds with the security of data and assets we have.

Cyber essentials+ – implementation of Cyber essential plus, ensuring that we are protected against common cyber threats.



ICT Digital Programme Management Office (PMO)

Our Purpose:

Strategic Pillar 1: Continuous Improvement in Core Services

Strategic Pillar 2: Enable Transformation and Innovation

Strategic Pillar 3: Developing Digital Capability & Capacity across the Organisation

Strategic Pillar 4: Improving Engagement and Communications.

The Trust has made significant progress in developing the ICT Programme Management Capability over the last 5 years. This dedicated team has successfully implemented a number of major schemes over the full project cycle that have benefited the Trust in terms of efficiency and improving patient outcomes. The established team is augmented by fixed term resources from time to time to support specific projects.

The project portfolio is built upon the digitisation of the NHS and in particular the requirement to be paperless at the point of care by 2024.

PMO Strategic Roadmap

Organisations such as RWT where typical projects require significant modification to process will require dedicated ICT Programme Management Office support in order to ensure and facilitate the required changes, bridging the gap between strategy and results for patients and return on investment for the Trust. Evidence from our delivery of previous projects supports the assertion that projects are more successful where dedicated resources are allocated.

We have a standard framework for delivery around industry best practice and adoption of PRINCE2 framework across the full project lifecycle.

ICT PMO will ensure that all ICT Projects & Programmes are well governed and led ensuring delivery in an effective efficient manner. Appropriate investment will be required and this will be supported by the essential role ICT PMO perform in the formation of Business Requirements and outcome Business Cases for approval within division and the wider Trust.

ICT PMO will be responsible for the identification and management of key stakeholders in delivery of the portfolio, the stakeholders will have engaged and have brought into the strategy enabling the organisation to drive through transformational change within the business, this will be further improved with closer links to the Continuous Quality Improvement and Service Efficiency teams. The effectiveness of ICT PMO will only be maximised by early involvement in the business decisions that generate new programmes and projects and it is imperative that this occurs supporting a culture of continuous improvement at the Trust. This is about moving towards levels of engagement for ICT as a strategic partner.

We should also continue to invest in the quality of people we have and support learning development / opportunities to look further into developing the team into capable digital leaders via mechanisms such as NHS Digital Academy. The focus of the ICT Programme Management Office will be to implement key strategic projects that ensure the delivery of a 'fully digitised' Trust.

PMO 3 Year Outcome - What Does Success Look Like?

Recruitment and retention of resources will be a feature of our forward view ensuring that we secure the right people for the right roles via Trust supported investment.

Over the next 3 years the ICT Digital Programme Management Office will implement:

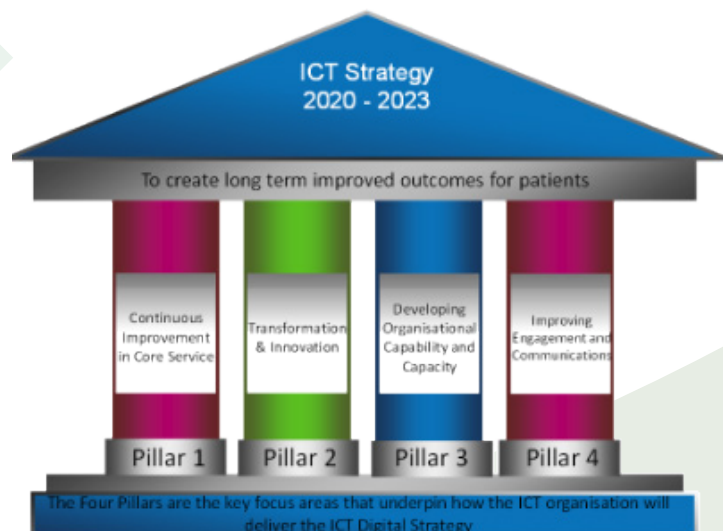
- Delivery on EMR strategy continued progress in meeting the paperless agenda by delivery of further implementation of Clinical Web Portal enhancements as well as supporting systems that meet this agenda.
- Clinical Patient Portal, providing the patient with direct access to a comprehensive view of their patient record.
- Conclusion of the expansion of e-Obs into other key areas of Trust including Emergency Department, West Park and additional supporting modules that support the improvement of patient care and outcomes.
- Winscribe Text Correspondence and workflow
 - To improve turnaround times for letters.
 - With the increased business and higher volume of correspondence being generated, electronic workflow will ensure all letters are approved/edited and delivered in a timely fashion.
 - Improved efficiency for Medical and Administration staff - An electronic workflow system will reduce the need for time consuming manual tasks
 - Paperless/ Paper light environment - Less paper printed for approval and/ or edit between Medical Secretary and Author, to meet NHS directive, reducing paper costs.
- IPT Telephony – Implementation of CISCO IPT across the Trust replacing current phone system which is obsolete and nearing end of extended support.
- Single Sign-On function allowing Clinicians to access the multiple systems within their Trust essential for performing their role with the use of a single set of profile credentials. This remains one of the single most requested improvements to the service that IT currently offers.
- DocMAN10 and integration with ERS
 - To enable eRs functionality allowing for referrals to be pulled from eRs into Docman for triage.
 - To allow existing functionality of monitoring email addresses.
 - To allow users to continue to scan paper referrals.
 - To rollout new Docman10 RMS for all administrative and clinical departments in-scope to manage referral process.
 - Ensure Benefits reporting to measure return on investment.
 - To improve the patient experience of the referral management process.
- DocMan Connect, enhancement to the existing Docman Hub Network, supporting STPs and providers achieve their transfer of care requirements.

Appendix 5: NHS Long Term Plan – ICT Strategy Key Action

NHS Long Term Plan	Our ICT Digital Strategy
1. Empowering people with greater access to their health records and care plan	<ul style="list-style-type: none"> • Development of Patient Portal function with more access to information • Improvements to integration with the Summary Care Record • Expanding solutions to support GDPR i.e. Data Portability, SAR, etc. • Integration with Primary Care patient records across wider EPR
2. Supporting the health and care workforce with mobile digital services	<ul style="list-style-type: none"> • Expand remote / mobile access technologies • Feasibility of mobile Apps / IT Systems • Establish the ICT Digital Strategy Group • Development of on-line training programmes
3. Support clinical care with digitally-enabled primary and outpatient care	<ul style="list-style-type: none"> • Deployment of remote consultation (Babylon) • Feasibility of wearable technologies • Interoperability with the NHS App • Developing tools to simplify data capture at point of care i.e. eForms • Redevelopment and expand the Trust EPR to support increasing EMR expectations. • Embedding 'Privacy by Design' & 'Secure by Design' into all developments • Alignment with STP Digital Strategy
4. Increasingly focus on population health through Integrated Care Systems (ICSS)	<ul style="list-style-type: none"> • Delivery of a Trust data warehouse aligned to EPR and clinical systems • Delivery of visualisation / analytical tools • Further interoperability of incumbent systems • Redevelopment of Trust data structures • Use AI, risk stratification to understand population health requirements • Alignment of STP Digital Strategy

