Electronic patient records and nurses' work: Rhetoric and reality

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Abstract

The UK National Health Service (NHS) has been at the centre of a long-term effort by successive governments to modernise public services and create information-led, cost efficient institutions via the introduction of information and communication technologies (ICTs). One such initiative is Electronic Patient Records (EPR), which forms a major arm of the British government's National Programme for Information Technology (NPfIT) aiming to connect doctors, nurses and health care professionals countrywide. The core ideology of NPfIT is based on the view that ICTs are means of providing better information to clinicians which in turn will enable them to provide better healthcare to patients. Connecting for Health, the coordinating agency for NPfIT, suggests that the programme will not only drive modernisation of the NHS but also support the NHS infrastructure by promoting knowledge management and technology-assisted decision making by clinicians, as well as providing training and development for all NHS staff.

Our research investigated the extent to which the premised potential has been realised. To that end, it examined the ways in which nurses enacted an EPR system in a London teaching hospital and the benefits they perceived in the three years since full rollout of the system. Our findings show that while nurses commented positively about the potential of EPR, and claimed to use it in support of their daily work practices, the reality was rather different. Furthermore, hospital managers tacitly challenged the deterministic logic of NPfIT since they made little effort to ensure that nurses used EPR for anything other than the most basic functions. We provide some explanations of these mismatches between rhetoric and reality using concepts from the social study of information technology, which examine ICTs and organizations in terms of individual actors' behaviour embedded in social context, that is, enabled or constrained by institutionalised modes of practice.

Keywords: Electronic patient records, social shaping of technology, public sector modernisation, National Programme for Information Technology.

1 INTRODUCTION

For about quarter of a century, successive UK governments have been attempting to modernise the National Health Service (NHS) as part of an extensive programme of public sector reform aiming to create an efficient, "consumer-led" model of healthcare provision supported by the use of information and communication technologies (ICTs). As part of this programme, the government has introduced the use of electronic patient records (EPR), which are general practice records containing medical information on individuals. In the wake of government plans to computerise the NHS, a plethora of research projects has arisen. Some work has focused on largely technical aspects, such as capturing and networking information for clinical purposes (Louw 1995), whilst other research has addressed the social-technical issues concerning information systems (IS) within healthcare. Studies that have focused on the use of IS amongst clinicians have explored issues such as resistance to clinical IS, usability, and system design concerns.

Despite the useful contribution of these studies, only a small minority address the use of EPR within the NHS, specifically focusing on the nursing population. It is necessary to investigate how nurses use EPR in order to promote an understanding of the extent to which such systems support (or not) existing working practices. To this end, our research examines the use of EPR by nurses at a London teaching hospital (referred to by the acronym LTH). Our aim is to evaluate the extent to which EPR is contributing to the government's vision of the NHS as an information-led, cost efficient institution of modern health care provision.

The remainder of this paper is organised as follows. In the next section we review relevant literature on the use of information systems in healthcare, focusing on the issues surrounding EPR. Then we introduce the theoretical perspective that informs our analysis. In the following sections we provide details of the research setting and describe our research methodology. Then, we present an analysis of the case examining the rhetoric surrounding EPR and how implementation of the system plays out in practice. Finally, we draw conclusions from the study and identify further research directions.

2 INFORMATION SYSTEMS IN HEALTHCARE

2.1 National programme for IT in the NHS

The UK NHS is at the centre of government efforts to modernise public services mediated by the use of ICTs. In 1998 the Department of Health produced a report entitled "*Information for Health",* highlighting that the NHS would undergo extensive reform to introduce electronic health records for every individual within the UK. The Department of Health has since commissioned the agency Connecting for Health (CfH), whose primary role is to deliver and integrate various information systems to achieve the desired modernisation of the NHS via the National Programme for Information Technology (NPfIT). NPfIT aims to connect over 100,000 doctors, 380,000 nurses and 50,000 health care professionals (Connecting for Health 2006a).

The core ideology of NPfIT is that ICTs are a means of providing better information to clinicians which will enable them to provide better healthcare for patients. The programme is seen not just as a strategy to drive modernisation of the NHS, but also a

means to support the overall NHS infrastructure by promoting knowledge management and supported decision making for clinicians as well as providing training and development for all NHS staff (ibid.). Official sources claim that key lessons have been learnt from prior IS implementations within the NHS which will pave the way for NPfIT. Such lessons include not underestimating the gap that exists between IT skills and confidence, giving a high priority to the registration of users for the implementation of ICTs, and finally, providing a clear message to the entire stakeholder community of the benefits and impacts of introducing information systems (Connecting for Health 2006a). Despite these claims, the National Audit Office (NAO) has highlighted how CfH has concentrated its efforts on the procurement of activities rather than communicating with NHS staff about the NPfIT strategy. The NAO has emphasised the need for CfH to communicate with NHS staff in order to win their support and engage them, so that they will make better use of the systems that will be in place (National Audit Office 2006).

