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Concerted adoption as an emerging strategy for digital transformation of healthcare - lessons from Australia, Canada, and England

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Abstract

Objectives: With an increasing focus on the digitalization of health and care settings, there is significant scope to learn from international approaches to promote concerted adoption of electronic health records.

Materials and methods: We review three large-scale initiatives from Australia, Canada, and England, and extract common lessons for future health and social care transformation strategy.

Results: In doing so, we discuss how, despite differences in contexts, concerted adoption enables sharing of experience and learning to streamline the digital transformation of health and care.

Discussion and conclusion: Concerted adoption can be accelerated through building communities of expertise and partnerships promoting knowledge transfer and circulation of expertise, commonalities in geographical and cultural contexts, and commonalities in technological systems.

Introduction

Health systems face increasing pressures to integrate data across settings to support better and safer care delivery.(1) Despite clear drivers and some successes,(2,3) there are however many high-profile failures of centralized large-scale digital transformation initiatives seeking to streamline procurement and achieve large-scale interoperability.(4-6) Underlying reasons include a lack of local engagement and buy-in, as well as challenges with centrally procured systems fulfilling local needs. Locally led adoption in provider organizations is still common, as it often has less adverse impacts on local work processes and organizational functioning.(7) However, such local efforts can be expensive as they involve trial and error attempts in exploiting complex technological functionality and are associated with limited learning from other contexts.

Concerted adoption may help to address some of the tension between centralized attempts and local needs associated with digital transformation, whilst at the same time promoting large-scale interoperability and reducing the cost of implementations. We characterize concerted adoption as including: (1) scope for shared learning thereby reducing costs and risks of current and future procurement, implementation, and use, and (2) formation of communities of adopters allowing better deals with and stronger negotiating power over suppliers. Such a coordinated or collective approach to adopting new technologies contrasts with a more fragmented adoption strategy, where different entities adopt technology based on their more-or-less specific local circumstances or preferences. The concept has emerged from a variety of academic fields and discourses with sporadic use of the term including information systems, organization studies and technology studies, but none of these fields has used the term systematically. As such, we are using this term de novo to convey something that we observed in practice. The developments we report on here arise from the efforts of change managers and policymakers to tackle the tensions between “top-down” and “bottom-up” strategies to implement electronic health records (EHRs). We have explored parallel developments in practice across a range of settings, which have not been identified in prior literature.(8-12) The term is likely to gain relevance to a range of settings internationally, since many national and regional health services are grappling with the trade-off between laissez-faire and centralized approaches.

Public policies have struggled to address the dilemma between the poor outcomes (e.g., low acceptance/use) of “top-down” centralized solutions and expensive, poorly integrated “bottom-up” solutions. There are inherent trade-offs between centralized and local approaches to adoption. Centralized “top-down” approaches offer standardization and data integration at the cost of flexibility and limited attention to local needs, while “bottom-up” approaches allow for customization and system resilience but risk data fragmentation and higher integration costs. Finding a middle ground between the two approaches has proven difficult, with public policies often favouring one over the other and experiencing associated challenges. As such concerted adoption approaches are still in their infancy and have not been sufficiently studied to explore their characteristics and impacts. There is also limited transferability of learning within and across organizations and countries relating to concerted adoption strategies.

We here seek to characterize the process of concerted adoption of EHRs in three international settings: Australia, Canada, and England. Extracting common factors underlying concerted adoption will help decision-makers to develop effective strategies for large-scale digital transformation of health to promote interoperability, whilst also allowing for local transformations and engagement needed to ensure local use and benefit. We hope that this will help policy-makers to maximize efficiency in planning and executing large-scale digital transformation initiatives in healthcare.

Distinctive features of concerted adoption of electronic health records

Concerted adoption can help to facilitate shared learning and thereby stimulate faster and smoother implementation and use of systems. Despite differences in local settings, we have discovered similar strategies in international programmes promoting concerted adoption of EHRs (Table 1).