NHS Long Term Plan	Our ICT Digital Strategy
<p>5. Deployment of digital technologies to transform service delivery</p>	<ul style="list-style-type: none"> • Establishing the Digital Innovation Forum • Engagement of local clinical services to deploy proven innovations • Deployment of AI, predictive analytics to support patient pathways • Delivering notification/alerts to support prioritised workflow in community • Delivering focused reporting library supporting management decisions • Expansion of Patient WiFi and implementation of Unified Communications / eBleep • IP Telephony supporting integration of Primary and Secondary care • Partnering with health tech industry i.e. Babylon, CliniSys, EMIS etc. • Continued adoption of technology standards i.e. Cloud, API's
<p>Note: EPR: Electronic Patient Record AI: Artificial Intelligence API: Application Programming Interface EMR: Electronic Medical Record</p>	
<p>6. Implementation of security, monitoring systems and staff education</p>	<ul style="list-style-type: none"> • Working towards Cyber Essentials Plus standard • Review and refresh of firewall architecture • Deployment of Microsoft Windows 10 and Advanced Threat Protection • Embedding 'Secure by Design' into all developments • Develop educational content for on-going awareness of security • Incorporate IT, Health Records and Information Services to Trust IAR • Replace / Refresh Network Core, Edge Switches and Firewalls • Embed HTTP protocols into in-house systems.
<p>Note: IAR: Information Asset Register</p>	

Appendix 6: ICT Digital Strategy – Strategic Roadmap

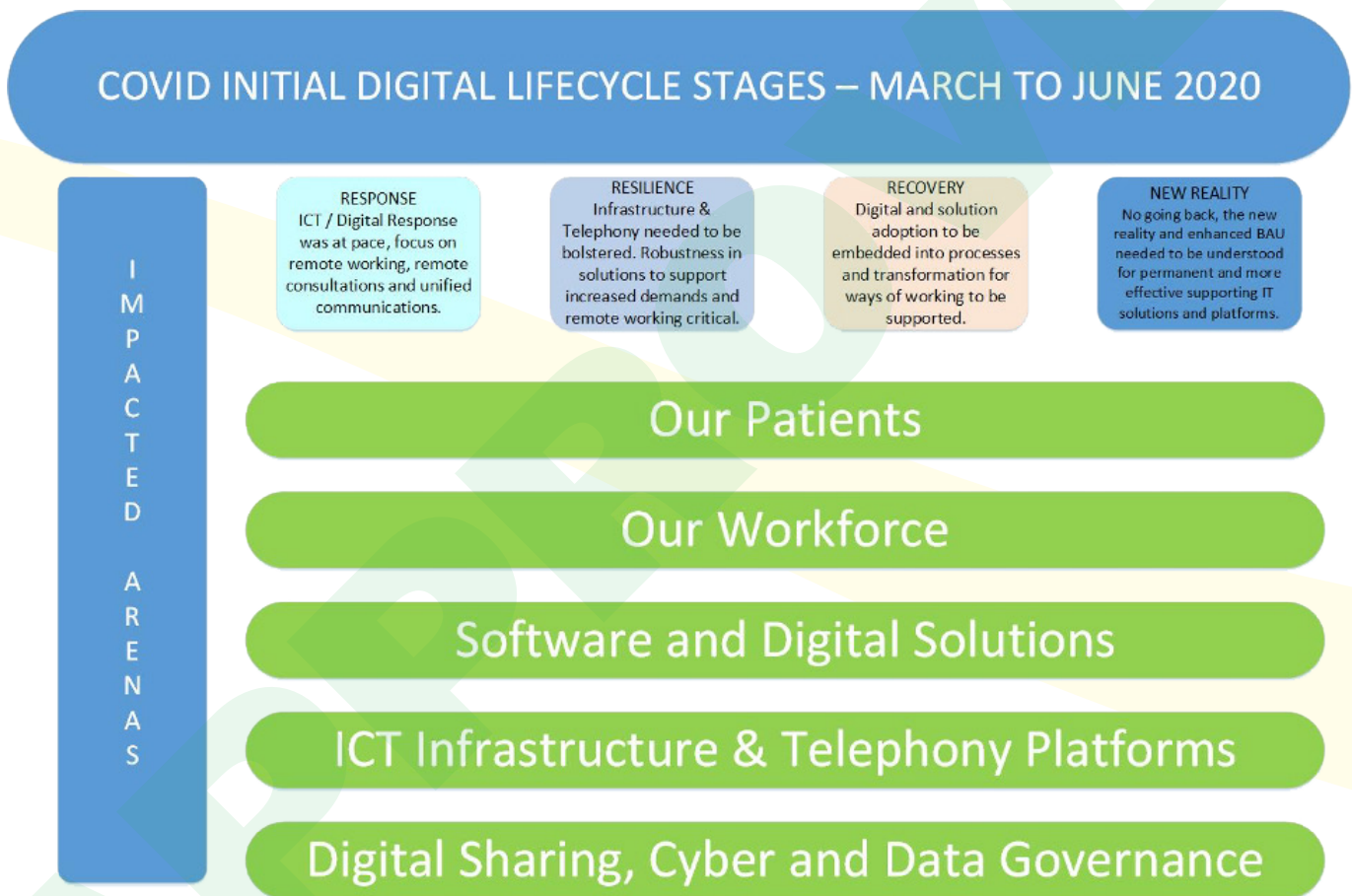


Appendix 7 COVID Impact

COVID Impact - Our New Technology Reality

The COVID19 pandemic significantly progressed IT / Digital solutions and the set objectives of the ICT Digital Strategy and NHS Long term plan with significant pace. Forcing our need to operate an effective healthcare service virtually or with applied distance then saw a massive acceleration of technology solutions that was never envisaged within the short term.

Life Cycle Stages



Original NHS Long Term plan digital ambitions and objectives some targeted for as far out as 2023 was now deemed as essential for deployment and adoption within weeks. The onset of COVID19 forced the rapid transformation to the way we provision our services; virtually and remotely where this was required to address the COVID challenge and the deployment of technology had to be delivered with extreme pace.

It's worth noting that there was NO Deviation to the planned Strategic Roadmap in this Strategy or our Digital / IT Strategic Objectives. Instead the impact of COVID accelerated some of our defined Enablers which are mapped to the detailed Strategic Pillars.

Critical Path IT / Digital enablers had to be deployed at rapid pace, this saw an element of National unity with some large scale collaborative decision making that drove outcomes for strategic solutions. A classic example of this is the unified communications platform Microsoft Teams. Now embedded within a wider N365 Offering, the decision to move forward with this platform and pragmatic strategic thinking to assure the future of Office 365 was a major positive step. The Trust was fortunate enough to have in place national NHS Mail solution which then allowed swift adoption of the NHS instance of Teams. In addition the Trust was already digitally mature in terms of robustness of our underlying infrastructure platforms which were essential to support our digital workforce working remotely.

