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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.

## POLICY AREA: The care of patients and service users

### *Change in targets over time*

Commitment 3 (“Roll out integrated health and care records to all people, providing a functionally single health and care record that people, their carers and care teams can all safely access, enabled by a combination of nationally held summary data and links to locally held records, including shared care records”) was desirable but far too ambitious; not reflecting a clear understanding of existing complexities. Health and care organisations feel under significant pressure to achieve what is perceived to be an unrealistic target, and Integrated Care Systems (ICSs) lack expertise to lead this change.

There have, however, been important successes in establishing shared care records amongst areas that took this as key goal.<sup>1</sup> This progress has created a valuable reservoir of experience, which unfortunately has not been effectively exploited, partly due to a marked failure to evaluate these developments and learn from existing experiences. However, there is still scope to build on them.

Health and social care integration is not a trivial task, particularly if it involves sharing data across care settings. Social care has limited existing digital infrastructure. This short-term obstacle may present an important opportunity, as adopting new infrastructures is likely to be less disruptive than replacing or building on existing ones.<sup>2</sup> Electronic health record packaged solutions – large integrated suites mainly geared towards acute hospitals - are not well-suited to the distinctive needs of community and mental health and in particular social care. Key challenges in this respect are likely to be not only technological (e.g. developing functionality that integrates with and fulfils the needs of diverse health and social care settings), but crucially socio-organisational in nature (e.g. professional groups with differing needs and practices must share information).<sup>3</sup>

Experience suggests that attempts to resolve integration problems by installing monolithic integrated solutions are risky and impose significant implementation costs that can lead to disillusionment of adopters.<sup>4</sup> Rushed procurement can also lead to implementation of infrastructures that are not suitable for the range of uses they need to fulfil, presenting potential problems for future development (as replacing systems can be costly and extremely difficult).<sup>5</sup> Information and service integration is a long-term journey requiring an integrated strategic vision.

One of the biggest problems in the digitalisation of health and social care, are the frequent changes in leadership and associated strategic direction. There is currently no integrated long-term vision of the unfolding architecture of digital technologies and their contribution to health service delivery building on previous experiences, including the National Programme for IT and the Global Digital Exemplar Programme. A digital transformation programme needs to be planned over decades, requiring long-term frameworks, visions and investment planning. Problems of short-term policy and funding are widely recognised, but are seen as not readily resolved within UK political structures.

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<sup>1</sup> Local Health and Care Record Exemplars. Available from: <https://www.england.nhs.uk/publication/local-health-and-care-record-exemplars/> (last accessed: 21/10/22).

<sup>2</sup> Cresswell K, Hernández AD, Williams R, Sheikh A. Key Challenges and Opportunities for Cloud Technology in Health Care: Semistructured Interview Study. JMIR Human Factors. 2022 Jan 6;9(1):e31246.

<sup>3</sup> Cresswell K, Anderson S, Mozaffar H, Elizondo A, Geiger M, Williams R. Attention to socio-organisational dimensions is key to advancing the shared care record agenda in health and social care. JMIR Preprints. 30/03/2022:38310. Available from: <https://preprints.jmir.org/preprint/38310> (last accessed: 21/10/22).

<sup>4</sup> Cresswell K, Sheikh A. The NHS Care Record Service (NHS CRS): recommendations from the literature on successful implementation and adoption. Informatics in primary care. 2009 Sep 1;17(3).

<sup>5</sup> Dedalus to replace Lorenzo EPR with Orbis software. Available from: <https://www.digitalhealth.net/2022/03/dedalus-replace-lorenzo-epr-orbis/> (last accessed: 21/10/22).

However, in order to keep up with the fast pace of technological development, we need to develop new approaches to planning. One aspect is evaluation for emerging technologies.<sup>6</sup> Established quantitative methods like randomised controlled trials are not flexible enough to have an impact on practice within the required timeframes. They take too long to conduct, they do not feed into system development and implementation strategy, and they fail to take account of the incremental evolution and optimisation of technology (through customisation, upgrades etc.).

#### **POLICY AREA: The health of the population**

*Public and health professionals' confidence in data sharing for research, including any issues relating to cybersecurity*

Empirical work has shown that the public is generally happy to share their data if it is used for research and in trusted research environments.<sup>7</sup> There has, however, been a failure to establish consensus around appropriate models of data sharing with appropriate safeguards, and a failure to attend to benefits sharing, which research has found to be a key factor influencing public acceptance.<sup>8</sup> We now need to establish wide public understanding and consensus of information sharing arrangements.

