Envisioning Electronic Health Record Systems as Change Management: The Experience of an English Hospital Joining the National Programme for Information Technology

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Abstract. The historical National Programme for Information Technology (NPfIT) in England was the most expensive (~$20billion) and ambitious politically-driven IT-based transformations of public services ever undertaken. Nation-wide implementation of integrated electronic health record (EHR) systems in hospitals was at the heart of the NPfIT (~$10billion). We conducted the first longitudinal, prospective, and sociotechnical case study-based evaluations of the implementation and adoption of national EHRs implementations in 12 'early adopter' hospitals across England. This paper reports the arrival, implementation process, and stakeholders' experiences of one EHR software (Millennium) at a National Health Service's (NHS) general hospital participating in NPfIT, hereafter called Alpha. From the outset, Alpha envisioned the implementation of EHR as a practice of change management to improve its performance. This vision attributed to the establishment of a 'design authority' at Alpha, including users from various capacities and levels. The 'design authority' was perceived a key contributor to appropriate (compared to other hospitals we studied) clinical engagement and bottom-up approach to deploying EHR. Through conducting several hundreds of group and individual workflow familiarization, Alpha adopted a novel approach to training staff on EHR software. This led to greater local configuration and high sense of ownership among users, which transformed work practices towards overall better performance of the hospital. Contrary to painful and turbulent experiences of EHR implementation via NPfIT route in the English hospitals, this in-depth case study revealed the importance of vision (change management) and insightful leadership in 'working out' EHR. We advocate envisioning EHRs as change management endeavors to enhance their complex, multi-dimensional, and sociotechnical adoption in healthcare settings.

Keywords: electronic health records (EHR), NPfIT, change management, leadership, 'working out'

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Introduction

There is growing global interest in the potential of electronic health record (EHR) systems for modernizing healthcare and improving its quality, safety and efficiency [1-3]. Such initiatives are increasingly being undertaken on a system-wide or national scale [4], presenting new challenges both for the delivery of EHRs and for their evaluation [5-7]. We refer to EHR as a digital longitudinal record of a citizen's health and healthcare interventions that can be potentially accessed by healthcare providers across a range of healthcare settings [1, 8].

The English National Programme for IT (NPfIT) was the most ambitious and expensive civilian IT project ever undertaken [9-13]. Launched in 2002 [11-12], and dismantled in 2011 [14], NPfIT was the first sustained attempt to implement EHRs into hospitals throughout England [9, 15]. We undertook a longitudinal, socio-technical [16], and real-time evaluation of EHR implementation in 12 'early adopter' hospitals participating in NPfIT [8, 15]. By narrating an in-depth case study of the implementation of Millennium software at one English hospital, called Alpha, this paper highlights the importance of change management in 'working out' Electronic Health Record systems.

1. Methods

Alpha was chosen following a purposive sampling. A broad range of longitudinal data was collected from Alpha (December 2009-December 2010). The hospital was conceptualized as an independent case study to reflect the importance of local contingencies, whilst making general inferences transferable to other contexts [17].

Using interview guides, 36 semi-structured interviews were conducted with a diverse range of stakeholders: 8 manager; 10 members of the implementation team & IT; 11 healthcare practitioners; 4 representatives of NPfIT; and 1 software developer. All interviews were audio-recorded and transcribed verbatim. Interviews were complemented by 22 hours of observation and 124 documentary data of various types.

Data analysis was an iterative process, using a combination of deductive and inductive approaches [18]. An adopted sociotechnical framework was used for data classification [16]. We understood the implementation of EHR as a balance between delivery of the technology by NPfIT, and the hospital's role of integrating this into its operations (adoption). We also used the notion of "working-out" to signify a dynamic process of change over time that involved the ensemble of people, existing and emerging workflows, individuals and organizational beliefs and expectations [19].

2. Results

Alpha is a medium-size general district hospital in London-England. It has 500 beds, over 2500 staff and serves about 320,000 people. Alpha went live with the Millennium software in late 2009. Millennium is an established, large-scale 'Off-The-Shelf' software, mainly developed in America by Cerner Corporation (www.cerner.com).

2.1. The Problem: Provision of Patient-Focused Care

Similar to other NHS hospitals, Alpha was legally obliged to obtain 'Foundation Hospital'[2] status by 2014 and had to be fully compliant with components of 'Clinical Five'[3]. Integrated EHRs were identified as key means to achieve these goals at Alpha, and to make it a 'patient-focused' organization. Therefore, Alpha seized the opportunity of NPfIT (with virtually free centrally-procured EHR software and implementation support), to transform clinical behaviors and improve work practices:

"*EHR is not about the IT. It is more about the management of change and understanding enough about the operational processes*" [Manager].