Moving forward the Trust has also registered as part of “the new reality” expression of interest to ensure our place within the national tenancy for Office N365. This will consolidate our solutions in this arena and also cement our place strategically with the national position for economies of scale.

The table below depicts the Core IT Enablers, as defined in the pre-COVID ICT Digital Strategy under [Core Enablers Page 22] where these have now been accelerated under the banner of the following categories during the COVID19 crisis:

- Core Enabler successfully delivered under COVID in full.
- Core Enabler successfully delivered under COVID in part.
- Core Enabler has been successfully evolved, as part of COVID or developed under a wider trust process for COVID19 patient care.
- Core Enabler delivery has been accelerated, due to acknowledgement of patient care priorities but not yet delivered in full or partial.

Accelerated COVID19 ICT Digital Enablers				
Strategic Pillars	Continuous Improvement in Core Services (P1)	Enable Transformation & Innovation (P2)	Developing Digital Capability & Capacity across the Organisation (P3)	Improving Engagement and Communications (P4)
	Clinical Systems (Electronic Patient Record)	Clinical Systems (Electronic Patient Record)		
		Administrative Patient Portal	Administrative Patient Portal	
			Mobile Apps / Agile Working	
			Digital Workforce	Digital Workforce
		AI & RPA		
	Online Digital Consultations	Online Digital Consultations	Online Digital Consultations	Online Digital Consultations
			Digital MDT Enablement	
			Shared Docstores & Cloud Office	
	High Performance Integrated Network			
	Telephony			
	Unified Communications			
		Data Driven Care		
			Analytics & Development	
	Disaster Rec-Switchboard			
	Cyber Security	Cyber Security	Cyber Security	Cyber Security

For more details on the Core Enablers listed in the table above, please see full IT Core Enabler description as detailed in Appendix 4 of the ICT Digital Strategy document.

Agile working via Digital enablement for our workforce since end of March 20 saw over 700 laptops built and issued across our staffing base. Over 100 patient iPad devices were built with free to use access for Skype, Zoom and FaceTime for the wards, so patients can keep in touch with their loved ones during admission. In addition desktop Computers were complimented with over 60 Logitech Webcams for staff operating onsite to enable patient remote consultations, where laptops or tablets were not available. The sheer demand of remote ways of working saw the urgent need for implementing increased telephony bandwidth across the entire Trust. This coupled with compliance to social distancing for the Trusts Switchboard resulted in a disaster recovery Switchboard being invoked and the Trusts inbound / outbound telephony lines with mobile GSM Gateway being strengthened significantly.

Further to this, inspirational innovation saw the implementation of AI solutions for automated triaging for our patients via web based access that proved hugely beneficial. Opportunities for expansion of this platform and the digital offering is currently being explored for the future to offer patient digital choice.

Remote consultations have been implemented with success, this has proven to be a massive step in the right direction, not only alleviating COVID patient risk, but for the future this should also see positive influence in terms of Estates, Car parking, DNAs etc... Strategically this was always a major key digital enabler and currently this has been adopted successfully by clinicians and patients alike.

As one of the COVID19 accelerated enablers our capability to provide the promotion of online consultations in secondary care, meets the ambition of avoiding a third of all hospital outpatient appointments, where 40%+ of our current outpatient appointments over the COVID19 period are now being offered as a remote digital consultation. In addition this has laid the path for patient choice with 'digital first' options now having the potential to be offered as default. This has required new ways of working to provided effective business / service process, but remote digital consultations have also been adopted across Primary care and secondary care services. In addition the best of 3rd party offerings, such as Babylon Healthcare has been utilised to transform the way triaging care is delivered to our patients. Currently partially deployed given its full potential, further work is ongoing as part of this core enabler to exploit opportunities it can provide for the future. Process transformation was key and clinical services have successfully adapt their own working practices to pro-actively embrace the advantages of virtual / digital appointments. The NHS Forward Plan had set out the objective that all patients would have the right to opt for a digital service from their existing GP, or secondary care provider with a target date by 2023. The onset of the COVID crisis has forced the rapid deployment of this technology and adoption by services with positive outcomes in the much shorter timescale. Therefore the "No going back" initiative will see an evolution to these digital platforms and the maturing of our business processes, essential to support and embed these virtual ways of working further into our provisioned care.

Accelerated deployment of unified communications, such as Microsoft Teams has seen staff working brilliantly to overcome the challenges of COVID with the increased use of technology to host meetings; across various locations, working on-site and remotely. The capability to get together and make progress via virtual catch ups would have been considered prior to COVID 19 to be months, if not years away. Instead our ability to instant message, conduct agile working from home and meet via Video conferencing platforms is here and it's here to stay!

It's been both a significant challenge and achievement to deploy these solutions and bolster the robustness of the ICT infrastructure needed for their enablement. Most of all it's been a fantastic shift in mind-set / culture for both our patients and our staff whom have adapted incredibly well to these new ways of working for the future!

Appendix 8 Digital Sustainability Blueprint

Simon Parton – ICT Divisional Lead for Sustainability

Background

The need for fundamental change in order to support a habitable future is now well known, understood and documented. As with any change that is disruptive, it is normally a single discovery or industry that is seen as its catalyst and protagonist but also its champion. In the 21st Century, the age of knowledge and information, it is the IT industry that is being heralded as being the way forward. From machine learning, to Artificial Intelligence, to recycling, to renewable fuels, to data mining, to mobile living, various aspects of IT are being looked to for solutions to the impending environmental challenges which need to be addressed urgently. Healthcare IT has a greater challenge in that it needs to ensure the well fare of the patient whilst at the same time, factoring both the operational requirements of the health organisation and the need to move to a more sustainable operating model. Digital Sustainability is a key element in the overall solution of moving towards a sustainable, safe, caring and environmentally sensitive way of working into the future.

This Digital Sustainability BluePrint appendix will highlight both the background and rationale for change, the key areas where opportunity exists for progressive change and provide recommendations as how the Trust ICT department can both change in and of itself whilst also supporting the rest of the Trust to do the same, all whilst ensuring operational integrity and the care and safety of patients through the use of innovative technology and working practices.

It is worth noting that many corporations and organisations are already leading on transforming themselves for the future. Microsoft have their Project Natick as an example of innovative transformation towards a sustainable future. Further, they have committed to being Carbon Negative by 2030,

removing all their historic carbon emissions from the environment by 2050 both of which are being achieved through a \$1billion climate innovation fund.

Finally, in the age of COVID-19, organisations are taking the opportunity to change themselves for the future. As of May 12th 2020, it was reported that Twitter will allow their employees to work from home permanently. Is it time for the Public Sector, including Health Care, to take bold steps to match such initiatives?