Table 1: Examples of international programmes promoting concerted adoption for electronic health records

	Australia	Canada	England: Global Digital Exemplar Programme
Health system	Universal healthcare, managed at provincial level	Decentralized, universal, publicly funded health system, managed at provincial level	National Health System free at the point of care, managed centrally
Setting	16 hospital and health services governed by a single health department, administrative region: Queensland, subset of around 100 hospitals	Over 35 organizations, representing more than 80 hospitals, administrative region: Ontario, subset of around 140 hospitals	A cohort of 51 provider organisations (3 ambulance, 33 acute, 15 mental health), administrative region: England, subset of around 300 organisations
Cost	\$1 billion USD for 16 hospitals (including software acquisition)	\$1.3 million USD for ~80 hospitals (focusing on change management services; not including software acquisition)	\$383 million USD for 51 organisations (spending decided by participating organizations, mixture of software acquisition and change management services)
Digitalisation initiative	Rollout of a single integrated electronic medical record funded centrally and supplemented by local funding (13)	Provincial funding from the Ministry of Health and Long-term Care in Ontario between 2016 and 2019	Support digitally enabled transformation to transform relatively digitally mature provider organizations into digital exemplars
Programme governance	Provincial support for the establishment of programme governance and delivery assurance arrangements	Provincial support and governance oversight for North York General Hospital and Ontario Shores Centre for Mental Health Sciences	National support for the establishment of programme governance and delivery assurance arrangements
Mechanisms of knowledge transfer	Central resources for rollout with a central single team attending to most early rollouts	Establishment of a core Hospital Information System	Supporting various mechanisms for knowledge sharing: establishment of

	<p>An academic network for knowledge creation and transfer including research, digital health grand rounds and digital health journal club</p>	<p>Benefits and Adoption Team (HISBAT)</p> <p>Sharing knowledge among peers and offering mentorship to project teams through in-person visits, all without any charges for Ontario hospitals</p> <p>Aim to enhance the knowledge of the hospital's client team, especially in areas that fall outside the purview of services provided by the EHR vendor and consultants</p> <p>Repository of support documents</p>	<p>partnerships, Blueprinting (documents summarizing procurement and implementation experience), various learning networks to capture and share implementation experiences.</p> <p>Learning in the course of the Programme through an external formative evaluation</p>
<p>Macro-environment dynamics</p>	<p>Ambitious state-wide digital health strategy</p> <p>Funding for central resources requires ongoing cabinet submissions but received ongoing funding to complete 26 hospitals</p> <p>Local funding variable</p>	<p>Centrally funded initiative supported by the Ontario Ministry of Health and Long-Term Care to help Ontario hospitals with the implementation of advanced EHRs</p> <p>Ministerial push to promote adoption of advanced EHRs</p> <p>Adoption of HIS has been slow in Canada</p> <p>HISBAT funding was renewed once, then the program stopped when the Ministry of Health decided to move to a different funding approach for concerted adoption (i.e. collaboratives of Ontario hospitals, sorted by EHR vendor)</p>	<p>Strong enabling political context for digital transformation led by the NHS Long Term Plan (14) and a national digitalization strategy (15)</p> <p>Frequent re-structuring of political leadership</p> <p>Limited national funds</p> <p>Demand for inter-organizational spread of digitalization knowledge across the NHS (at scale)</p> <p>Funding was not renewed at the end of the program</p>

Governance of community	Mostly vertical learning and knowledge transfer	Mostly horizontal learning and knowledge transfer	Mostly vertical learning and knowledge transfer
	Strong central and regional aspirations to be digital exemplars	Establishment of communities of practice	A degree of competition between organizations
	Some resistance from secondary sites to deploying the instance configured by the primary site	Common considerations surrounding data and project governance	Partnerships between exemplars and later adopters to promote knowledge sharing, facilitated by strong shared identity of selected exemplars, redressing recent competitive pressures between sites

Distinctive features of concerted adoption include knowledge transfer and professional development, and comparable contexts that promote shared learning (Figure 1). We identified these factors by consensus and discussion amongst the authors. In doing so, we thematically analyzed the elements within each programme, and then identified the three common elements across settings.