Commercial conflicts of interest are a significant threat to public confidence, undermining trust of health and care professionals and wider publics in existing infrastructures and secondary uses of data. These are exacerbated by issues surrounding data lock-in and the increasing dominance of international corporations. For example, there is anxiety about the role of commercial intermediaries especially if the UK becomes reliant upon powerful overseas suppliers.<sup>9,10</sup>

#### **POLICY AREA: Cost and efficiency of care**

*Evidence on the process of selling and buying equipment and innovative technology in the NHS market, including NHS partnerships with innovative companies*

Procurement processes are currently fragmented between regional and national bodies, poorly coordinated and surprisingly opaque given the substantial public funds being invested (partly due to vendor calls for commercial confidentiality). The National Programme for IT highlighted the severe risks of rigid centralised procurement.<sup>11</sup> However, the scope for achieving economies of scale and

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<sup>6</sup> Cresswell K, Sheikh A, Franklin BD, Krasuska M, Hinder S, Lane W, Mozaffar H, Mason K, Eason S, Potts HW, Williams R. Theoretical and methodological considerations in evaluating large-scale health information technology change programmes. *BMC Health Services Research*. 2020 Dec;20(1):1-6.

<sup>7</sup> Kalkman S, van Delden J, Banerjee A, Tyl B, Mostert M, van Thiel G. Patients' and public views and attitudes towards the sharing of health data for research: a narrative review of the empirical evidence. *Journal of medical ethics*. 2022 Jan 1;48(1):3-13.

<sup>8</sup> Bull S, Bhagwandin N. The ethics of data sharing and biobanking in health research. *Wellcome Open Research*. 2020;5.

<sup>9</sup> No Palantir in Our NHS. Available from: <https://nopalantir.org.uk/> (last accessed: 21/10/22).

<sup>10</sup> Palantir's plan for the NHS: "Buy our way in". Available from: <https://www.computing.co.uk/news/4057314/palantirs-plan-nhs> (last accessed: 21/10/22).

<sup>11</sup> Lee L, Williams R, Sheikh A. How does joint procurement affect the design, customisation and usability of a hospital ePrescribing system?. *Health informatics journal*. 2016 Dec;22(4):828-38.

economies of learning from concerted adoption was highlighted by the success of the Global Digital Exemplar Programme (through partnerships and an informal learning economy instead of competition).<sup>12</sup> There is a shortage of procurement expertise across the NHS, which may be compounded by the regionalisation of procurement.<sup>13</sup>

The substantial procurement power of the NHS has also not been systematically deployed. The market dominance of big multinationals is a significant threat to diversity in the market that impedes innovation and transformation through digital technology. Although there is an overall goal of retaining a flexible market, recent policies seem set to accelerate vendor shakeout resulting in an oligopoly/duopoly in the electronic health record market.

Market management initiatives have to date not had the desired effect. Indeed, they have been perceived as disadvantaging small and medium-sized enterprises. There is also a lack of transparency on what individual care settings pay for procurements, under the guise of commercial sensitivity. This limits negotiation power with suppliers and inhibits adequate economic assessments.

We recommend that the NHS has a twin-track strategy to at least build some of the infrastructure itself in order to minimise risks. This also needs to involve creating a consistent view of an information architecture and information models across the NHS. Such efforts could reduce ongoing costs of interoperability and may aid concerted adoption without creating vendor lock-in.

Support for novel health technology innovation (a very different matter to supporting digital service transformation) is currently focused on the early stages of innovations (offering modest investments in diverse high-risk ventures) and there is a dearth of support for scaling innovations (which requires higher levels of more sustained support). As a result, there is an extremely high rate of abandoned systems that do not go beyond proof of concept. Previous public investments over many years have not succeeded in promoting a viable UK digital health and care market. Evaluations conducted in the course of digital innovation programmes are poorly equipped to capture medium and long-term outcomes let alone draw lessons about how these could more effectively promote successful innovation and exploitation.

