

SPECIALIST HOSPITALS AND DIGITAL TECHNOLOGY – MAKING PATIENTS THE HUB OF CARE

Introduction – unlocking the potential for Specialist Hospitals to deliver the NHS Digital Vision

The UK is fortunate to have some of the world's finest specialist hospitals with internationally recognised names associated with the highest standards of care in their respective fields. Caring for the highest volumes of patients with rare and complex conditions means that specialist hospitals are host to a breadth and depth of patient data. This makes them ideal research and testing sites for both scientists looking for new treatments and cures and tech innovators seeking to develop faster diagnostic tools, safer and more efficient processes and a better patient experience to benefit the sickest and most vulnerable patients in our society.

The NHS digital revolution outlined in the NHS Long Term Plan (January 2019) offers the prospect of a dramatic transformation in the quality of specialist care, faster translation of research from bench to bedside and more sophisticated 'learning health systems' that self-correct in real-time to deliver better patient outcomes. Just as importantly, it identifies the potential for technology to shift the centre of gravity from the bricks and mortar of specialist institutions, disseminating data and expertise across the system. Delivering this revolutionary change in NHS care management could support safer localised care of complex patients and empower them and their families to be more informed, involved and in control of decisions affecting their health and wellbeing.

In the past, the reach of the specialist hospital has been constrained by geography and hierarchical, linear methods of communication. Patients have had to travel long distances to access specialist consultations, diagnoses and treatments. Primary and Secondary Care clinicians have felt out of the loop about treatment regimes, making them unsure how best to support their patients in DGH and GP settings. Meanwhile, patients and families have been frustrated by the barriers to accessing specialist advice and support – particularly when seeking referral or transitioning back to local care pathways. Today, the technological building blocks to facilitate integrated care exist, but the NHS still lacks the system design to make it happen.

It is essential for policy-makers to recognise the scale of the challenges ahead in translating the NHS Digital Vision into reality. Specialist hospitals are an excellent place to start. They are the ideal test sites from which to design the telemedicine and patient communication platforms highlighted within the World Health Organisation's Digital Health Interventions report. They are custodians of the data, the specialist clinical expertise and the confidence of the patients who must be the main beneficiaries of change.

This paper describes some of the ways in which specialist hospitals are already making significant contributions in digital health. However, there are currently significant barriers to releasing their full potential in this field.

The main issue is that existing funding structures are transactional, rewarding units of activity and actively dis-incentivising specialist hospitals from investing in research and

development. Creating tailored solutions to complex problems is not compatible with the provider-commissioner model of hospital care.

National focus and leadership is required urgently to support collaboration between providers, academia and industry and to develop funding structures that incentivise specialist hospitals to take the lead in delivering:

- Big data tools that facilitate consenting, logging, storing and sharing of incredibly valuable patient data safely and equitably, protecting it from misuse and allowing it to be harnessed to expedite research and discovery. (NB this work must align with the ongoing efforts of HDR UK, supported by the UK Government through Innovate UK/UKRI.)
- Tailored platforms that ensure data follows the patient across the care pathway and that provider-to-provider and provider-to-patient telemedicine platforms *complement* rather than replace the human interaction that is the core business of healthcare.
- Common data standards to ensure innovation can be adopted and spread across the NHS and make it into a 'learning health system', again aligning with HDR UK.
- Commercial partnerships identifying existing technologies that have transformed the way the private sector interacts with its customers and adapting them to suit patients' needs.
- A skilled and engaged NHS workforce that can deliver the Digital Vision for patients as per the Topol Review (February 2019) – building the capacity to make sense of big data, the insight continuously to adapt and improve data capture systems and the compassion to develop interactive platforms that enhance – but do not replace – patient-clinician communication.
- Releasing the potential of AI to transform whole health systems by unlocking value in data and analytics, facilitating condition recognition and refining organisational processes – as identified in the AHSN Network report on Accelerating Artificial Intelligence in Health and Care (Autumn 2018).

Internationally, the bar is being set high, with the likes of the Mayo Clinic demonstrating that geographical location is no longer a block to powerful national and international networking effects.

