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National electronic health records implementation: a tale with a happy ending?

Aiming to improve healthcare efficiency and quality, countries around the globe, including Singapore, the UK, Japan and the US, are implementing nationwide electronic health records (EHRs). Recent studies suggest that when EHRs are shared across different healthcare providers they can facilitate better care and with the use of aggregated data analytics improve healthcare management and research. However, their implementations face myriad challenges, not least diverse stakeholders with often conflicting interests. This prompted us to examine stakeholder interactions and the pressures they exerted in two contrasting national EHR implementations – a successful one in Singapore and a failed one in England. Both examples provide useful insights for policymakers and practitioners.

In Singapore, EHR was successfully adopted across 280 healthcare institutions and 14,000 clinicians. In England, the National Programme for IT resulted in limited adoption of EHR in secondary care. On comparison, Singapore and England exhibited both similarities and differences in their healthcare structures, systems, and EHR initiatives. In both countries, coordinating public agencies responsible for healthcare assets and national EHR programmes were enforcing a "top-down" implementation strategy. In both, most secondary healthcare was provided by public hospitals who were key stakeholders in EHR implementation.

To apply the "top-down" implementation strategy, coercive pressures were exercised from national healthcare administrators on agencies responsible for the delivery of EHRs. In turn, these agencies exerted pressures on commercial IT providers and healthcare provider organisations. The pressures were both "soft" e.g., financial incentives for early EHR adopter sites, free systems for all public providers, and "hard," e.g., legislation. This gave rise to bottom-up pressures by healthcare professionals on healthcare integrators and commercial IT providers. However, the bottom-up pressures varied in type and strength, and the way stakeholders interacted differed in the two countries. Ultimately, the pressures shaped the results of the two EHR implementation efforts in different ways.

Three factors that led to more positive stakeholder interactions in Singapore than in England

1. *Positive role of boundary spanners (CMIOs)*. Key mitigators of stakeholder conflicts in Singapore were the chief medical information officers (CMIOs) of hospitals, who were senior doctors familiar with IT. Working closely with other doctors in their organisations, as well as being convinced of EHR's value, they were able to bridge communication gaps between the coordinating agency for EHR implementation and users, e.g., doctors and nurses. Their inputs helped to define the implementation and make EHRs clinically relevant. In England, clinical leads co-opted to bridge the interests of healthcare coordinating agencies, clinicians, and private IT providers, either became disillusioned with the initiative and the nature of clinical engagement or were unable to bring others to support the EHR implementation. Although the majority of healthcare

professionals viewed the idea of EHR positively, they considered its particular manifestation as detrimental to day-to-day patient care. Further, the bureaucratic stance of coordinating agencies was seen as obstructing the implementation and adoption of EHRs.

2. *Greater engagement with medical professionals*. In Singapore, doctors representing different clinical interest groups were engaged early on during the initial planning phase and continued to be engaged throughout the subsequent phases of EHR implementation. The national EHR became a system "for clinicians by clinicians". The agency supporting implementation included IT staff from healthcare organisations and this helped with incorporating clinical needs and feedback into the system design in a timely manner. In contrast, in England, although clinicians were seconded to the national implementing agency, these appointments came after key IT procurement decisions were made. Subsequent efforts to engage clinicians did not alleviate their belief they were not "involved" in setting the direction for EHR implementation. Clinical engagement, and more broadly user engagement was problematic, at least partly due to contractual arrangements, complex supply chains, and highly formalised communication channels between hospitals, local service providers, software suppliers, and coordinating agencies.

3. *Less passive and active resistance*. Unlike in Singapore, coercive pressures from government agencies often failed in England, counteracted by opposition from professional bodies e.g., British Medical Association and Royal Colleges, patient groups, and healthcare staff. Media turned public opinion against the EHR implementation, giving a platform to dissatisfied voices. IT providers struggled to deliver EHRs. Punitive contracts made relationships between IT providers and government agencies difficult and hence were detrimental to the implementation effort. Two out four main IT providers left the programme. As early EHR adopters struggled, other healthcare providers followed a "wait and see" approach. Thus, unlike in Singapore, where early adopters played a positive role in convincing others, in England they negatively influenced the adoption of EHR.

Contextual differences that matter

Singapore is much smaller than England and its healthcare system is characterised by a flatter hierarchy, smaller number of public health organisations, and relatively few legacy IT systems. Key to its relative success in implementing EHR were a centralised public agency responsible for managing healthcare resources and the implementation support agency working with private IT providers. In contrast, England's healthcare system was characterised by heterogeneous and powerful stakeholders, i.e., healthcare professionals and their representative bodies, semi-autonomous organisations with significant variations in practices, and many different legacy systems. These presented challenging conditions for EHR implementation.

Although both countries employed top-down approach to EHR implementation, there were significant differences. In England, "ruthless standardisation" through "rip and replace" was promoted. There was a mismatch between the trend towards decentralisation of healthcare structures and the top-down nature of national EHR implementation. In Singapore, existing IT systems were allowed to co-exist with the national EHR, which was designed to "ride on top of them". Also, the healthcare structure was more suited to a top-down strategy.

England is now embarking on a less centralised, regional approach to EHR implementation, having learned from past mistakes. Our study provides important insights on how national EHR implementations can be carried out effectively.

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Notes:

- *This blog post draws on the authors' article, [The dynamics of institutional pressures and stakeholder behavior in national electronic health record implementations: a tale of two countries](), with Yap Hwee Wee, in the Journal of Information Technology.*
- *The post expresses the views of its authors, not the position of LSE Business Review or the London School of Economics.*
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