2.2. The Solution: Implementing Integrated EHR as a Change Management Process

Most interviewees at Alpha considered EHR as a change management process that "*is 20% system and 80% user change issues*" [IT Manager].

"*I don't think we are deploying Millennium here, we are reviewing and improving our services. In the background IT will help ensure that*" [IT Manager].

Implementation of EHR was not a one-off project for Alpha, therefore no project manager was appointed. Instead, the Chief Executive Officer (CEO) divided the operational directorate of EHR implementation among the team members and made everyone jointly responsible in delivering change. As described below, such transformation had positive effects on the strategy and consequences of implementation.

2.3. Unfolding Change Management: The Implementation Strategy

Alpha envisioned EHR as a means of achieving other desired endpoints and as "*a vehicle for improving the hospital performance*" [Senior Manager]. A new CEO with prior experience of implementing EHR was appointed, and a number of software configurations to the standard Millennium software were undertaken to accommodate Alpha's specific requirements:

"*Alpha has had the most changes to the Millennium functionality of any hospital. They have strongly influenced how the product now looks*" [NPfIT1].

Alpha approached the implementation of EHR through preventive lenses and planned to prepare as much as possible prior to facing problems:

"*We brought all in advance and had our procedures and policies tied down before we went live and we used those to inform our much higher level training*" [Manager].

The hospital did not overestimate its internal resources and outsourced several hardware and software prerequisites of Millennium implementation. Alpha did not anticipate any immediate benefit from EHR and managed the process realistically:

"*I wanted to lower the expectations. Three months after deployment, my only expectation was to be back to where we were before*" [Senior Manager].

This was a deliberate decision "*trying to message to the organization that they shouldn't be expecting everything would be working really well*" [Manager].

Alpha delegated some staff to visit other hospitals that had previously implemented Millennium. This "*showed us the potential and the possibilities of the*

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[2] Greater autonomy and freedoms for NHS hospitals within a national framework of standards [DH 2005].

[3] Five key system requirements for hospitals to meet the information needs of clinicians, and to "create a 'tipping point' in the acceptability and demand for strategic IT systems [DH 2008].

system" [Nurse] by "*seeing the actual Millennium product in actual working life as it was*" [Nurse]. The hospital established a 'Design Authority' consisting of users:

  "*I didn't make the decision, the 'Design Authority' made it. This is change management: empowering people to make their own decisions*" [IT manager]. Instead of classroom generic training, Alpha conducted 700 workflow familiarization sessions.

2.4. Improving Work Practices, Realizing Early Benefits

Alpha experienced a relatively smooth implementation process: "*I won't say that we went through it without some issues, but I'd say, yes, we've been successful*" [Nurse]. In addition, hospital managers realized some early benefits from EHR: "*The very tangible thing for me is that I can go on there myself and see what my guys are up to and that's a benefit. That's quite valuable*" [Senior manager].

  Four early benefits were realized as a result of Millennium implementation: online order communication; the ability to real-time patients' follow up; improving patients' workflows; and the ability to book outpatient clinics and send discharge summaries to general practitioners electronically. These benefits gave Alpha "*the ability to look at data that we couldn't look at previously. There will be increased rigor*" [IT manager].

3. Discussion

This case study offers some potentially transferable lessons for international EHRs implementations. First, it highlights the importance of experienced and insightful leadership for envisioning EHR as a means to improve hospital performance and transform work practices. We therefore advocate that the basis to choose EHR systems should lie in assessing their potential for improving clinical care processes, not on achieving cost-savings. Second, visions of EHR are crucial indicators of the later consequences of the implementation of EHR systems. Third, past experience of the managerial team with implementation of the same EHR software is necessary to direct implementation through the change management path. This may facilitate sharing lessons across healthcare organizations. Fourth, approaching the implementation through preventive lenses, and engaging with various stakeholders are essential to overcome challenges. The establishment of a 'Design Authority' was a bottom-up engagement that resulted in a tailored training environment, and a strong sense of ownership among users. Finally, all of the above need to be coupled with a realization that the main benefits of EHRs are likely to accrue in the longer term, and health informatics policies need to reflect the dynamic environment in which they take place.

4. Conclusions

This paper underpins the importance of envisioning EHR systems as long-term change management endeavours. Expanding this vision may scale-up 'working out' EHR in healthcare settings internationally. The NPfIT has been dismantled now. As healthcare organizations around the world increasingly engage with EHR systems or other health ITs, and work hard to make them work, the real long-term benefit of NPfIT-mediated EHR may emerge, and the lessons learned form historical NPfIT will become clearer.

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