Introduction

Digital Sustainability is a relatively new sub-discipline of ICT and as such, goals of any length are subject to market conditions and the health and social care agenda. The digital landscape is rapidly changing; as healthcare demands change, so does the digital ability to meet it. By the same measure, as the ways in which healthcare needs to operate change, so does the digital capacity to support it. Overlaying this is the impact that both healthcare directly and digital support for that healthcare, impact upon the wider environment.

ICT is being seen as the answer to many of the world's challenges be they healthcare orientated or otherwise. Artificial Intelligence (AI) is being heralded as the new breakthrough technology which can provide answers where humans are currently incapable. Whilst many solutions that can be implemented now, do not need the innovation of technology such as AI, they can provide real-world resolutions which can help support healthcare in its efforts to be both effective and environmentally aware. Digital Sustainability is the mechanism which will allow future healthcare provision across all disciplines to realise a path for achieving the health care objectives whilst not continuing to contribute to environmental damage and where some critical decisions need to be made, minimising that impact.

Many of the solutions we need within IT are available now and in many cases, do not require the introduction of disruptive technology to achieve. It will require bold and brave leadership to progress the agenda which will help to make a difference and to guide and lead the way into a greener future. The consequences of not doing so are now being felt globally, hence IT has its role in addressing that.

Sustainability Vision

This blueprint is focused on the following digital sustainability themes which are immediately achievable:

- **Remote Working:** To build on COVID19 approach for expansion of more remote working, digital equipping remote workers with the tools and access they need to efficiently and effectively operate away from the office and site or extended/permanent periods of time.
- **Agile Working:** Beyond the need for remote working is the need to be agile. A robust platform to be deployed to enable healthcare workers to use accessible and sustainable methods and technology in patient homes and other scenarios.
- **Digital Meetings:** To provision wide scale solutions that allow meetings to take place across the estate integrates across care organisations and multiple care teams. To provision accessibility on the move with effective mobile solutions, devices and software platforms that informs patient centric clinical care for our mobilised workforces.
- **Cloud Computing:** To utilise commercial product offerings, advancement in technical accessibility, wearable technologies, patient portals and home monitoring to empower our patients to contribute to their own health care.
- **Digital Repurposing and Reclamation:** Tactical and Strategic, localised and Regional patient records assessable at the point of care provisioned and scaled across

care organisations without geographical boundaries or digital islands.

- **Carbon Footprint:** To strive in making appropriate changes to the way in which it can be sustainable and mitigate our carbon footprint. Green credentials are a key driver in procurement decisions of the future and how IT will use integration and consolidation of systems to create a net reduction in its carbon requirement across the estate. Further, we will work towards the proactive and environmentally positive way of dealing with redundant IT equipment and the by-products of packaging, as well as encouraging and supporting staff in conscientious ways of working to promote healthy environments.

Frameworks

There are a number of policies, frameworks, plans and standards that the NHS adheres to which have a direct impact on its ability to be digitally sustainable. These include but are not limited to:

- The NHS Long Term Plan (2019) - The NHS Long Term Plan was published in January 2019 and includes a significant reference to digital enablement ('Chapter 5: Digitally-enabled care will go mainstream across the NHS'). It highlights key aspects of healthcare IT and the way in which it is to be deployed will be the priorities for the NHS all of which have implications for digital sustainability. Chapter 5 of the NHS Long Term Plan sets out a wide-ranging and funded programme to upgrade technology and digitally enabled care across the NHS.
- Greening Government: sustainable technology strategy (2020) – Strategy detailing how Government and its agencies should carry out ICT procurement in a sustainable way in order to meet green commitments.
- Climate Change Act (2003)
- Greening Government: ICT Strategy (2020) – Sets out how Government ICT will contribute to green commitments and deliver efficient green practices.

Other guidelines that are relevant include

- Sustainability in information and communication technology (ICT): A DEFRA guide (2019)
- NHS Planning and Contracting Guidance (2020)

Each of these pieces of documentation detail how Government and its agencies, including the NHS should change over the coming months and years to meet the green commitments that have been made. Changes to working practices to become more environmentally focused and flexible and to consider how staff are part of the environment itself and thus the organisational relationship with those assets.

The Challenges

Environmentalism, conservation, sustainability, climate change, these are all issues which are reported in the news on a daily basis. However, they are also issues which affect every individual on the planet no matter their circumstance, location or socio-economic situation. The NHS is no different in its need to adapt, evolve and mature to meet the future challenges and demands of an altering environment. With this in mind, there are changes to which the NHS can take nationally and on a local level, individuals Trust's can take, to help to work to mitigate the speed and breadth of those climate based changes and which will place the individual Trusts (and thus the NHS as a whole) in a stronger place into the future.

NHS guidance in this area is clear, change is an absolute must across all areas of activity. It is estimated that up to 40,000 people die prematurely every year linked to poor air quality. The NHS Long Term Plan seeks to reduce the impact the NHS has on the environment by reducing its carbon footprint, reducing the use of avoidable single-use plastics, and working with partners, including local government, to tackle local air pollution. The NHS will develop a national decarbonisation and climate change plan during 2020 in the run-up to COP26, the UN Climate Change Conference. Whilst many already do, in the meantime all systems should have a

Green Plan (also known as the Sustainable Development Management Plan or SDMP) and a plan to deliver the sustainable development related NHS Long Term Plan commitments.

"New ways of working are key to the future operation of the NHS including the need for a remote and mobile workforce."

The NHS is a significant consumer of various materials and substances as well as having a substantial carbon footprint making it an area ready for change to combat such a business model whilst still ensuring the highest quality of care for its patients. This change can be achieved but requires clear and bold leadership to empower the workforce accordingly.

The "carbon footprint" is a measure of how much carbon we individually or organisationally produce in order to undertake our daily activities. The volume of carbon being produced by human activity is not sustainable and is now leading to demonstrable environmental damage, which will ultimately affect all life on earth.

The carbon produced is helping the planet to warm, melting the polar ice caps leading to the rising of sea levels and the loss of volumes of fresh water from the ecosystem. This will also lead to localised extreme temperatures as well as more droughts and the emergence of new and deadlier diseases, all of which directly affect Healthcare provision.