The Federation of Specialist Hospitals looks forward to working with colleagues in the wider NHS to establish the right incentives and eliminate the barriers that might prevent patients here from benefiting from the transformational potential of digitally enabled healthcare.

CASE STUDIES

Unlocking the value of patient data

Great Ormond Street Hospital for Children

The Digital Research Informatics and Virtual Environments (DRIVE) Unit at GOSH aims to become a world leading clinical informatics unit focused on data analysis, accelerating research and the deployment of cutting-edge technology. It will harness the powerful combination of rich health data with data science and digital innovation and develop scalable solutions to enhance health services not only for GOSH patients but across the wider NHS.

The DRIVE strategy is underpinned by a collaborative approach, providing partners with safe access to subject matter expertise and curated, non-identifiable data where appropriate, in return for their world leading skills and knowledge in the sector.

Partnership agreements are in place with Microsoft, ARM, Samsung, NTT and Barclays and researchers from UCL and the LSE are working in partnership with GOSH clinicians. A purpose-built Digital Research Environment has been developed and launched in development in tandem with the trust's new Electronic Patient Record. This will enable clinicians and researchers to identify children eligible for clinical trials, recommend changes to clinical practice and predict serious events.

DRIVE has also partnered with NHS Digital to advance the adoption of common data standards for interoperability, which can be used across the NHS, academia and industry. Discrete research-led projects include the use of sensors and devices to support the treatment and improve the experience of young patients with cystic fibrosis, a toolkit app to promote the early detection of sepsis and the use of sensors to provide objective assessment of disability.

Diagnosis

Liverpool Heart & Chest Hospital

As part of a broad range of digital initiatives, video technology is used to transport specialist expertise across the region, for example impacting in real-time upon the identification and management of serious conditions such as endocarditis in secondary care.

The use of AI is being trialled in radiology to support radiologists in the identification of lung disease. A web portal with secure digital information exchange is used to manage the referral and transfer of urgent surgical and medical inpatients across the region – this has eliminated faxes, improved safety and reduced transfer times and length of stay through better clinical communications. The portal is also used as a second clinical opinion reference tool with international potential.

LHCH is leading the implementation of a single imaging platform for cardiology across the Cheshire & Merseyside Health & Care Partnership (STP) enabling the sharing of digital images and reporting expertise across the region.

The Christie

As part of the Greater Manchester Cancer Vanguard programme, the Christie has created Gateway-C, an online platform to help GPs in the task of recognising when patients may have cancer. The digital education platform features videos and learning activities to help GPs recognise symptoms, fully engage with patients and make referrals for diagnostic testing in line with national guidance.

An evaluation in 2017, found 94% of GPs reported that Gateway C had helped with referrals, 85% that it had improved recognition of symptoms and 85% that it had generated greater confidence about when to refer. The programme continues to be the subject of ongoing development and evaluation.

Organisational process

Royal Papworth

Papworth's imminent move to the Cambridge Biomedical Campus to be co-located with Cambridge University Hospitals (CUH) triggered the need for radical change in its approach to the handling of laboratory results, which had previously been entered manually at CUH and returned to Papworth in pdf form, typically introducing a 24 hour delay in clinical decision-making.

The project hinged on a move from manual to barcode scanning of lab results alongside the creation of interoperability between CUH's EPIC and Papworth's Lorenzo systems. This was achieved in seven months and means that results are now received in real-time, improving clinical decision-making and support. Furthermore, the use of barcodes is delivering the right test for the right patient at the right time, significantly reducing if not negating risk of never events.

Pathways

Moorfields

As with many specialties, ophthalmology faces an increasing number of referrals driven by increasing prevalence of eye disease as the population ages and disease demographics shift. The current face-to-face management pathways for these patients, though safe, do not meet current and growing capacity demands and are resource intensive. They can also lead to poor patient experience with frequent hospital attendance required, long waits for appointments and slow patient journey times when in hospital.

A digital solution is being trialled at the trust that provides the clinical team with imaging and other test results for review in a significantly faster format, making it possible to scale up the diagnostic-only clinic model and to enable the initial triage of referrals from high street optometrists: tele-ophthalmology.

