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I. Foreword

Welcome to ‘Digital Liverpool’, The Royal Liverpool and Broadgreen Hospitals NHS Trust’s digital vision and strategy. Digital Liverpool describes our ambitions for the next few years, how we intend to get there and the difference it will make for our patients, staff and citizens.

Liverpool is a leader in digital care and innovation. The city combines health and social care, research and innovation, public and private enterprise in an economy like no other. Fundamental to Digital Liverpool is our involvement in the Global Digital Exemplar programme. This recognises our achievements to date but more critically, our aspirations for the future. We now have a responsibility to accelerate our plans.

With health and social care partners across the city, we believe the delivery of Digital Liverpool will revolutionise patient & staff experience, transform quality and safety of our services and produce better health for our population.

We have an established partnership culture that unites clinical, managerial and technical expertise. This ethos of ‘digital clinicians’ allows us all to focus on improving the health and wellbeing of the population we serve. Our role is key in setting the digital leadership agenda.

Putting our citizens at the heart of everything we do, Digital Liverpool signals our commitment to making a difference to the lives of all.

Aidan Kehoe,
Chief Executive

David Walliker,
Chief Information Officer

Dr Mike Fisher,
Chief Clinical Information Officer
2. Introduction

This document presents the digital strategy for the Royal Liverpool and Broadgreen University Hospitals Trust (RLBUHT).

The development of this strategy could not be more timely. It is an exciting time for the people of Liverpool. Over the past 5-10 years, there has been significant investment and development in the City. We have two new world class hospitals, a leadership commitment to ‘Act as One’ and are joining together hospital services with the delivery of a new community model of care across our health and social care system. In addition, we have a focus on cutting edge innovation through academia and have a vibrant digital sector with our emerging Knowledge Quarter. The Knowledge Quarter has a £1bn flagship expansion site that will house 1.8 million square feet of science, technology, education and health space. It will also include The Royal College of Physicians and Liverpool International College, which will host over 45,000 students.

The new Royal is set to open its doors in 2018. This coincides with significant system wide work through Healthy Liverpool in creating single service clinical teams across the City. The way in which we deliver services and interact digitally with our public and enable our staff to do their jobs has changed fundamentally.

The digital strategy for RLBUHT is underpinned by the Global Digital Exemplar (GDE) programme. Digital technology and innovation is at the heart of care delivery. Through this strategy, RLBUHT will become a world leader in delivering innovative digital care. The City of Liverpool will be recognised internationally for embedded digital services, partnerships and innovation.

We have considered the fundamental tenets of the “what” and the “why” in our strategy. However, we place on an equal footing the manner in which we will conduct our work. The cultures, values and behaviours are pivotal for this work. Hence, our GDE details the “how”.

The Knowledge Quarter

The Knowledge Quarter Liverpool (KQ Liverpool) brings together the City’s key partners to collaborate in a creative environment and close the economic gap with London. KQ Liverpool is already home to some of the world’s most influential players in science, health, technology, culture and education and has over £1bn of new developments in the pipeline to position Liverpool at the forefront of global innovation.

The new Royal

The new Royal Liverpool hospital has been designed with patients at the very heart. Many rooms will offer spectacular views of the City. There will be lots of natural light, art, colour and it will be much easier for people to find their way round. The whole environment will be much more attractive and welcoming. It is a healthy hospital for a healthy City.
3.1 The Royal Liverpool and Broadgreen University Hospitals Trust

We are one of the largest university teaching hospital trusts in the North West of England.

We provide both general and specialist hospital services to the population of Liverpool and are based in the city centre. We manage three hospitals based on two sites: the Royal Liverpool University Hospital, Liverpool University Dental Hospital and Broadgreen Hospital. Our hospitals are at the forefront of medical breakthroughs and are a leading centre for clinical research, teaching and training across the spectrum of health professions.

We provide a comprehensive range of specialist services to 750,000 people each year within a total catchment population of more than two million people in Merseyside, Cheshire, North Wales, the Isle of Man and beyond. In the past year, we cared for over 90,000 people in our emergency department, around 95,000 day case and inpatients and over 587,000 outpatient appointments.

We are one of the largest employers in the City, with over 5,500 staff. Our annual budget is over £470 million. Many of our services are highly regarded both nationally and internationally. These include ophthalmology, pancreatic surgery, gastroenterology, pathology, vascular surgery and interventional radiology. We are a specialist centre for nephrology, renal transplantation, nuclear medicine, haematology, lithotripsy, dermatology, urology and dental services.

The new Royal Liverpool University Hospital is being built on the same site as the existing Royal and Dental hospitals. The new Royal will be co-located with the new Clatterbridge Centre for Cancer (CCC) and the new Liverpool Life Sciences Accelerator, a cutting-edge research space for the city. This purpose built Accelerator will have facilities for life science companies and is intended to support greater collaboration between the private sector, clinicians and researchers in the NHS. Its location is ideal: in close proximity to clinicians to facilitate a better understanding of patient/clinician needs, and to a clinical setting for testing new devices and medical technologies.

We have significant relationships with all the universities in Liverpool, but in particular the University of Liverpool and Liverpool John Moores University.

We have a dedicated Clinical Research Facility and we are the host organisation for the North West Coast Clinical Research Network. We continue to look at ways to enhance our research and development programme to identify improved treatment and care for our patients.