Figure 1: Concerted adoption factors

[Knowledge transfer and professional development](#)

Key common elements of concerted adoption across initiatives included shared learning through creation of communities of expertise and partnerships aided by knowledge transfer and circulation of expertise.

Interpersonal contacts and migration of staff across contexts were crucial in this respect.(16) Across programs we identified several intermediaries who helped to bridge implementation contexts and professions. For example, the Hospital Information Systems Benefits and Adoption Team (HISBAT) in Ontario, consisted of independent advisers with experience of implementing the same or similar system focusing on helping other organizations to implement.(17) In doing so, they provided a bridge between implementers, vendors, and frontline clinicians. HISBAT advised on the vendor-agnostic factors that were known to result in better patient and provider outcomes from implementing advanced clinical systems, such as standardizing content on evidence, building workflows that make it easy to follow best practices in daily care, and focusing on clinician engagement in system build and meaningful use.(18,19)

We also observed the development and validation of digital change expertise in emerging communities of practice. Across programs, this was accompanied by changing professional structures focusing on the increased status of hybrid knowledge. For instance, Queensland established a digital health research network bringing together academic, digital change and clinical specialties.(20) This network is led by the university which helped foster communities of practice, where clinical informatics experts informed evidence-based decision-making on the ground. In the English context, we observed that these arrangements facilitated the cross-organizational utilization of expertise as

individuals formed informal collaborations to share and apply valuable implementation expertise from one setting to another. In Ontario, the HISBAT team established cross-organizational communities of practice by promoting networking among organizations, regions, and vendor-specific communities that might not have been aware of each other otherwise. This strategy of fostering collaboration allowed hospitals throughout the province to tap into and exchange each other's resources and initiatives. Examples of coordinated knowledge sharing activities were seen in the English context as partnerships were formed between participating sites. These included formal activities coordinated centrally and informal activities coordinated by sites themselves.

Although communities of practice are difficult to plan centrally, the programs we have studied have demonstrated that supportive contexts can be created to facilitate these developments. These included the provision of incentives, coordinated knowledge sharing activities, and the orchestration of interdisciplinary networks. The notion of exemplars in the Australian and English examples promoted a degree of competition that was not evident in the establishment of communities of practice in the Canadian example. This was due to a focus on differences in digital maturity in the former (vertical learning), and the horizontal distribution of knowledge amongst peers in the latter.(21)

Commonalities in geographical and cultural contexts

We also discovered that scope for shared learning and leveraging procurement economies were drivers for concerted adoption. For example, in Ontario provincial governments funded centralized software procurement mechanisms, and in England adopters of the same software managed to get better deals with suppliers.

Shared learning depends upon achieving a trusted community of providers who share information freely and can be facilitated by central governance and funding. It is more likely to take place if settings have commonalities in geographical and cultural contexts as these can facilitate knowledge exchange. For instance, the English experience illustrated that networking and knowledge transfer could be promoted in organizations with similar cultures (including practices, values, and organizational routines) and shared patient populations/pathways as these had shared strategic interests.(22)

Similarly, in Queensland, all sites were part of a single jurisdiction, and the main site was already lead in several clinical areas, promoting knowledge transfer across the network. There was also a state-wide Digital Health Journal Club,(23) and a large digital health research program generating peer reviewed evidence to assist with best practice. Examples include a “checklist” for successful EHR implementation,(24) the use of EHR data for quality and safety,(25) ways to manage digital disruption, and the mortality outcomes associated with EHR implementations.(26,27) This academically led, and scientifically grounded method facilitated clinical engagement and confidence through sharing authoritative knowledge.