2.2 Clinicians and Information Systems

The past few years have seen a sharp increase in the usage of information systems within healthcare. Clinicians have been persuaded to use these systems with promises of improved data accuracy within patient records and a reduction in paperwork which would provide more time for patient care. Some studies within the IS field (Darr et al. 2003; Likourezos et al. 2004) report these promises being fulfilled and growing enthusiasm for the systems among clinicians. However, other work highlights a number of enduring issues affecting the use of information systems within healthcare.

For example, some clinicians find clinical information systems both time consuming and difficult to use (Darbyshire 2004; Timmons 2003; Wainwright and Waring 2006). A study by Timmons (2003) addresses how such difficulties led to resistance among nurses towards the creation and maintenance of electronic care plans. Rather than supporting their existing practices, the system hindered nurses' work with the result that many staff resorted to handwritten care plans. A similar phenomenon was highlighted by Wilson and Howcroft (2000), who claim that nurses found that the system in place was of no assistance to them in caring for patients and, in some cases, had a negative impact on the time they spent giving "hands-on patient care" (pp.99).

A further issue relates to the perception of clinical information systems as managerial tools which are of little or no value to the end users of the system (Darbyshire 2004; Myers and Young 1997). In this view, the managerial and administrative focus of the systems is of minimal use in meeting the information needs of nurses. Moreover, current clinical IS fail to facilitate the less tangible aspects of nursing work practices carried out by clinical staff (Darbyshire 2004). Indeed, Goosen et al. (1997) argue that information systems can have a negative impact on professional identity, with some nurses feeling controlled by the computer and unable to deliver personalised patient care. Many nurses fear that this will result in the loss of their personal skills.

Past studies which have examined the relationship between clinicians and clinical IS have shown that 'systems failure' can result from the tendency of some information systems to offer a standard rationalised view of existing work practices (Martin et al. 2005). Indeed, research suggests that the view of patient care inscribed in some clinical IS is in direct opposition to the nursing view of patient care which is focused on delivering "unique and holistic care to the individual" (Goosen et al. 1997, pp.86). The

implications of such conflicts are that health professionals are likely to develop a negative disposition towards such systems (Darr et al. 2003).

2.3 Electronic Patient Records (EPR)

EPR have been described as general practice records containing data on an individual with a list of entries about the individual's medical health (Hassey et al. 2001). The rhetoric surrounding EPR sets out a range of benefits, including increased accessibility of patient records and a clear and readable format which helps to tackle the problems associated with the legibility of clinicians' handwriting. The CfH literature suggests that current EPR systems provide a range of basic functionality, such as enabling clinicians to place orders for tests and medication, while facilitating communication between the pharmacy and multidisciplinary departments. Case studies of Salford Royal Hospital's use of EPR have shown the positive changes that EPR have contributed to the way that clinicians work (Connecting for Health 2006b).

Nevertheless, some studies have demonstrated the limitations of EPR systems. Goorman and Berg (2000) discuss the mismatch between EPR and the actual work practices of doctors and nurses. They argue that some EPR applications are rigid in their infrastructure and accept data entry in a predetermined way, having a "standard rationalist and non empirical view of healthcare work" (Goorman and Berg 2000, pp.5). Similar points are made by Walsh (2004), who goes on to argue that whilst there are obvious benefits associated with the use of EPR, a paperless environment is not necessarily better. He contends that reading from a computer screen is up to 40% slower than reading from printed text and concludes that it is important that clinicians have the choice to use either paper or electronic records.

Opinions differ about whether the complex informational requirements of modern healthcare are well served by information systems such as EPR. Our review of the issues suggests that many of the problems can be attributed to a mismatch between what clinicians do and the standard rationalised view of healthcare that EPR systems support. Hartswood et al. (2003) claim that this mismatch is due to a lack of understanding of clinician work practices and that such systems are based on unrealistic assumptions. One stream of research suggests that the way to alleviate such problems is for the end users to be involved in the development of the system (Darbyshire 2004; Darr et al. 2003; Walsh 2004; Whitley and Pouloudi 2001). Such work affirms the view that the involvement of clinicians in the development of systems may be vital in providing a realistic view of the work processes that clinical IS need to support. Indeed, Whitley (1999) argues that using participatory design methods is a common way of institutionalising an information system within an organisation and encouraging acceptance of the system amongst its users. On the other hand, one may question the extent to which clinicians judge that such systems can support their working practices. To that end, we explore the rhetoric and reality of EPR and nurses' work. We contend that such an investigation is vital to developing a more detailed understanding of the extent to which the use of EPR has both supported and constrained existing working practices for nurses. Actor-Network Theory (ANT) is used a theoretical approach to examine the complexities surrounding social-technical change within organisations. Some key concepts from this approach are outlined in the following section.