We are a key partner in leading the delivery of our local health and social care strategy, Healthy Liverpool. This is our systems approach to delivering sustainable, integrated and high quality health and social care.
Our Values

- creative
- patient centred
- open & engaged
- collaborative
- professional

Our Strategic Themes

- To deliver an exceptional patient experience, making the Trust one of the most sought after places to be treated anywhere.
- To improve the quality of life for our patients by providing excellent, safe and accessible healthcare, which puts patient’s wellbeing at the heart of all we do.
- To develop a world-class workforce, recognised for its skills and level of engagement and founded on a culture of achievement, education, training and development.
- To achieve international recognition for our research and innovation, bringing new therapies from the bench to the bedside.
- To play a lead role in the development of a sustainable health system for the communities we serve.

3.2 Digital Transformation

RLBUHT has achieved significant digital developments over the past five years, progressing considerably with our levels of digital maturity.

Achievements include our paper free programme, our leading whiteboard system, bedside e-observations, preparations for the new Royal and the procurement of a joint EPR with other local partner Trusts. The EPR will give us a single record for our hospital services with coverage of over 85% acute adult interactions across the local economy.

The Global Digital Exemplar (GDE) Programme provides us with a major opportunity to accelerate and enhance our plans both internally and across our broader system. Delivering digital excellence for our patients staff and broader system is one of our top strategic priorities. This strategy will supersede and replace our current IT strategy (TIME to make a difference) to reflect our plans for the future, aligned to GDE.
3.3 Local health and social care economy

Our Sustainability and Transformation Plan (STP), sits across Cheshire and Merseyside (C&M). Underneath the STP, there are three sub-STP footprints referred to as Local Delivery Systems (LDS) as follows:

- North Mersey
- Mid Mersey Alliance
- Cheshire and Wirral

It is expected that over 80% of service delivery will be at LDS and individual organisational level. The North Mersey delivery system is where RLBUHT sits and serves the populations of Liverpool, Sefton and Knowsley.

The North Mersey commissioning landscape is represented by four CCG commissioners - NHS Liverpool CCG, NHS Southport & Formby CCG, NHS South Sefton CCG and NHS Knowsley CCG, together with our 3 local authorities – Liverpool, Sefton and Knowsley.

The North Mersey LDS incorporates 9 provider trusts:

- Liverpool Community Health NHS Trust (services transacting to a number of other NHS providers at time of writing).
- Aintree University Hospitals NHS Foundation Trust
- The Liverpool Heart and Chest Hospital NHS Foundation Trust
- The Clatterbridge Cancer Centre NHS Foundation Trust
- Royal Liverpool and Broadgreen University Hospitals NHS Trust
- The Walton Centre for Neurology NHS Foundation Trust
- Alder Hey NHS Foundation Trust
- Liverpool Women’s Hospital Foundation Trust
- Mersey Care NHS Foundation Trust

Liverpool Clinical Laboratories provide the majority of pathology services to the above organisations.

The North Mersey LDS builds upon and joins-up Healthy Liverpool with transformation plans from neighbouring commissioners within the footprint to develop a compelling place-based, whole-system approach.

The North Mersey LDS identifies **five priorities**.

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**Our Priorities**

- Demand management
- Hospital service reconfiguration (single service teams across our hospitals)
- Population health
- Digital first
- Acting as one system

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Royal Liverpool, Our Digital Future
3.4 Local Digital Roadmap

The Five Year Forward View sets out national challenges in relation to care and quality, health and wellbeing and finance and efficiency.

The Local Digital Roadmap guidance outlines four national digital themes which will contribute towards delivering these challenges:

1. Paper free at the point of care.
2. Digitally enabled self care.
3. Real time analytics and clinical decision support at the point of care.
4. Whole Systems Intelligence to support population health management and effective commissioning, clinical surveillance and research.

Our LDR has three shared digital ambitions for all organisations delivering health and social care services which together meet the national challenge and support the delivery of our STP. These are:

1. Digitally Empowered Individuals

2. A Connected Health and Social Care Economy

3. Exploiting the Digital Revolution

The illustrations below highlight what these ambitions mean and how we will know if we have achieved them by 2021. There has been much recognition with our Local Digital Roadmap held up as a national exemplar in a number of areas. Our GDE programme and digital strategy for the Trust is fully aligned to deliver these system-wide ambitions.

By 2021, citizens will be able to:

- Interact through a ‘digital no wrong door’ with their health and care services.
- Have online consultations with their care providers.
- Book online appointments.
- Use their choice of device and app to manage their care.
- Use assistive technology to manage their care and interact with professionals.
- Access information about their own health and conditions to support them to self care.

By 2021, our workforce will:

- Be digitally skilled with the appropriate technology and culture to enable rather than disable effective working through technology.
- Include professionalised Informatics staff accredited through the Information Skills and Development (ISD) network.

By 2021:

- Every health and social care practitioner will have the ability to directly access the information they need, in near real time, wherever it is held, digitally on a 24x7 basis.
- We will have further consolidated and rationalised our Electronic Patient Record systems moving to a direction of a common system for out of hospital care and a common system in our hospitals with interoperability between the two.
- Duplication and paper processes will be removed to make our front line practitioners’ job easier rather than harder.
- We will have standardised, structured, digital clinical records across all providers in the pathways of care where it matters most.
- No patient will need to ‘repeat’ their story just because records are not available.
Nationally, the past year has seen significant digital developments. These include the national launch of Local Digital Roadmaps, the publication of the Wachter review, the appointment of a new senior digital team at NHS England, the development of NHS Digital and a heightened level of focus on the digitisation of hospital services through the investment in the GDE Programme.