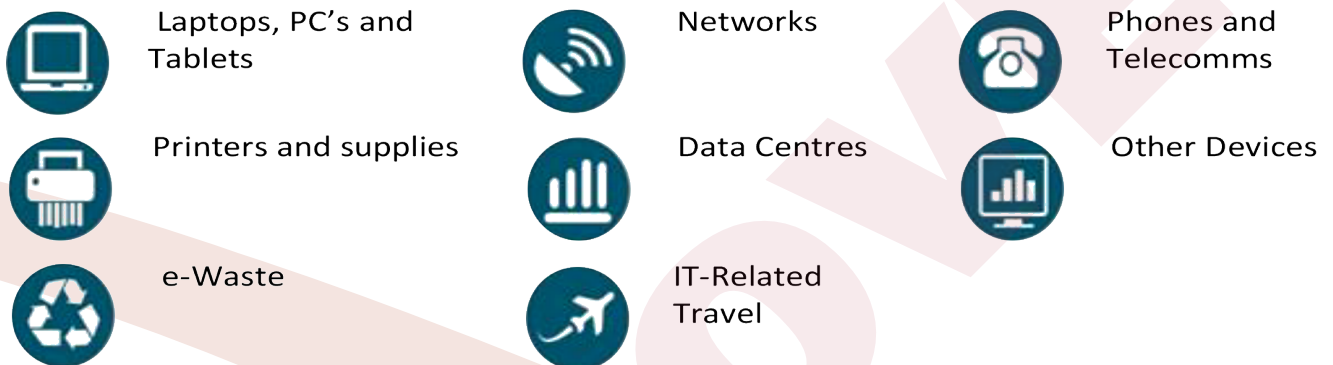
On an annual basis, we emit 50 billion tons of carbon into the atmosphere which will then remain there for circa 2000 years. Much of this is used for the generation of electricity which the technology sector will consume. As of 2020, "IT" is responsible for 3.6% of global electricity consumption and 1.4% of global greenhouse gas emissions (The Energy and Carbon Footprint of the Global ICT and E&M Sectors 2010–2015, Malmodin and Lunden).

It has been shown that with some innovative methods of both working and technology, these figures can be considerably reduced. Emissions from the technology sector are the same as the aviation industry. When

taken into account, the aforementioned figures rises considerably due to the substantial negative environmental effect some buildings have.

Carbon production is only one element of change needed by the technology sector. Each year 50 million tonnes of e-waste (technology) is produced which is often dumped in the developing world and slowly degrades leading to the loss of precious metals, environmental pollution and local healthcare challenges. Healthcare related waste is one of the largest challenges across the industrialised world and an increasing issue in the developing world. By working more flexibly and consuming more sustainably whilst maintaining or improving health standards is the primary challenge that Digital Sustainability has been posed as it is ICT that potentially has one of the largest impacts in this sector.

So what is the ecological footprint of technology such as IT? The following are areas where IT greatly contributes to all aspects of environmental damage and where it has the potential and ability to significantly reduce that impact, from carbon footprint, to e-waste to remote working.



The Approach

Before the challenges can be adequately met with any form of solution, IT needs to address the way in which those solutions can be implemented within an organisation which is going to potentially require significant and fundamental new ways of working into the future.

The Route to Communication

To help in communicating the message we need an effective model of communication and ultimately, of change. One such mechanism is the Prosci ADKAR Model. This has 5 key steps:

1. Awareness – This will involve a persistent programme of education informing users of what the problem is and how IT can help address it. This includes the consequences of inaction or mis-guided action. This becomes awareness of the need for change and the nature of what that change needs to be.
2. Desire – Once the organisation understands the issues and how everyone is affected, along with the benefits that such changes can bring, a desire to support the change and to participate, engaged and shape the future will start.
3. Knowledge – Once the change and the need for change is accepted, then the process moves into the implementation of knowledge, specifically on how to change and on how to implement new skills and behaviours to support and sustain the change for the future.
4. Ability – With knowledge and desire comes the ability to implement the changes required and as a consequence, to demonstrate performance.
5. Reinforcement – This is the final stage and in many ways the most important. This stage reinforces the change and makes it sustainable into the future. Sustaining any changes which improve the environmental situation is the key objective. This stage helps to build the culture and competence around the change, making it more likely to sustain.

The model relies on 3 key drivers and oversight, those being project management, change management and leadership. With these in place and active, the organisation can both adequately communicate the need for change, manage it and then sustain it into the future. The communication model will be key to successfully embedding the message regarding digital sustainability into the future and the ways of working that need to be developed in order to support that.

Changing the Mind-set

In order to make any change sustainable, the organisation and its constituent parts need to have a mind-set which promotes, manages and maintains the importance of that approach. From an IT perspective, the changes needed and the solutions that are therefore, available are based on 5 key tenants:

Prevention – Is technology always needed, if it is; is the latest technology needed to achieve an objective? Preventing the over-consumption of electronics/IT helps prevent the e-waste challenge and also helps focus the attention of the Trust in how it operates, in terms of what it actually needs.

Re-use – Whilst the latest technology provides greater efficiency, power savings etc., there is often opportunity to re-use existing technology to meet other objectives. This can also include the re-use of technology that is donated to the Trust or technology the Trust may wish to donate elsewhere.

Refurbish/Repurpose – Very similar to re-use, this involves the reuse of technology but for purposes other than what it was originally intended but for which it serves adequate purpose.

Repair – Rather than disposing of technology when it becomes faulty, there is opportunity to either strip the items for parts limiting how much of it is disposed of, or repairing the technology and redeploying into the estate.

Recycle – what many used to consider a strategic approach to e-waste is now considered the final option available due to its limited impact. However, recycling is still better than disposal (although some by-product of recycling is inevitable). The technology can be broken down into its recoverable parts outside of the IT setting and used as required (see later in this document).

These are especially important when considering the amount of resource required to manufacture technology initially. An example of this is embedded carbon.

	A	B	C	D
Asset Type	Average Weight	H2O	Fossil Fuels	Embedded CO2
	kg	litres	kg	kg
Desktop PC	12	1500	240	744
Server Blade	12	1200	192	588
TV (Large)	20	1900	304	920
TV (Connected)	10	900	144	441
Laptop	2	1050	168	514
Monitor	7	620	100	303
Tablet	0.75	260	41.6	123.5
Mobile	0.17	109	17.4	54
PCB	0.275	520	83.2	260
Chip	0.002	8	1.3	4

Source: J M Jefferson

The need to change can often be resisted for a number of reasons. If digital sustainability is to be achieved, then such resistance needs to be understood to adequately address. The main reasons for resistance are:

1. Lack of awareness about and involvement with the change and why it is needed.
2. Loss of control or negative impact on the job role and/or wider team.
3. The organisations previous performance where change has occurred.
4. Lack of visible support and commitment for management.
5. Fear of job loss.
6. Increased work load and lack of time to achieve objectives.

To address such concerns we need to demonstrate that we are delivering impactful benefits which are both locally and globally worth the investment by the individual and/or teams involved.

A good example of this is in relation to the move to digital meetings. Despite the numerous benefits, there are a number of reasons why such meetings are resisted, including:

1. The perception that "important" meetings should be conducted face-to-face.
2. Poor AV in meeting rooms which isn't addressed but used as a reason not to proceed.
3. Lack of equipment for remote workers, also not addressed but used as a reason not to proceed.
4. Poor network performance which isn't addressed but used as a reason not to proceed.
5. Low confidence in arranging/hosting/chairing online meetings.

