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Our background

We are social scientists at The University of Edinburgh with extensive experience in the evaluation of digital change in the health service and beyond. Our group has evaluated the introduction of the NHS Care Records Service as part of the National Programme for Information Technology (NPfIT), and more recently, the Global Digital Exemplar Programme. We also teach technology strategy at the NHS Digital Academy.

Our response draws on a body of research findings and engagements across the NHS.

What progress has been made in dealing with the proliferation of legacy IT systems across the NHS?

The diversity of core Electronic Health Record (EHR) systems adopted by acute providers across the NHS, in part due to the piecemeal adoption post-NPfiT, presents a complex legacy. It increases the costs of establishing and maintaining data exchange for delivering integrated care across primary and secondary health and social care and for clinical research. Newly established Integrated Care Systems (ICSs) now need to confront this diversity. However EHR switching costs are high and harmonisation of systems will need to be gradual given the necessarily long contracts with existing suppliers.

Multiple recent policy initiatives have attempted to address these issues by seeking to promote a more vibrant marketplace. However, these market management efforts have often not had the desired effect. Indeed recent initiatives have seen a reduction in the supplier base and supplier/data lock-in in some markets. The benefits of promoting concerted adoption of systems to facilitate interoperation may be in tension with the desire to promote innovation and open markets. Nuanced long-term policies are needed to shape the market over time.

The current focus has been on promoting the implementation of large integrated EHR systems (such as Epic and Cerner) that allow organisations to achieve high levels of digital maturity relatively quickly.¹ Implementing these systems is, however, risky, as they are expensive, and lack flexibility and interoperability (e.g. with specialty, community and primary care systems). Concerted adoption of selected systems may offer economies of scale and of learning but also brings unintended/undesired consequences of increasing data lock-in and reliance on multi-national vendors and narrowing already restricted markets.²

We have conducted some (unpublished) work on the strategy of managed convergence,³ exploring current views of the strategy and extracting potential lessons for policy making (see <https://blogs.ed.ac.uk/kbeyer/2022/07/12/exploring-the-strategy-of-managed-convergence-interviews-with-national-digital-leaders/>).⁴ This has shown that there are various existing interpretations of the concept. There is currently no EHR offering that matches all the requirements of the health and social care ecosystem including acute and specialty medicine, primary and social care. The optimal solution is likely to vary between locales depending on context and prior technological investments. Whilst it would be helpful to certify a group of solutions centrally, there is a need to maintain flexibility of local procurement.

Long-term policy and vision surrounding data architectures is crucial towards addressing issues associated with the proliferation of legacy IT systems across the NHS.

¹ Cresswell K, Sheikh A, Krasuska M, Heeney C, Franklin BD, Lane W, Mozaffar H, Mason K, Eason S, Hinder S, Potts HW. Reconceptualising the digital maturity of health systems. *The Lancet Digital Health*. 2019 Sep 1;1(5):e200-1.

² Cresswell K, Sheikh A, Williams R. 'Managed convergence' in health system digitalisation. *Journal of the Royal Society of Medicine*. 2022 May 12:01410768221098274.

³ <https://www.digitalhealth.net/2022/03/major-push-on-epr-convergence-and-levelling-up/>

⁴ This builds on forthcoming work we have conducted for Ernst & Young around data architectures and international approaches to concerted adoption.

How do IT platforms used in NHS hospitals in England compare with those used in hospitals in the United States?

The healthcare technology market in NHS England is increasingly dominated by vendors from the United States. There are relevant experiences of building and scaling national infrastructures in the devolved nations and in Northern Europe that should also be considered.

What progress has been made in digitising health and care records for interoperability, such that they can be accessed by professionals across primary, secondary, and social care?

Most digital transformation efforts to date have focused on individual provider organisations and most recent support has been targeted towards acute care settings. The greatest benefits are, however, likely to be achieved by promoting interoperability and digitally-supported shared care pathways across health, social care, and community settings.

There have been important local experiences and national strategies that need to be built on (including the Wachter Review and the Tech Vision).⁵ ⁶ For example, the Global Digital Exemplar Programme and the Local Health and Care Record Exemplar (LHCRE) Programme have made important headway in digital transformation.⁷ ⁸ There is now a need to take the lessons learned from these programmes and apply them to less digitally mature settings, including community and social care. Our work has shown that this is best achieved through a careful balancing between national guidance and local involvement in decision making, as well as a degree of experimentation.⁹ Local leadership and engagement is crucial for success. Successful developments around Shared Care Records in England and in other regional ecosystems (e.g. Catalonia) highlight the benefits of a pragmatic evolutionary approach incrementally building data that is exchanged (from limited datasets to more comprehensive ones) and systems to facilitate this data exchange.¹⁰

Interoperability is not solely a technical issue but a socio-organisational one – in order to promote it, there is a need to consider how different organisations interoperate (as well as their needs) and use this as a basis for procuring technological solutions.¹¹ A digital transformation strategy and not solely a technology adoption strategy is therefore required at local and national levels.