The creation of global digital exemplars and the establishment of the GDE programme are key components of the national Driving Digital Maturity Programme.

The organisations were identified according to the following criteria:
- High Digital Maturity self-assessment scores for ‘readiness’ and ‘capability’.
- Involvement in innovative digital healthcare initiatives.
- Representation of a range of different solution types.
- NHS Improvement confirmation.

"An internationally recognised NHS care provider delivering exceptional care, efficiently, through the world-class use of digital technology and information flows, both within and beyond their organisation boundary. It will also be a reference site to other care providers."

"NHS England is working with a small number of Acute Trusts who are the most advanced in their use of technology, to go from national leaders to world leaders at an accelerated pace. NHS England want to create exemplars that will inspire others by really showing how information technology can deliver both improved patient outcomes and enhance business efficiencies."

By 2021:
- Progress towards intelligence led services using a device agnostic intelligence centre to deliver patient telemetry and wider service intelligence allowing care to be delivered in the most efficient and effective manner.
- Standardised predictive analytics tools allowing for the identification of high resource users across the economy and early identification of episodes of care at a patient level.
- Emerging partnerships with the city regions universities allowing the development of increased digital skills through curriculum development for new clinicians and accessible training courses for experienced clinicians.
- Use of sensor technologies to allow monitoring of people in their own homes, both for the purpose of remaining out of hospital and also for improving their health.
- Closer working relationships with academia and industry to take advantage of new, cutting edge innovation and expertise.
- Identification of sharing and best practice plus access to funding streams for the City region through links with Europe.
- Work with functional multi-omics pathways to enable advanced therapeutic innovation and enhanced clinical interpretation of whole genome sequencing.
3.6 International context

Internationally, there have been many developments in digital care.

Most notably, in the field of digitisation of hospitals through Electronic Medical Records (EMRs) and the achievement of significant levels of digital maturity with formalised assessments through the Healthcare Information and Management Systems Society (HIMSS) maturity model.

The HIMSS model is an eight stage model (0-7) for provider organisations to demonstrate levels of digital maturity and excellence. For an organisation to achieve HIMSS Level 7, there is a requirement for universal levels of digital maturity within that organisation.

**Stage 6**

Full physician documentation with structured templates and discrete data is implemented for at least one inpatient care service area for progress notes, consult notes, discharge summaries or problem list and diagnosis list maintenance. Level three of clinical decision support provides guidance for all clinician activities related to protocols and outcomes in the form of variance and compliance alerts. A full complement of radiology PACS systems provides medical images to physicians via an intranet and displaces all film-based images. Cardiology PACS and document imaging are scored with extra points.

**Stage 4**

Computerised Practitioner Order Entry (CPOE) for use by any clinician licensed to create orders is added to the nursing and CDR environment, along with the second level of clinical decision support capabilities related to evidence based medicine protocols. If one inpatient service area has implemented CPOE with physicians entering orders and completed the previous stages, then this stage has been achieved.

**Stage 2**

Major ancillary clinical systems feed data to a clinical data repository (CDR) that provides physician access for reviewing all orders and results. The CDR contains a controlled medical vocabulary, and the clinical decision support/rules engine (CDS) for rudimentary conflict checking. Information from document imaging systems may be linked to the CDR at this stage. The hospital may be health information exchange (HIE) capable at this stage and can share whatever information it has in the CDR with other patient care stakeholders.

**Stage 0**

The organisation has not installed all of the three key ancillary department systems (laboratory, pharmacy, and radiology).

HIMSS is widely adopted in the US with many providers being HIMSS level 6 or 7. There are some developments in hospitals in the UK and Europe however, levels of digital maturity are less universal and more isolated to specific departments within a provider, or for smaller specialist Trusts rather than for large teaching hospitals.

Achievement of HIMSS level 7 enables providers to positively impact on patient safety through closed loop prescribing, clinical decision support and complete end to end digital care.

As part of the national GDE programme, there is much learning for the UK with international partners. Whether that be in the context of research or our developing knowledge quarter, GDE will give us a fantastic opportunity to exploit existing and develop new relationships and partnerships.

For RLBUHT and the broader City of Liverpool, the digital opportunity which lies ahead through delivery of our current and future plans is both exciting and enormous.

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**Stage 7**

The hospital no longer uses paper charts to deliver and manage patient care and has a mixture of discrete data, document images and medical images within its EMR environment. Data warehousing is being used to analyse patterns of clinical data to improve quality of care and patient safety, and care delivery efficiency. Clinical information can be readily shared via standardised electronic transactions (i.e. CCD) with all entities that are authorized to treat the patient, or a health information exchange (i.e. other non-associated hospitals, ambulatory clinics, sub-acute environments, employers, payers and patients in a data sharing environment). The hospital demonstrates summary data continuity for all hospital services (e.g. inpatient, outpatient, ED and with any owned or managed ambulatory clinics).

**Stage 5**

The closed loop medication administration with bar coded unit dose medications environment is fully implemented. The eMAR and bar coding or other auto identification technology, such as radio frequency identification (RFID), are implemented and integrated with CPOE and pharmacy to maximise point of care patient safety processes for medication administration. The “five rights” of medication administration are verified at the bedside with scanning of the bar code on the unit dose medication and the patient ID.