*How digital tools have or have not made cost savings in patient care, and any processes used to evaluate innovations*

Existing approaches to the evaluation of major digital health programmes have not been conducted in a manner that could unequivocally establish net benefits in terms of costs savings or improvements in patient care. Cost savings, and particularly cash releasing benefits, are notoriously difficult to attribute to digital technologies, as these technologies usually do not simply automate but transform care and organisational processes making before-after comparisons difficult. Returns on investment, let alone improvements in quality of care and health outcomes, also often only become evident much later than the timeframes over which they are currently measured (shorter than or equal to duration of the programme). For example, a European study of several electronic health record implementations concluded that: *“Successful EHR [electronic health record] and ePrescribing investments are not quick wins; they are sustainable wins. It takes at least four and, more typically, up to nine years before initiatives produce their first positive annual SER [socio-*

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<sup>12</sup> Full Report of the Independent Evaluation of the Global Digital Exemplar (GDE) Programme. Available from: [https://www.ed.ac.uk/files/atoms/files/final\\_report\\_gde\\_evaluation\\_programme.pdf](https://www.ed.ac.uk/files/atoms/files/final_report_gde_evaluation_programme.pdf) (last accessed: 21/10/22).

<sup>13</sup> *here we need to pay attention to organisational design, where we need to conserve certain kinds of experience based expertise*

*economic return], and six to eleven years to realise a cumulative net benefit.*"<sup>14</sup> In line with this, our work has found that UK health organisations were working to optimise their use of novel infrastructures and utilise the information they collect five years after go-live.<sup>15</sup>

Economic evaluations are important to justify returns on investment. They contribute to measuring efficiency savings and help decision makers to make a judgement of whether an intervention is worth investing in. However, they need to be designed in a manner able to capture these complex sets of outcomes. Mixed methods formative and summative longitudinal evaluations are therefore likely to be most suitable for capturing complexities and learning.<sup>16</sup>

#### *Evidence of roll out of digital innovation across the NHS*

As stated above, despite significant national investments in early stage innovation development, most of these innovations will fail to scale. The roll out of working interventions is inhibited by the lack of effective sharing of digitalisation experience/knowledge across organisations and limited evaluation expertise.

Our work has highlighted the important role of partnerships in organisational knowledge sharing and scope to create a learning ecosystem.<sup>17</sup> We have also identified circumstances where competition may inhibit sharing of digitalisation knowledge. The focus now needs to be on establishing nationwide structures to promote sharing.<sup>18</sup> Empirical evidence suggests that professional networks may be key to scaling up best practice.<sup>19</sup> Some encouraging developments have taken place in this respect already but these need to be built on. There may be scope to more systematically target emerging groupings such as ICSs and provider collaboratives.

### **POLICY AREA: Workforce literacy and the digital workforce**

#### *Progress on enablement of recruitment, retention and growth of these staff groups*

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<sup>14</sup> Interoperable eHealth is Worth it Securing Benefits from Electronic Health Records and ePrescribing. Available from: [https://www.digitalhealthnews.eu/images/stories/pdf/201002ehrimpact\\_study-final.pdf](https://www.digitalhealthnews.eu/images/stories/pdf/201002ehrimpact_study-final.pdf) (last accessed: 21/10/22).

<sup>15</sup> Sheikh A, Coleman J, Chuter A, Williams R, Lilford R, Slee A, Morrison Z, Cresswell K, Robertson A, Slight S, Mozaffar H, Lee L, Shah S, Pontefract S, King A, Wiegel V, Watson S, Salema NE, Bates D, Avery A, Girling A, McCloughan L, Watson N. Electronic prescribing systems in hospitals to improve medication safety: a multimethods research programme. Southampton (UK): National Institute for Health and Care Research; 2022 Sep. PMID: 36223444.

<sup>16</sup> Cresswell K, Williams R, Sheikh A. Developing and applying a formative evaluation framework for health information technology implementations: qualitative investigation. *Journal of medical Internet research*. 2020 Jun 10;22(6):e15068.

<sup>17</sup> 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.

<sup>18</sup> 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.

<sup>19</sup> 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.

The NHS Digital Academy<sup>20</sup> has achieved quite a bit in this respect – most significantly in creating new forms of hybrid experts with the clinical/managerial/technical capabilities needed to procure and implement digital transformation. There is however an enduring problem in retaining staff with this digitalisation expertise/experience as well as conventional technical specialists. Many move to the private sector and there is an increasing reliance on commercial consultancy expertise that means that knowledge is not retained within the NHS.

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<sup>20</sup> NHS Digital Academy. Available from: <https://www.england.nhs.uk/digitaltechnology/nhs-digital-academy/> (last accessed: 21/10/22).