Lack of leadership leading to no visible move by management to have online meetings.

With the recent outbreak of COVID 19, these reasons are being addressed through necessity of social distancing and the need to provision remote care to our patients.

Digital Sustainability Framework

To achieve the digital sustainability outcomes, an overarching approach is needed that is both ambitious and focused. The approach should be based upon the research and experience in line with strategic objectives of the Trust and industry best practice. As a bridge between the Trust Strategic Objectives and the need for digital sustainability, 4 key principles have been identified as areas to focus upon and strive towards implementation:

- Agile & Remote Working
- Energy Efficiency
- Innovation & Culture Change
- Digitisation & Repurposing

Principle	Description	Outcomes
Remote/Mobile/Agile Working and Cultural Change	Providing a safe and secure mechanism for working remotely in the treatment of patients and the processes of business as usual. To include the cultural change of non-location specific working practices and the opportunities that it brings.	<ul style="list-style-type: none"> • Deliver home working, remote working and mobile working securely. • Non-location specific technology. • Cultural change within the workplace • Improved work/life balance, • Increased productivity with reduced overheads • Reduced carbon footprint
Energy Efficiency	We will create the environment for staff and patients to adopt digital technologies in their day to day working as they evolve, using multi-channel technology and which employ the best in energy efficient standards to encourage energy efficient ways of working.	<ul style="list-style-type: none"> • Interoperable solutions • Prefer strategic over tactical, Trust-wide over business unit specific • Construct for multi-division capability • Deploy newer technologies for lower consumption. • Changes to ways of working to make technology objective specific.
Innovative Technologies and Artificial Intelligence	Utilising the latest technology and approaches to enable staff to fulfil their duties whilst still being energy efficient and sustainable.	<ul style="list-style-type: none"> • Design consolidated solutions that provide deep integration of data, to best help clinicians and make ways of working more efficient. • Utilising RPA and AI to improve effectiveness of processes reducing energy overheads and reducing consumption time. • Implementing innovative technologies such as unified communications to improve efficiency and sustainability of deployed solution architectures.
Reduce, Reuse, Recycle	To recycle technology and its dependents where possible but more pertinently, to reuse and redeploy existing technology solutions where possible.	<ul style="list-style-type: none"> • Reuse of existing technology where possible. • Employment of staff redundant technology within the estate. • Recycle as much as possible into a circular economy.

Principle 1 – Agile & Remote Working.

Providing staff across a range of disciplines, the tools to work remotely both in terms of alternative office locations, within patient homes and from their own residence as well as completely being completely mobile as needed in transit.

A. Remote Working

Remote working, mobile working, working from home etc., is one of the single largest impacts that organisations and their workforces can have to address climate change. It is being seen as one of the key strategies for addressing climate change into the future with the need to empower a digital workforce to work from home when they can. This will significantly impact on the carbon footprint and the reduction of that impact. During the recent COVID crisis it's been successfully proven that digital technology is now mature enough to allow workers to operate accurately from remote locations, be they orbital offices, home based solutions or even in transit. Smart technology means that VPN and VDI technology provide the worker with a number of options to achieve this. In terms of healthcare professionals, many will need to remain working within a large acute setting such as a hospital, however, community services are predominantly based in the patient home and could return to their own home at the end of a shift, negating the need to return to any base for the majority of the week.

For Corporate and support services, many have under COVID distancing operated efficiently and effectively from their own homes without the need for frequent site based access. Remote working has a number of benefits, detailed below, however, as an example, Tower Hamlets Council redesigned their office environment to include only 6 desks for every 10 staff available. This has worked exceedingly well for them between remote working and hot desking leading to a measured 10% increase in productivity during their evaluation period. As reported in the Telegraph, May 12th 2020, 74% of all employers now favour some level of remote/home working for their workforce, demonstrated by the number of

organisations currently either re-developing workspaces or shedding their physical assets entirely.

- Reduction in travel – obvious benefits to the environment in that less fossil fuels are burnt. Improvement in road safety in less traffic accidents due to reduction in frequency of travel. Less localised pollution and improved quality of air (which has tangential benefit of potential reduction in air quality related deaths).
- Reduction in Car Parking required – With more staff potentially working from home or off-site for greater proportion of the working week, less car parking spaces required. This also reduces localised traffic and pollution on site with idling traffic waiting for spaces. Further, it may potentially lead to more spaces becoming available for patient visitor car parking.
- More office space available – With staff potentially working some/most/all week off site, this has the potential to support hot desking or completely negating the need for some space, thus freeing that for further clinical transformation and use.
- Improved staff well-being – many remote/home-working staff report improved work/life balance in that it affords them more time to be with their families etc. rather than caught in traffic. Having familiar surroundings and the opportunity of configuring workspace can also have health benefits. Many organisations who have already enabled an agile workforce report increased productivity and staff retention as a result.
- Reduction in overall environmental impact – Reduction in fossil fuel consumption through traveling, improved air quality, reduction in need for Hospital site heating for those areas without staff on site, reduction in lighting requirement. Overall consumption of energy reduced on site due to lower IT based activities.

B. Digital Meetings

Accelerated with pace due to COVID19, the Trust now supports effective digital meetings. This includes both the implementation of appropriate video and teleconferencing facilities, such as MS Teams or PowWowNow. In addition to enabling virtual meetings, one key environmental factor has perhaps been overlooked. This has helped significantly in removing the need for printed material to enable these meetings, as screen sharing and the whole ethos of the virtual set-up doesn't allow or promote this. Digital meetings have become even easier through the use of products such as Microsoft Teams with these types of meetings having numerous benefits including:

- Reduced Travel – either to different sites for meetings or even within the site campus, meetings can now be held effectively on-site reducing the need for any form of travel and energy consumption.
- Reduced need for paper –Removing the need to produce it in the first instance, removing the need for transportation and subsequent disposal or recycling, all of which require fossil fuels to achieve previously. This will also lead to a reduction in printing and by consequence reduction in wasteful printer ink.
- Wider audience – often meetings are not well attended due to busy schedules but also the convenience of getting to the meeting. Remote meetings remove that barrier by putting the meeting in any office or location. This helps to ensure that the meeting reaches and can be attended by a wider audience helping to keep everyone informed and ensuring that the most appropriate and efficient decisions are taken.

C. Online Digital Consultations

As the capabilities of the Trusts online presence expands accelerated at pace due to COVID19, so will its ability to meet other key enablers. IT already enables online consultations, used with over 40% of patients within Outpatients arena during the peak of COVID19. This contributes to meeting the ambition of avoiding a third of all hospital

outpatient appointments within five years as per the NHS Long Term Plan. It will assist in enabling a 'digital first' option for most consultations, allowing for appropriate face-to-face consultations with clinicians over distances, where patients want or need it. This has required new ways of working for Primary care and outpatient services to make best use of such enablers. 3rd party offerings could be utilised to transform the way primary care is delivered to patients. Process transformation is key for primary care practices or any clinical services whom will need to adapt their own practice to work more pro-actively with patients in a time efficient manner.