**Stage 3**

Nursing/clinical documentation (e.g. vital signs, flow sheets, nursing notes) is required and is implemented and integrated with the CDR for at least one inpatient service in the hospital; care plan charting is scored with extra points. The Electronic Medication Administration Record (eMAR) application is implemented. The first level of clinical decision support is implemented to conduct error checking with order entry (i.e. drug/drug, drug/ food, drug/lab conflict checking normally found in the pharmacy information system). Medical image access from Picture Archive and Communication Systems (PACS) is available for access by physicians outside the radiology department via the organisation’s intranet.

**Stage 1**

All three major ancillary clinical systems are installed (i.e. pharmacy, laboratory, and radiology).
Our story
Royal Liverpool, Our Digital Future
4. Our digital story so far...

The Royal Liverpool and Broadgreen University Hospitals Trust

We are not starting from a blank canvass. Our foundation has been set within RLBUHT with investments made in **people**, **technology**, and **change**. These achievements are making significant differences to the front line care our patients experience.

### Key achievements to date:

- **Award winning Admission, Discharge and Transfer Whiteboard.** Our Whiteboard is used on every ward including our emergency floor. It allows our staff to have a real time view of which patients are where and holds a range of clinical information including:
  - e-National Early Warning Score (NEWS)
  - Venous Thromboembolism (VTE) Risk Assessment
  - e-discharge summaries
  - Smoking status
  - Dementia screening
  - Acute kidney injury warning
  - Estimated discharge date

- **Patient Electronic Notes System (PENS):** an in house developed electronic clinical record. It is implemented across the majority of the Trust with plans for full coverage by Spring 2017. It enables a contemporaneous, integrated clinical record across the hospital bringing together medical, nursing and Allied Health Professional clinical notes in the one place for the first time, reducing duplication and improving communication.

- **Joined up diagnostics through ICE, for pathology results, and PACS, for radiology images, and reports both within the Trust and across the broader health economy.** Diagnostics are universally digitised and paper-free.

- **Clinically designed systems:**
  - e-Observations: A jointly designed clinical and digital innovation to actively monitor bedside observations. Our recent successful pilot and refinement of this system has prepared us for full deployment through GDE.
  - e-NEWS: A digital system enabling clinicians to implement the benefits of the National Early Warning Score from an aggregation of the patients E-Observations. This supports the rapid assessment of acute-illness severity and identifies critical conditions such as sepsis at an early stage.

- **Electronic Patient Reported Outcome:** Digital dictation and transcription. This has reduced delays in transcribing clinical information, particularly in an outpatient setting, from months to days.

- **Trust Dashboard:** Shows a real time bed state, a summary of expected discharge dates and live emergency floor activity, all in one place. Staff can have an overall Trust view or drill down to their specific area of practice or patients.

- **Coeus:** Our key information portal which is available on every desktop. It sits over a sophisticated data warehouse and provides live reporting across the Trust.

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**46% in cardiac arrests** through introduction of **Medical Emergency Team and e-NEWS system**

**200k case notes** fully digitised

**over 10 million pathology results** sent each year to primary care

**removed 30 million pieces of paper** when stacked together this is the size of the Radio City Tower 10 TIMES!

**multi million EPR procurement across 3 hospitals**

**1.2 million discharge summaries per year** sent digitally from hospitals to primary care
Key achievements to date include:

- As part of our iLINKS programme, filmed in the mock room of the new Royal, publication of a unique approach to patient communications about information sharing ‘We Share Because We Care’ video and leaflets.

- One of the largest deployments of telehealth in a single health economy in Europe.

- Technology on prescription where GPs can refer specific digital apps for patients with certain conditions.

- Leading ‘Person Held Record’ systems currently being used as a test system with NHS England, HSCIC and the Government Digital Service to design online identity verification for patient record access at scale.

- Award winning ‘Smarthouse’ technology demonstrators in the City to provide the public with access to health and care technology in a familiar setting.

- 50 digital hubs for free access to the internet and volunteer support ‘digital champions’ to train those wishing to access the internet.

- 600 Community Champion volunteers supporting individuals in the community with their health, care and other social needs.

- An NHS led e-health SME cluster with local SME digital companies supported to work with the NHS, its procurement systems and to support innovation.

- A common PACS system across Cheshire and Merseyside providers with a global worklist that enables seamless and secure digital image sharing across the region.

- A shared instance of a radiology information system across the Cheshire and Merseyside region.

- Rationalisation of Primary Care and community based services onto EMIS.

- Liverpool City Region’s eHealth Cluster Ltd is the only NHS led eHealth SME cluster in the UK. It delivers a new model for providing practical support to the digital and care industry through collaborative Cluster working.

Although we have many successes and achievements to date, we recognise that the NHS as a whole is playing continual catch up with industry. Locally and internally, we know we have a way to go, however we believe that the foundations we have in place and the opportunities we will develop and deliver through GDE will rapidly bridge the gap.

### Health and Social Care Economy

As a partner in the larger health and social care system, we have had a pivotal role in some cross community successes.

#### Unique, region-wide large scale collaboration with a single information sharing agreement involving 164 stakeholders

- 76% of repeat prescriptions are sent online between patients, GP and community pharmacies

- World-leading approach to information sharing with over 16 million shared records accessed

- A single PACS system across Cheshire and Merseyside

- 130,000 GP appointments booked online by Merseyside patients

- Telehealth services have reduced emergency admissions and associated costs by 22-32%
The future...
5. The future’s bright, the future’s digital!