Progress towards integration of health and social care has been limited. Past investments have failed to deliver desired outcomes because they have been pursued through a succession of changing initiatives and short-term projects. Integration of health and social care is a long-term journey that

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https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/550866/Wachter_Review_Accessible.pdf

⁶ <https://www.gov.uk/government/publications/the-future-of-healthcare-our-vision-for-digital-data-and-technology-in-health-and-care/the-future-of-healthcare-our-vision-for-digital-data-and-technology-in-health-and-care>

⁷ <https://digital.nhs.uk/blog/transformation-blog/2019/so-what-is-a-local-health-and-care-record-anyway>

⁸ <https://www.ed.ac.uk/usher/digital-exemplars/final-report>

⁹ Sheikh A, Cornford T, Barber N, Avery A, Takian A, Lichtner V, Petrakaki D, Crowe S, Marsden K, Robertson A, Morrison Z. Implementation and adoption of nationwide electronic health records in secondary care in England: final qualitative results from prospective national evaluation in “early adopter” hospitals. *Bmj*. 2011 Oct 17;343.

¹⁰ Cresswell K, Sheikh A, Williams R. ‘Managed convergence’ in health system digitalisation. *Journal of the Royal Society of Medicine*. 2022 May 12:01410768221098274.

¹¹ Cresswell K, Sheikh A, Williams R. ‘Managed convergence’ in health system digitalisation. *Journal of the Royal Society of Medicine*. 2022 May 12:01410768221098274.

will require significant investment and long-term strategies to realise. Departing from this history of fractured short-term initiatives calls for profound rethinking of how health service policies are developed, funded and implemented.

What progress has been made on making data captured for care available for clinical research through digital transformation?

Digital transformation requires the exploitation of data held within longitudinal records and making these available for clinical research.

However, the exigencies of data sharing for health and social care integration are not identical with the exigencies for making data available for research.

Important progress has been made in creating data repositories and this needs to be built upon.^{12 13}

What are the principal considerations that should be taken into account in this context and what additional training of the workforce will be needed to achieve this?

The workforce needs to be trained in technology strategy, including procurement, implementation, optimisation and evaluation. There is also a need to develop expertise in building systems and data analytics.

The NHS Digital Academy has made important headway towards achieving this but has only reached a minority of implementers (mainly those from digitally mature settings and in leadership positions).¹⁴ There is now a need to target less digitally mature organisations, including social care settings.

Our work has highlighted the growth and increasing contribution of hybrid digital transformation expertise across clinical and digital leadership domains (e.g. Chief Clinical Information Officers, Chief Nursing Information Officers) at Board level.^{15 16} There is now an opportunity to build on the growth of digital transformation capability and establish these firmly within new ICS structures.

Our work has also emphasised the growth in knowledge networking and its contribution to digital transformation (and potentially to the levelling up agenda). There is a need to capitalise on emerging networks, developing partnerships, and promoting learning across the health and care ecosystem.

¹² <https://digital.nhs.uk/coronavirus/coronavirus-data-services-updates/trusted-research-environment-service-for-england#our-tre-customers-and-their-research>

¹³ <https://www.ed.ac.uk/usher/eave-ii/about-eave-ii/eave-ii-data>

¹⁴ <https://www.england.nhs.uk/digitaltechnology/nhs-digital-academy/>

¹⁵ Cresswell K, Sheikh A, Franklin BD, Krasuska M, Hinder S, Lane W, Mozaffar H, Mason K, Eason S, Potts H, Williams R. Interorganizational Knowledge Sharing to Establish Digital Health Learning Ecosystems: Qualitative Evaluation of a National Digital Health Transformation Program in England. *Journal of medical Internet research*. 2021 Aug 19;23(8):e23372.

¹⁶ Hinder S, Cresswell K, Sheikh A, Franklin BD, Krasuska M, The Nguyen H, Lane W, Mozaffar H, Mason K, Eason S, Potts HW. Promoting inter-organisational knowledge sharing: a qualitative evaluation of England's Global Digital Exemplar and Fast Follower Programme. *PloS one*. 2021 Aug 2;16(8):e0255220.

How can the creation or exacerbation of digital inequalities be avoided when implementing digital transformation?

Evaluation can help to address health inequity by helping to design systems that are inclusive and reach those who most need it. We have written a paper on relevant methods using patient portals as an example and would be very happy to discuss this in detail.¹⁷ Key considerations include:

- Assessing stakeholder needs that a technology should address before deployment
- Co-design of technologies involving vulnerable groups
- Studying unanticipated consequences and impacts of systems in use over time
- Studying technological and human contexts in which the technology is placed

¹⁷ Cresswell K, Rigby M, Georgiou A, Wong ZS, Kukhareva P, Medlock S, De Keizer NF, Magrabi F, Scott P, Ammenwerth E. The Role of Formative Evaluation in Promoting Digitally-based Health Equity and Reducing Bias for Resilient Health Systems: The Case of Patient Portals. Yearbook of Medical Informatics. 2022 Jun 2.