- Easy access to care for patients – not having to wait on premise at a GP Surgery can help reduce exposure to potential disease.
- Reduced Travel – benefits to both the environment and the patient through not having to travel to see a GP.
- Improved efficiency – For the GP through managing their consultation sessions more precisely through the use of the technology as well as using a variety of tools to enhance the session and the exposure to the presenting issue.

Principle 2 – Energy Efficiency.

The IT industry as a whole consumes large volumes of fuel to power its devices. With healthcare now being so technology-centric in the delivery of patient care, it is important now more than ever to ensure that both local devices and wider infrastructure utilise energy efficient methods. In recent years, there has been a move towards a cloud/internet first strategy by NHSE and NHSD which comes with multiple benefits, however, this is not the only area with potential for energy efficiency.

An example of this consumption can be highlighted using a simple webpage. The size of the average web page has increased at least threefold from 2010 to 2018. Utilising a simple equation of £ - P(-30%) – C (-40%) convert to E (electricity at 12p per KWh/month) and convert to CO₂ (average UK grid, 0.352gCO₂/KWh), then removing a 20KB JavaScript dependency from that web page would yield a global CO₂ emissions savings of 59 tonnes per annum. That is a single page on a single

site. Most sites will not have that level of JS on all pages but it illustrates the point of how cumulative the CO2 saving could be.

To further illustrate this potential from a Trust perspective, take email as an example. Most average email users within the Trust receive circa 40 emails per day. With 8000 potential accounts, this translates into 320,000 emails per day. Assuming a conservative average of 10% superfluous emails (emails that include details which may not be solicited, "thank you's" etc.) this would mean that the Trust has 32,000 emails per day that are not required for strict business purposes or the equivalent of 160,000 emails per week (5 day period) which is equivalent to 640,000 emails per average month (or 7.6million emails per annum).

Work commissioned by the company OVO demonstrated that there is 16,433 tonnes of carbon for every 64million emails sent, which translates into 0.00025 grams of carbon per email, thus, using the aforementioned scenario, the Trust could save as much as 190 tonnes of carbon per year by staff not sending emails that don't need to be sent. This is the equivalent as driving for 855,000km (circa 530,000 miles).

Equally, all of the emails sent and received are then stored which takes space on a server, which requires energy and more technology to house and power them. Assuming (generously) that each email message is 200Kb, then we would need approx. 1.5Tb of storage just to store emails that are not required and keep them accessible as part of a backup of those emails.

To help reduce such consumption and eradicate practices which are energy inefficient, the following are approaches which need to be taken:

A. Only use when needed & switch off when not.

Many systems are maintained in an "always-on" status which is often inappropriate. Only initialising systems when they are going to be needed will help reduce the energy overhead of the Trust as well as impacting the environment. Equally, when not in use, turn devices off. This not only helps to reduce the power consumption but also the life of the device.

B. Cloud Computing & Remote hosting

It has been shown to be more efficient than on premise equivalents. Cloud hosting not only remove the liability for hardware maintenance from the Trust but is also 93% more energy efficient and 98% more carbon efficient than on premise equivalents. Cloud Computing allows users to access applications and data hosted and managed offsite, removing the requirement for onsite resources; users can access and share information and applications securely from any location. Many Cloud hosts now utilise mass energy generation through solar farms which cover the centre and provide uninterrupted power meaning their carbon footprint is net zero. The use of solar power and solar farms are being explored by the Trust and would be essential to power a variety of Trust demands including onsite IT Datacentres.

C. Latest Technology.

Whilst the drive to maximise benefit from any IT device has helped to keep legacy devices longer than intended, the benefits from upgrading those devices outweigh the initial capital cost. For example, newer devices improve speed and responsiveness giving end users not only an improved experience but the ability to operate more quickly in the care of their patients. Newer technology is also more energy efficient and requires fewer charges/less power to perform the same or better functions than legacy devices, improving the carbon footprint of the Trust. Newer technology also provides easier access to the latest innovations and tools, again improving the ability of the users to perform their duty of care.

D. Keep It Simple.

A lot of IT endeavour is invested in solutions which become convoluted and complex. This increases the level of IT capacity required to power the solution and thus, the level of fuel needed to the same effect. Keeping solutions simple can help both the end user in their ability to use the solution, the Trust in that it removes a potential layer of liability and the environment in that it requires less power to keep the solution working.

Principle 3 – Innovation & Culture Change.

One of the largest barriers to moving forwards with a green IT agenda is cultural change. Change is not readily accepted or embraced by many people including those calling for the change itself. Change can take time and may require incentives to enable, however, time is a commodity the environment does not have and by association, neither does healthcare. Integration and interoperability will be a key enabler for the Trust over the next 3 years and as such innovation will drive how that will develop. To that end, IT will support innovation where pragmatically possible. There are a number of areas where IT can enable the Trust to innovate and start to employ new, clean and green technology which will be both disruptive and revolutionary. These include but are not limited to:

A. Artificial Intelligence & Robotic Process Automation (RPA)

The Trust already employs Robotic Process Automation in the management of patient data through the community. This has proven successful and as such, lends itself to further utilisation and expansion. As such, the Trust will need to capitalise on systems which can make use of machine learning and its further enhancement into true Artificial Intelligence. AI is an emerging technology which is also evolving as its accuracy improves and which provides the potential for efficiency in the future supported by the objectives of the NHS Long Term Plan.

B. Unified Communications

Unified communications is the integration of enterprise communication services such as instant messaging (chat), voice including IP telephony, web & video conferencing across multiple devices and media types. This technology is very much at the core of agile and remote working, digital meetings and other “connected” solutions which make agile working a possibility and as a result lead to all the aforementioned benefits.

C. Digital Enablement / Digitisation -Internet of Things

Internet First is a key NHS strategy that has followed on from the Cloud First philosophy. Internet First means that externally accessible health and social care digital services must be securely accessible over the public internet by default. Internet First applies to digital services such as the systems, applications and services used by Trust staff and partners/other NHS organisations, who require them to be accessible remotely. There are 9 principles associated with Internet First which the Trust ICT will need to embed in working practices to achieve this objective, however, the 3 key principles in relation to the green agenda are:

1. Where a digital service can be migrated or performed by a shared service presented over the internet, the application should be retired, and the functionality provided by the shared service.
2. Internet facing digital services should be designed to be shared and re-used. They should avoid bespoke features that constrain re-use.
3. Existing digital services should be developed to be accessible over the internet at the earliest opportunity.