Commonalities in technology and adoption practices

Shared learning could also be promoted through adopting common technologies. The English experience showed that the wholesale transfer of a package of technological elements between different settings, proposed by some strategic decision-makers, was neither achievable nor effective.(28) However, some implementing sites with common technological platforms successfully transferred code or system configuration knowledge for implementing specific functionalities.(28,22) Here, transfer of technological elements reduced costs of coordination and implementation, and increased the mutual benefits of sharing.

Queensland deployed a single code base across 17 hospitals, facilitated by a centralized program enabling local teams to lead the implementation.(29) Minimal modification of code was possible at each site, and state-wide governance committees formed to govern upgrades and optimization. This single instance was effective and allowed care coordination for consumers over a large geographical area (>1700km). Although it did disrupt, and force standardization of local workflows perceptions of impact were mostly positive.(30,31) Settings were paper-based before implementation and this may have provided opportunities arising from not having prior installed base of electronic systems.(32)

In Ontario, provincial governments funded the development of Provincial Reference Models (PRMs) that standardized clinical content from existing digitally mature hospitals into a single foundational build for selected vendor products.(33) Consensus was achieved through government funding of third-party facilitation and stakeholder travel to consensus meetings, the promise of cost benefits to new and existing hospitals on a given vendor footprint, as well as enforcement of PRM's as a mandatory initiative. The PRM's were used as an Ontario-specific "best practice" starting templates for implementation of each vendor product in new hospital implementations (rather than using United States-centric templates provided by the vendor).

However, we also observed that effective transfer of technological components depended on existing health information infrastructures, cultures, and organizational structures. These could in some instances inhibit shared learning. For example, the English experience showed that in some instances, there was a perceived competition between hospitals, and a fear that adopting shared system might invite mergers/takeovers.(16) Similarly, in Ontario, hospitals were reluctant to share ownership and maintenance of clinical systems with one another due to: (1) each organization having its own independent leadership team and board (rather than a regionalized or provincial model); (2) fear that clinicians would not be able to agree on clinical system content and workflows across organizations, potentially increasing implementation costs and decreasing adoption; (3) existing footprint of legacy clinical systems that were expensive to "rip and replace"; and (4) challenges with inter-organizational contracts and data-sharing agreements.(34)

In addition, prior investment in legacy systems may, paradoxically, act as a barrier to large-scale new technology implementation. For example, sites in Queensland had, prior to implementation, mainly paper-based systems and could readily adopt a new technological infrastructure. In contrast, programs in Ontario and England were characterized by an extended history of prior technology investments. The consequent patchwork of legacy systems (and the value of historic data held in these, high switching costs, and concerns to protect the value of sunk investments) constituted a barrier to the adoption of common platforms.

Conclusion

Digital transformation of health and care is disruptive and in the immediate term may pose additional tasks or change to well-established for front-line clinical staff who are not the immediate beneficiaries. A clear vision is therefore needed to demonstrate clinical and service delivery benefits.

Concerted adoption is a coordinated approach to implement EHRs, which can be promoted through accelerating knowledge transfer and professional development, capitalizing on commonalities in geographical and cultural contexts, and exploiting commonalities in technology and adoption practices. As far as we are aware, we are amongst the first authors to apply the concept to EHR adoption.

We have outlined some significant examples of successful concerted adoption in regional programs for major upgrades in digital infrastructures. Although programs were strongly shaped by their historical (institutional, professional, and technological) context, we have illustrated how strategies for promoting concerted adoption of EHRs can promote knowledge transfer and shared learning to deliver more efficient and effective digital transformation.

Although some lessons may be applicable to low- and middle-income countries, the transferability of the operationalization of concerted adoption outlined here is likely to be most applicable in high income countries.

Relatively frequent changes in administration and shifting priorities of strategic decision-makers have impeded wider recognition and uptake of these successes. Ongoing national strategies now need to carry forward these factors and there is a need to develop more nuanced insights through detailed evaluations of large-scale initiatives.

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Conflict of interests: KC, RW and HM led the GDE evaluation. CS led the Australian programme and JT the Canadian programme.

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