3 THEORETICAL APPROACH

ANT has its roots in the academic fields of science, technology and society and has been credited with inspiring a "large number of empirical studies which have illuminated the goals, values, meanings, histories and social interests related to technology" (Heiskanen 2004, pp.15). A distinguishing feature is its concept of an "actor-network" comprising heterogeneous entities of humans and artefacts in which the technical and the social are seen as inseparable. An ANT approach enables researchers to trace the processes through which stable networks are formed and maintained, leading to the alignment of diverse interests amongst actors. This approach is also useful for understanding why such alignment fails to occur and hence why some attempted alliances fail to achieve desired outcomes.

The concepts which inform our analysis are drawn from the "sociology of translation" (Callon 1986). We are particularly interested in the role of discourse in accomplishing the desired translation, that is, the process through which actors interrelate to build or change networks. We focus on four moments during which key actors identify and explore a problem to which a number of solutions are possible. These key actors attempt to persuade other actors in the network that the problem is significant enough to merit their attention. This usually involves negotiation about alternative scenarios, during which several actors present their favoured solutions to the problem and attempt to enrol allies. Finally, resources need to be mobilised to ensure sustained support for the new network. These four moments are problematization, interessement, enrolment and mobilisation.

Language has a crucial role to play at each stage of the translation process. During problematization key actors attempt to design the proposed solution and promote it in such a way that other actors are convinced that it is in their best interests to accept it. In effect, they need to be persuaded to define their own identity and the problem at hand in terms of the solution that has been proposed (Whitley 1999). In the case of IS projects, a number of rhetorical claims are generally made about the benefits that will accrue from adopting the proposed innovation.

During interessement the key actors attempt to bind other actors in the network to roles and responsibilities defined for them as part of the proposed solution. A successful interessement process will cut off other options for the actors involved, enrolling them into accepting the solution defined by the problematization. However, interessement will fail if the actors resist the new identities, defining the problem and themselves in a different way (Whitley 1999). Enrolment entails the negotiation and consolidation of alliances and the allocation of roles to actors who accept them. Some actors are enrolled via persuasion, some by transaction and others without discussion (Callon 1986).

Finally, mobilisation involves moving beyond discussion and negotiation to the point where actors begin to engage according to their specified roles. Successful mobilisation results in the allocation of resources to form a constraining network of relationships capable of supporting the new network. However, actors may fail to engage as intended, and even within a mobilised network, relations can be contested at any time. The four moments of translation are useful for understanding the rhetoric and reality of attempts to introduce a new information system. They shed light on how such agendas are communicated and translated, and the persuasive devices that are used to encourage a certain disposition or behaviour towards a proposed innovation.

4 IMPLEMENTATION OF EPR: THE LTH CASE

LTH is a large teaching hospital based in London with over 5000 staff, of which over 2000 are nursing and midwifery staff serving a local population of approximately 700,000. Following commission in September 1997 for 35 workstations, LTH went live with the pilot implementation of their EPR system in January 1999. The pilot implementation team comprised 4 clinical analysts (drawn equally from LTH and the vendor) and 4 integration engineers (3 from the vendor). The clinical analyst role is a relatively new one in the NHS, requiring clinical, IT and associated relationship management skills. The EPR pilot took place within the cardiac care group (on 3 wards and 2 outpatient clinics), which were reported as responding quite positively to it. The major perceived benefits were: greater accessibility to information, quicker ability to request tests, and greater legibility of information (LTH Systems Manager 2006). A key implementation issue was the need to ensure that documented policies and procedures were followed, and that policy statements were kept 'up to date'. For example, nurses were used to requesting tests, although the stated policy was that only doctors could do this. Given the urgency for certain tests and the nurses' greater experience compared to junior doctors, the policy was changed, mainly driven by the EPR implementation.

Following the positive response of the cardiac care group to the pilot EPR, the full rollout was scheduled for 1999 (on an area by area basis, due to licensing and financial constraints). However, the need for system upgrades and Y2K re-testing meant that implementation was delayed until the following year. During 2000, the system successfully went live in Haematology, and Medical and Surgical outpatients. In December 2000, LTH made a strategic decision to take over responsibility from the vendor for completing the rollout and supporting the EPR. This was primarily a money saving decision, and consequently the vendor contract was not renewed after March 2001. By July 2002, LTH had completed the rollout of the results review and order communications parts of its EPR system across all wards and outpatient clinical areas. Further, by March 2003, LTH had grown its in-house team to 5 clinical analysts (1 as team leader), 4 integration engineers and an interface project manager. Development of the EPR continued, so that by March 2005 LTH could claim to have reached the nationally defined goals for EPR systems (Burns 1998).