By utilising connected technologies, those that are energy efficient, those that are process efficient, those that are digitally enabled, those that improve the effectiveness of the healthcare end result, Trust IT will ensure that the environmental benefits become a natural and expected part of the process rather than something that is “bolted on” afterwards or which need a separate case for justification and investment.

D. Procurement.

Procurement can be a key enabler in new ways of working and new ways of consuming. This is also true in regards to sustainability. As part of any procurement process relating to digital sustainability, the Trust Procurement department should ask suppliers for the manufacturing Co2 footprint of the technology the Trust is procuring. This requirement should also form part of any tender specification and general buying criteria.

Principle 4 – Recycling, Reusing & Repurposing

Whilst much is often made of the recycling movement which has been available for a number of years, in recent times, it's been acknowledged that recycling is not always the answer. It is inefficient, costly and often does not yield the results that are desired. Furthermore, it does not encourage individuals to change their behaviour to support more sustainable processes. As such, through 2019 into 2020, the emphasis has been on reusing, repurposing and sustainability in terms of changing the use of source materials. Nowhere has this been more prominent than in plastics use and IT sustainability.

Here we consider the major approaches in this area and how these can impact on the Trust in a positive way:

A. Recycle & Remove

IT consumes a large amount of materials that can be recycled and in some cases, repurposed. Packaging (especially cardboard) around IT equipment can be recycled easily where plastics involved in packaging of devices is also predominantly LDPE 4 which is also recyclable. If all such materials were recycled rather than disposed of, this would help to reduce its impact. IT devices and equipment can also be recycled. Where devices are end of life, some aspects may be recoverable for use with other devices, whilst that content which is no longer of use can either be donated for repurposing or recycled completely through agreements with innovative IT recycling companies which attempt to extract the maximum benefit from the materials present. In the event that devices and technology cannot be reused, recycled or repurposed and instead have to be destroyed as part of a safe destruction policy, then the Trust should demand proof of outcomes such as Certificates of Destruction, WEEE, Environmental Impact Data etc., in relation to the items being destroyed. Alternatives to destruction can also be sought such as fundamental material extraction. One such process is referred to as Bio-Leaching which is a far superior alternative to mining. This involves the process of mechanically removing components from IT equipment for processing (such as the PCB). The PCB etc. is

shredded into small parts to enable bacteria to access the inner materials. The shredded board is placed into the bacteria which turn (for example) any copper into a solution. The copper (a major electrical component) is then electro-plated and as such, then becomes available for re-use. This is a process which is being constantly updated, refined and scaled for wider and more commercially viable use.

B. Re purpose & Reuse

With the acknowledgement that recycling is not always the long term solution for dealing with materials that are end of life and that in many cases, IT equipment and devices can serve a useful purpose for longer than originally intended with some minor maintenance, the emphasis is now on medium to long term sustainability through the reuse and repurposing of such technology.

Some of this already exists within the Trust with devices being inherited by one area as they are no longer fit for purpose in another. However, part of keeping assets longer is that they depreciate in terms of efficiency which can have a counter carbon footprint effect, so repurposing has to be within context and with the wider impact considered.

Another potential for reuse is to allow employees to bring their personal unwanted electronics to the office for reuse or disposal. Staff will be upgrading phones on a frequent basis and not all of those hand units will be traded in. As such, research has shown that many unwanted hand units remain discarded but in the home. Both the Trust and its staff could potentially benefit.

The Conclusions and Recommendations

It is clear that there is a strong and urgent need for decisive action to be taken in tackling climate change. The consequences of not doing so will be catastrophic and will ultimately negatively affect health care systems globally. Equally, there is the need to serve patients and staff in the present and those responsibilities that the Trust needs to execute are of equal importance. These two positions are not polar opposed and neither are they untenable.

As detailed, certain key actions can impact these requirements in an effort to meet the overall objective, that of safe, secure, timely patient care within an environment that is healthy, conducive and protective for both patient, staff member and public. In summary, the following key actions can be enabled with relative ease but would have a significant and very immediate positive effect to this end:

1. Further expansion and continuation of Remote working.
2. Further expansion and continuation electronic meetings.
3. The Paperless office.
4. Reuse and Repurpose of existing devices.
5. Energy efficient devices and ways of working.
6. Recycle of disposable packaging.
7. Transition to more efficient and effective modern technology and the removal of old, legacy technology.
8. Focus on environmentally friendly destruction methods for non-recoverable devices.
9. Linking in with other initiatives across the Trust to maximise benefits.

These adhere to a minimum of requirements across the digital sustainability arena. These principles include:

1. Minimising waste and embracing circular economy concepts
2. Using resources more sustainably and efficiently
3. Promoting social, legal and ethical ICT
4. Mitigating and adapting to climate change and supply chain risks
5. Life cycle analysis and whole life costing
6. Seeking innovation opportunities

If the Trust is to move forwards with a progressive agenda regarding digital sustainability and a wider green agenda, then both these principles and the recommendations need to become part of any future strategy.

COVID-19

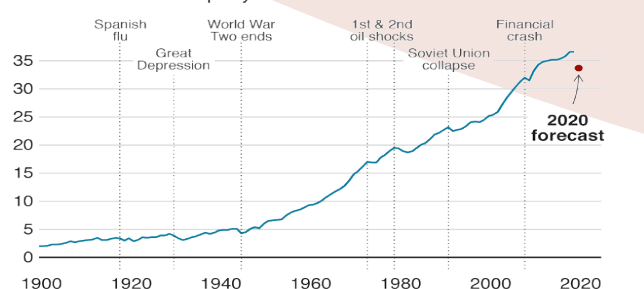
This document was commenced several months prior to its publication. Since that time, COVID19 has appeared on the world stage and very much changed the way (in the short term) that we work, live and play. The virus has affected the lives of millions and potentially billions of people around the world and in so doing, has ironically, provided the world with first-hand experience of many of the changes detailed in this document and provided subsequent evidence as to the environmental benefits of working in this manner.

Through personal and professional isolation, action such as remote/agile working, paperless office, remote consultations, unified communications and digitisation of processes has needed to be employed in order to continue to operate at some level, especially within the health care setting.

The effects of this alongside the reduced need for travelling etc. has had a profound effect on the environment where local air quality has improved, having a subsequent local effect to respiratory health in the area and beyond. This has also had an effect on the consumption of fossil fuels and as a consequence the overall carbon footprint of the Trust. The following graph (source: BBC) demonstrates how CO2 consumption has increased over time:

Global CO2 emissions, 1900-present

Billion tonnes of CO2 per year



Source: Global Carbon Project, CDIAC & IEA

BBC

What COVID19 has shown the world is how that consumption can be drastically reduced and the positive effect that has on the environment. The lockdowns encountered as part of COVID19 has seen electricity demand reduce by 20% despite home working, largely due to the reduction of electricity consumption by large organisations, much of which is wasted through inefficient practices such as leaving devices on when not needed.

APPROVED