Through our GDE programme, we will deliver our vision to:

- Improve the health and wellbeing of our patients through the use of digital technology
- Use digital technology in every clinical pathway design and every clinical interaction
- Use digital technology to provide our care givers with high quality decision support to ensure patient centric care
- Truly exploit innovation with private partners and academia delivering cutting edge technologies at the point of care
- Develop the capabilities and spread of technology to highlight Liverpool as a Global Digital Exemplar City in partnership with the aspirations of the emerging Knowledge Quarter in the City
- Improve flows through the hospital and broader system

Success is defined by digital excellence becoming central to delivery of improved outcomes and experience of health and social care for our patients, staff and caregivers and that we act as exemplar and implementation partner to other NHS organisations. The experience of technology application for staff and patients in our Trust should be better than their home experience.

Quality, safety and patient experience will be improved through moving to a world-class digital environment by ensuring the right information to the right staff at the right time. Through co-design with staff and patients, our connected hospital will support delivery of excellent care, provide intuitive and innovative ways of working and produce huge improvement in patients, staff and visitor satisfaction.

Staff involved in the care of an individual will be able to see everything they need to make their unique and tailored contribution to the care-giving experience.

As a GDE, we will actively share our knowledge, experiences and achievements across our local system and beyond.

We will utilise the established relationships and governance that we have across the local system to ensure spread and adoption of learning, using our LDR as the platform.

By 2021, we will support better health and care for our population by maximising the benefits of digital technology and innovation.

Continuing this collaborative approach we will ensure that:

- We act as one across our local health economy, and collaborate on everything that we do.
- We design our digital services around our people not our organisations.
- We ensure that our GDE vision is clinically led and we will co-design the digital services of the future with patients, clinicians and practitioners.
- We enable patients to access their own data.
- We provide assistive technologies to our patients and carers.
- We share data in line with the single information sharing framework and agreement in place.
- We will improve our digital maturity to HIMSS Level 7 or equivalent so can help other Trusts achieve the same levels.
- We share resources and learning.
- We use predictive analytics to develop new ways of working to deliver world class patient care.

We will deliver these principles by providing digital clinical and managerial leadership across the LDR footprint, removing organisational barriers and ensuring that digital solutions are enabled at scale to achieve the benefits.

We will develop a clinical informatics hub to ensure that we take advantage of, promote and coordinate genuine digital innovation, both within the Trust, across the wider economy and with our partners in academia, research and industry.

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Delivering HIMSS level 7 or equivalent, will give us complete universal coverage across the hospital. Clinically this will give us the ability to deliver three important functions which have an evidenced based improvement in patient care and reduced costs.

1. The ability to deliver genuine clinical decision support delivers the ability to reliably integrate lab and demographic data which support the management of our patients. Not only does this shorten the time to diagnosis and alerting but it does so in a reliable manner. Integrated risk scores allow the use of order sets tailored to individuals.

2. Medication administration is entirely digitised allowing for closed loop administration. This allows continuous stock control, eliminates wrong drugs being administered to patients and improves patient safety through alerting on critical medication omission and allergies.

This technology also brings similar benefits for blood transfusion, pathology samples and implants. This improves efficiency but also improves patient safety.

3. Patient pathways involve multiple hand-offs between departments and providers. NHS England document 10,000 harms annually due to failures of hand-offs. GDE will deliver active management of patient pathways and allow for capacity and demand management.

We will use the opportunities from GDE to accelerate our digital maturity, benefiting the whole LDR footprint in doing so. Through this, we will ensure that all data within the hospital is complete and shared across the health economy using open standards, being fully compliant and secure with the data sharing frameworks in place whilst observing our legal obligations.

To deliver this compelling future, our programme objectives are outlined below.

**Objective 1**
Input to the GDE development nationally and act as an ambassador to GDE internationally.

**Objective 2**
Create a GDE Blueprint to enable city wide transformation for partner organisations to access locally, nationally and internationally.

**Objective 3**
Improve organisational digital maturity, and work collaboratively with partners in the Local Digital Roadmap (LDR) footprint to improve maturity in the region.

**Objective 4**
To become a paperless hospital demonstrated by HIMSS 7 accredited or equivalent status.

**Objective 5**
To deliver the information sharing framework for North Mersey local delivery system (LDS).

**Objective 6**
Implement a fully integrated EPR for use across 3 Trusts, with full interoperability with primary and social care.

**Objective 7**
To improve the outcome of patients with acute deterioration, i.e. Sepsis.

**Objective 8**
To improve the flow of patients through and out of the hospital and reduce inappropriate and avoidable admissions.

**Objective 9**
To improve the long term conditions for the people of Liverpool and the Merseyside region by use of genomic data in patient care.

**Objective 10**
Establish a clinical informatics function, with digital clinicians working with the Liverpool Knowledge Quarter, Academia, Academic Health Science Network (AHSN) and SMEs with relationships to the new digital academy.
6. What’s the plan?

Overall Plan

Our vision, aspirations and objectives for GDE are ambitious. This section will detail our ‘Plan’. What we intend to do and when we plan to deliver it. We will implement our GDE programme through the four workstreams. Overarching these workstreams are six major programme milestones.

Deliverables and Milestones

Workstream 1: Digital Innovation

- Bedside Observations
- Sepsis Early Warning
- e-NEWS
- Blood Tracking
- Virtual Reality
- Genomics
- Big Data
- City Wide Bed Management
- Sensor Technology

We aim to deliver a future where individuals are empowered to access healthcare and undertake their work in an innovative, ‘digital first’ hospital.