The tele-ophthalmology clinics have been found to deliver safe care, optimise the use of existing resources, halve the median time that patients have to spend in the hospital per attendance and increase the skills of the existing workforce, while maintaining high-quality clinical standards. The next step would be to include community-acquired eye images in the pathway.

To date, the trust's initial pilot of tele-ophthalmology triage of referrals avoided 52% of patients attending hospital and also enabled fast identification of those in urgent need of hospital care.

Royal Brompton

Cystic fibrosis requires ongoing specialist care meaning regular visits to treatment centres and associated disruption for patients and their families. Furthermore, as life expectancy has steadily improved the size of the affected population has grown, placing a growing burden on available capacity.

The Brompton has developed an innovation project that aims to address these challenges by empowering the person with cystic fibrosis to monitor their condition from home. This involves self-assessment equipment and an app to share that data with the healthcare team, enabling them to provide remote, virtual consultations and advice. By putting data in the patient's hands, his or her ability to manage their condition is strengthened as is the nature of the relationship with the clinical team. Crucially, the innovative use of digital technology also offers the opportunity to reduce the number of in-hospital clinic appointments to the benefit of all concerned.

St Mark's

As part of London North West University Healthcare, St Mark's is part of an e-referral system enabling initial triage by clinicians so that patients can embark on an appropriate pathway such as telephone appointment, straight to test or referral returned with advice/treatment plan. This reduces unnecessary new outpatient appointments.

The electronic referral triage system allows clinicians to access referrals electronically within and outside the trust. The system manages all referral types including GP e-RS, internal and external consultant to consultant referrals. Referral management and subsequent appointment booking is more efficient, ensuring patients are booked in to the correct clinic more quickly.

The Clatterbridge Cancer Centre

As part of Transforming Cancer Care in Cheshire and Merseyside, The Clatterbridge Cancer Centre is participating in the Global Digital Exemplar (GDE) programme and is working to engage with hospital teams in a process of service transformation and quality improvement capable of meeting the predicted growth in demand and activity over the next 10 years.

The projects that have been implemented to date have shown a number of demonstrable benefits, particularly around efficiency gains that have resulted in improvements in patient and staff experience. The Trust has enhanced interoperability with primary and secondary care across the Cheshire and Mersey footprint, implementing an E-Xchange platform to share clinically related patient information across the system. The platform is also working as part of the Local Health and Care Record Exemplar (LCHRE) work nationally and will see shared records in Cheshire and Merseyside joined with Cumbria and Lancashire.

The introduction of new technologies, such as TeleHealth consultations, digital dictation and healthcare apps are supporting a reduction in the number of patients required to travel for their appointments. Clatterbridge is at the forefront of digital

healthcare, working with other partners, such as MacMillan Cancer Support, to share digital innovation. The Trust is creating a personal health record (PHR) collaboratively with other Trusts across the Cheshire and Merseyside footprint. The PHR will build on use of citizen identity and the NHS app to access their PHR so that patients have a single point of entry. Linking the PHR to the E-Xchange platform across Cheshire and Merseyside gives patients the advantage of a joined up PHR, enabling access to all their appointments and letters.

The Walton Centre

For selected patients with hydrocephalus who have undergone previous surgical intervention and have ongoing symptoms requiring multiple outpatient assessments, the Walton has introduced an indwelling intracranial pressure (ICP) monitor. This provides a measurement of ICP which can be accessed remotely using Teamviewer during a telephone consultation. The reduction in outpatient appointments is particularly beneficial to patients who live a significant distance from the centre, including Scotland.

The Walton has also revamped its consultant advice line for GPs with significant promotion in Cheshire and Merseyside. The use of digital phones and voice-recording speeds the provision of written advice, while in the first six months 37% of calls required no further assessment with associated saving in outpatient appointments.

Conclusion

Specialist hospitals are actively engaged in the use of digital technology to improve system performance and clinical outcomes. They have the expertise to improve the accuracy and speed of diagnosis and the efficiency of clinical pathways. That said, they are not primarily leaders in the field of digital technology meaning that a two-way street needs to develop to optimise results. Payment models will also need to evolve as the nature of interactions between providers and patients evolves, with the realistic prospect of improving patient experience, efficiency and outcomes.

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