Length of stay and transfer delays will be reduced through clinical staff using technology differently in hospital, supported by links to assistive technology based in the community. This will be achieved by condensing the time between diagnosis and results, between prescribing and medication issue and by providing a single view of beds across the City. There will be a reduction in duplication and unwarranted variation of clinical information and requests. In addition, we will increase data quality through better coding and increased analytics and intelligence capability.

Key deliverables for the digital innovation workstream include:

- Recording structured and unstructured clinical documentation, in real time at the point of care through our patient electronic notes system (PENS).
- Enhancement of e-observations, interfaced with sensor technology (in partnership with private parties and academia) to enable: e-NEWS and sepsis early warning, integrating lab and prescribing information, reducing length of stay, readmission and avoidable mortality.
- Further development of our bed management system, recognised as outstanding by the CQC, to enable all order-comms to be available from a “single click” principle throughout the hospital. This will be available to all staff at the point of care with interfaces to clinical decision support systems, linked to evidence based workflows.
- We will develop our whiteboard solutions to provide real time bed state delivering a city wide view of beds, resources, results and alerts aligned to the data sharing principles to which the city have committed.
- Exploit the use of artificial intelligence systems to analyse the results and datasets we produce and ensure continuous clinical performance improvement through intelligent data and intuitive systems.
- Use of technology will reduce the number of follow up appointments, utilising technologies such as telehealth and virtual reality which we will deliver through local and international industry partnerships.

The diagram above details the component parts of this workstream, completion dates and how they link to the major programme milestones.
Through our city wide EPR, real-time digital information will be provided at the point of care, eliminating paper processes and records that cause inefficiency and fragmentation of service delivery. Using the foundation of our economy single information sharing agreement, transparency of patient information will be enhanced. With our single EPR across 3 hospital providers in the City, this will link seamlessly through interoperability with the broader health and social care system.

Staff involved in the care of an individual will be able to see everything they need to make their unique and tailored contribution to their care-giving experience. Key deliverables for the EPR workstream include:

- Delivery of an integrated EPR across 3 local hospitals.
- Replacement of best of breed clinical systems with the new EPR. Enabling patients to have access to their medical information, a key deliverable of the LDR and enable closed loop medicine management.
- Potential to on-board other hospitals onto our EPR through our hospital programme single service system wide vision.

The diagram above details the component parts of this workstream, completion dates and how they link to the major programme milestones.

The new Royal will be a state of the art hospital in Liverpool City Centre. It will transform healthcare in the city and is currently the single biggest regeneration project in Liverpool. The new hospital will be leading edge in terms of clinical service delivery and patient care, transformed through the innovative adoption of digital technology. Key deliverables to this workstream are:

- Core, underpinning infrastructure in place to facilitate new ways of working
- Foundations set through our digital innovation workstream to enable staff to operate differently in preparation for the move to the new hospital.
- Digital redesign of the ways in which patients and public interact with the new hospital whether as an In Patient, Out Patient, within community services or as a visitor

The diagram above details the component parts of this workstream, completion dates and how they link to the major programme milestones.

Workstream 2: New Royal Hospital

Completion of digital innovation workstream
Move into the new Royal
Installation of cloud-ready network infrastructure
Safe room technology
Outpatient redesign
Digital signage
Tele-medicine
Building move in

OCT 2017
DEC 2017
DEC 2017
MAR 2018
FEB 2018
FEB 2018
APR 2018

Workstream 3: EPR

Contract sign-off
AUH Phase 1
LWH Phase 1 + 2
RLB Phase 1 + 2
AUH Phase 2
Primary Care Bi-Directional

MAR 2017
APR 2018
JUL 2018
SEPT 2018
NOV 2018
DEC 2018
This workstream will allow us to both create a different approach to clinical leadership for the future and a different type of ‘how’ we operate.

This workstream will also deliver our ambitions in terms of digital maturity and achievement of HIMSS level 7 or equivalent. This will give the whole programme scale, speed, ambition and truly innovative and joined up working across the hospital, the services and the providers across the city on our roadmap to Liverpool becoming recognised as a GDE City. Key deliverables include:

- All communication from the hospital to primary care is electronic for pathology reporting, PACS reporting, Outpatient and Inpatient discharge summaries.
- All systems will be open standard.
- Working with NHS Digital, cyber security compliance will be met. Audit of frameworks will form part of the Trusts annual audit cycle.
- Partnerships and innovations through the clinical informatics hub including development of a capacity breach tool and markov predictive modelling of patient flow between clinical areas and clinical teams.

The diagram above details the component parts of this workstream, completion dates and how they link to the major programme milestones.

**A partnership approach - Healthy Liverpool**

Partnerships and relationships are at the heart of our GDE cultural approach and a cornerstone of our digital principles of how we operate.

We will work in partnership with our patients and staff, listening and responding to their ideas and needs for digital excellence. We will ensure that we co-design our digital services with those that will be using and benefitting from them.

Locally, we will work with other providers of health care, local GPs, community teams and other hospitals alongside Liverpool Clinical Commissioning Group to work together as one around the needs of our population. We will build on existing partnerships and develop new ones to ensure that we deliver the best possible services for the population we serve.

We will continue to nurture and develop partners with our clinical system suppliers, industry partners, SMEs and academia to ensure that we maximise our true digital potential.

We will proactively partner with other local GDEs, ensuring that we identify areas of best practice and not only have digitally excellent hospitals but work to make the Liverpool City Region a digital exemplar Region, recognised nationally and internationally.

A requirement of the GDE programme is for GDE hospitals to work as an international partner with a HIMSS Level 7 Hospital globally. Due to similarities in our cultures, history and geography and given the broad scope of RLBUHT’s bid in relation to HLP, we have established a set of relationships and emerging digital partnerships with Boston, USA.

These include a range of individuals and organisations including Boston Children’s Hospital, Massachusetts General, Harvard University, The Dimock Centre, Massachusetts Institute of Technology and Institute for Healthcare Improvement.

The partnerships we will cultivate and develop over the course of the GDE programme will be key to our success and to our learning.
Sharing our learning

We will proactively share our experiences and learning as a GDE internally, locally, nationally and internationally.

We will be open and transparent with our partners locally, not simply providing lessons learnt documents at the end of a project but involving them in the projects from the outset and ensuring all our projects are reported to the economy wide Clinical Informatics Advisory Group, where all local organisations are represented to drive forward and deliver our LDR. Furthermore, we will bring patients into the evaluation process for all applications being developed from telemedicine to smart phone apps and their scoring will be integral to the procurement evaluations.

Working together across the health economy, we will enable patients to access, co-design and update their health records. This could be via direct clinical interaction or linked to our genomics work. This can only be achieved by working as one across the LDR and ensuring that standards and data sets are consistent and in line with national standards.

We will share our technical knowledge, resources and people. We will create a talent pool for digital from application developers through to storage experts and build relationships with SMEs, Academia and our local E-Cluster to ensure universal access.

Researchers will be able to access research informatics data through an established cohort selection/patient stratification tool. The tool will enable researchers to access pre-set research marts, as well as to stratify into data sets of their own interest and export to other tools. The cohort selection/patient stratification tool will sit, alongside other standard business intelligence (BI) tools.

Not only will data be shared but it will be collated allowing us to summarise all care and implement an accountable care organisation philosophy. This is based on vertical integration which enables implementation of a population health model. The impact of this will be to deliver high value care as close to home as possible, reducing costs and improving outcomes.

We will lead on the creation of a procurement framework for suppliers whose systems enable joined up digital working, for any Trust in the LDR, regionally or nationally to access where these don’t already exist.

We will also establish user groups that ensure contribution from all stakeholders. This will allow other partners to benefit from and contribute to the suite of digital ready applications and processes by establishing a digital marketplace for Trusts and suppliers to come together for the benefits of our patients.

As a core principle of the LDR, we will collaborate on infrastructure. This will reduce the number of networks, the number of domains and align our work to the connected cities infrastructure so that a city wide digital fabric is created.

We will publish all progress at conferences, journals and publications, via white papers and at the LDR governance boards, to ensure that everything is transparent and demonstrable. As a learning and teaching organisation, we will ensure open access to our work.
So what?
7. So what?

Digital services for the future will feel different for our public and professionals.

We are passionate about adopting pioneering new approaches to care. All service redesign internally and across other organisations will include digital technology in the work and process flow design. We will build upon our long-standing local relationships across different settings to transform care for patients.

A key question when designing services for the future is the ‘So What’ factor.

The Patient Perspective

- Patients will only need to tell their story once
- Technology will be used for individuals to self care and self monitor proactively
- 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 City

Our Staff

- 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

Our Hospital, City and Broader System

- Acting as One across the whole system
- Universal approach and delivery
- Cross organisational pathways are introduced and facilitated and the patient record data shared, reducing time and improving quality of service delivery and care
- 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
Case Study #1

Hi I’m Phil, and I’m a doctor working in the Emergency Department of the new Royal. Thanks to the new digital systems, with consent, I now have a complete picture of my patients’ medical and social care records and any key preferences surrounding end of life care.

Emergency care

Phil is a doctor working in the Emergency Department in the new Royal. As part of the Single Service, City Wide Delivery for hospital services, and to keep his clinical skills up, he rotates his shifts between the Royal and Aintree.

With the new digital systems in place, he can see a complete picture of his patients’ medical and social care records at the click of a button. This allows him to ensure that he is aware of any key preferences which is particularly important in urgent care including information about resuscitation, mental capacity and end of life wishes.
On the ward

Our digital future enables Martha and her team of doctors and nurses on the ward to continually monitor the patients in their care. They will be able to do a continuous monitoring of patient state which doesn’t rely on their physical presence. The digital technology will bring to their attention any changes and deterioration for action. The process will automate through a set of algorithms, information which was previously written down on paper, with manual interpretations.

Clinical teams will be alerted much earlier that patients may be deteriorating and be given a set of prompts through clinical decision support to assist them to treat patients effectively.

Patients will get quicker, safer and more responsive care.

Hi I’m Martha, the digital technology will continually monitor my patients’ clinical observations and will alert me and my team to any changes so that we can be alerted to any deterioration in health. Patients will get quicker, safer and more responsive care!
Outpatients

Our Consultant Cardiologist, Evie will be able to do all of her clinical preparations in advance. She will have a complete picture of her patient Ron’s notes to show her what the issues are. The digital notes will be complete, every member of staff involved in his care can both see and contribute to his digital record. This supports better Multidisciplinary Team working as all of the information is complete in the one place. It will provide a robust mechanism for investigations, with immediate results and monitoring of DNAs. Ron’s records from other hospitals and from his GP will also be viewable to Evie and she will be able to interact with other professionals involved in Ron’s care outside of the hospital providing a much more seamless experience for all involved.

Hi I’m Ron, my consultant cardiologist has a complete picture of every member of staff who has been involved in my care. She is also able to access records from other hospitals as well as notes my GP has made providing a much more seamless experience!
Case Study #4

In the community

Graham, Sophie and Jim are professionals working in one of our Community Care Teams. Graham is a Social Worker, Sophie a District Nurse and Jim is a GP. They have a joined up view of information for all of their work caring for their patients outside of hospital. Our hospital GDE work will give them a fuller picture of their patients’ care, allowing them to know when patients are in hospital, when they are likely to be discharged, key tests they have had done and what they need for when they come home.

Our work across the system with assistive technology will enable the hospital staff to discharge patients more quickly and allow our community and primary care teams to care for patients differently and in a much more joined up way.

Our digital future will enable dynamic care plans aiding communications, preventing duplication and supporting a much more efficient patient journey. Everyone involved in the care of an individual will see EVERYTHING they need to make their contribution.

Hi I’m Graham, I work as a Social Worker in one of our Community Care Teams. Our hospital GDE work will help us coordinate care plans in a much more joined up way. Everyone involved in the care of an individual will see EVERYTHING they need to make their contribution.
So how?
Another key area for consideration is the ‘So How’?

Keep it Simple
Simplify, simplify, simplify – create an amazing experience for staff by keeping it simple.

Person Centred
Having the individual at the heart of the care they receive, we will design our digital services around our people not around our organisations. People will only have to tell their story once.

Co-Design
Digital services of the future are designed by and with the people who will be using those services ensuring an improved user experience for both patient, clinicians and practitioners.

Innovate
Working with industry and academia we will innovate and make best use of cutting edge technology. We will foster a ‘bottom up’ approach to innovation in the delivery of care.

Digital Leadership in Partnership
Front line clinicians and digital clinicians will work in partnership with one another fostering excellent relationships. Digital leaders will ‘walk the walk’ with their clinical colleagues to ensure a deep level of understanding of the impact of their work. Relationships with external parties will be developed and commissioned.

Digital Inclusion
We will support inclusion so that the digital opportunities are open to all who could benefit.

Rationalise Systems and Interoperate
We aim to consolidate and rationalise Electronic Patient Record systems to achieve common systems across each care setting. We will seamlessly connect key systems together using a set of interoperability standards, ensuring that information is no more than 2 clicks of a mouse away for individuals giving them an intuitive, joined up service. Any future investment moves us closer to our strategy of reducing our systems in specified settings of care.

Share by Default
When appropriate, we share information by default asking how do we, rather than why can’t we. We sign up to the economy-wide sharing framework and agreement for record access, with options for patients to opt out. To build and sustain trust, we will ensure appropriate safeguards and audit systems are in place to monitor appropriate access to information.

Gold Standard Digital Maturity
All information is recorded electronically, consistently and contemporaneously at the point of care giving us a Gold Standard level of Digital Maturity across all health and social care organisations. We will record the data only once, with the correct information first time. We will reduce paper processes and reliance on faxing internally and externally between organisations and services.

Intelligence Led Healthcare
We will have an approach to intelligence led healthcare, supporting transformation and new models of care by utilising all appropriate forms of data to understand and predict when care will be needed, how it will be needed and identify those required interventions before the health need arises.

Digital Skills
We will ensure increased digital skills for workforce and citizens to ensure maximum impact, effectiveness and inclusion.
A digital legacy
9. A digital legacy

Through our GDE Programme and our next chapter of digital developments, we are creating a unique and exciting future for the people of Liverpool.

Delivery of this strategy will not only enable us to create the architecture for ourselves to excel, but for others to learn from our experiences and adopt the blueprint which we will put in place.

We recognise that core digital building blocks are needed everywhere in the NHS. It is also clear that local customisation and adaptation is essential for successful spread and utilisation of these blocks. We aim to produce Liverpool “Digital Lego” so that others can develop their own interconnected and bespoke digital creations rapidly and effortlessly and deliver digital excellence in healthcare, anywhere.

This opportunity will both liberate and digitally disrupt our ways of working to improve the care we give to patients. We believe that our relationships, support, leadership and talents of our staff will enable us to deliver our aspirations at a pace and magnitude yet seen in the NHS.

Our ‘digital first’ new hospital will be a beacon of innovation in the city.

Through Healthy Liverpool, our acting as one approach across the broader system will transform outcomes for our population.

We will co-design digital excellence with our population and then deliver it with them.

As a patient, I can input information into my health record which those involved in my care can access! I also have fewer blood tests as all my previous results can be accessed by those involved in my care!

Our digital first and ‘joined up’ approach to information sharing will transform healthcare for the people of Liverpool. After all, we are all part of the same healthcare journey!
From home, my condition can be monitored remotely by the hospital using sensor technology. This means that I don’t have to stay in hospital but my care team can be alerted immediately of any change in my health, without me even aware. It’s transformed the management of my care and my life!

The River Mersey
The River Mersey is the lifeblood of Liverpool, shaping not just the waterfront contours but the very soul of the city. It stretches for 70 miles from Stockport to Liverpool Bay and for centuries marked the boundary between the historic counties of Lancashire and Cheshire. It gave its name to Merseybeat, the sound of Liverpool bands in the 1960s, and hit single Ferry Cross the Mersey by Gerry and the Pacemakers.

The Beatles
Liverpool is proud to be the birthplace of The Beatles, an English rock band, formed in Liverpool in 1960. With members John Lennon, Paul McCartney, George Harrison and Ringo Starr, they became widely regarded as the foremost and most influential act of the rock era.