5 RESEARCH METHODOLOGY

This study was conducted during Spring and Summer 2006 at a large London NHS trust hospital, referenced by the acronym LTH. After a preliminary meeting with the assistant director of nursing and education in April 2006, the first author was invited to make a formal application to conduct the study via the trust's internal research and development committee and the Central Office for Research Ethics Committee (COREC). Once approval was granted, empirical work began on two distinct wards within the hospital. Ward A was an elective ward with patients from the NHS waiting list who were attending the hospital for planned, non-emergency operations. This ward had strict procedures for infection control and all patients were screened for Methicillin-Resistant Staphylococcus Aureus (MRSA) before admission to the ward. Ward B was an acute medical ward caring for patients with any medical condition. Being a medical ward, ward B was not as concerned with infection control as ward A and did not screen patients for MRSA.

During the course of the study, the researcher interviewed the managers of wards A and B, twelve nursing staff, a clinical analyst, the ICT training manager, the IT director, and the director of nursing and operations. A semi-structured interview approach was used to establish the rhetoric about usage of the EPR system and any changes it had made to the daily work practices of nurses on the wards. Several observation sessions also took place. During these times, the researcher used a desk beside the main work station of the EPR system and observed the usage of EPR amongst nurses. She noted how the system was used and what it was used for, but did not participate in any ward based activities. These sessions presented an opportunity to observe nurses within their natural working environment to ascertain if there were any discrepancies between what nurses said about their use of EPR and what occurred in practice. The researcher also had numerous informal discussions with other employees within the trust which have contributed to the overall findings of this research. Further background data were available from the trust web site and various internal documents.

Thematic analysis (Boyatzis 1998) was used to analyse the data. For the purpose of this research, a largely deductive approach was adopted (Denzin and Lincoln 1998). Since we were interested in how the EPR system shaped and was shaped by the working practices of nurses, we drew on the literature to highlight themes relating to the nature of work, perceived changes following the introduction of EPR, and notions of rhetoric and representation drawn from ANT. Our analysis of the implementation of EPR at LTH is presented in the next section.

6 ANALYSIS

6.1 Problematization at LTH

There has been a nationwide attempt to problematize the state of affairs within the NHS as a prelude to the implementation of various information systems. The Audit Commission estimated that approximately 1,000 deaths take place each year as a result of medical errors. Its report states that these errors are the outcome of clinicians not having the necessary patient information at the point of care and that 75% of these lives could have been saved by the use of modern computerised systems (Audit Commission 2001). Furthermore, commentary on the CfH website suggests that clinicians spend unnecessary amounts of time finding, recording, and communicating information on paper, with nurses spending over two and a half hours per day keeping manual records (Protti 2006).

Statistical findings from the Audit Commission and CfH contribute to the government's case for problematizing the existing work processes within the NHS, creating a sense of desperation regarding the need for modern information systems. This problematization has paved the way for the introduction of EPR as one of several information systems mandated for NHS trusts within the national programme.

At a local level the problematization at LTH was driven by a small group, including the director of nursing and operations, the IT director and particular pharmacists, clinicians, doctors, nurses and management representatives who helped to define the requirements for EPR. In addition to the national priorities, LTH has some local issues:

> *The key challenge that the introduction of EPR aimed to solve was the availability if information. Although we had a pathology system for people*

to access on the wards, it wasn't that easy for people to access it and I think there were issues about some of the processes we were following and whether they were effective or not and efficient enough or not. (IT director)

In addition to the accessibility issues surrounding LTH's pathology system, nurses had to engage in tedious form filling and bureaucratic procedures when ordering tests for patients. Such processes led some nurses to carry out illegal activities, resulting in some policy changes with the introduction of EPR:

...It [EPR] also formalised a lot of the practices which people knew were out there, but people said "oh nurses never ordered tests" for example, but they do! Sometimes they used to forge the doctor's signature and all sorts of stories like that. But bringing in the system [EPR] did actually formalise a lot of things that nurses were doing anyway.

Further issues, identified by the director of nursing and operations, related to paper based records and the problems associated with keeping such records up to date. In short, the problematization at LTH was driven by national priorities concerning the availability of information and the perceived time consuming nature of some existing work practices, but it challenged local mechanisms and processes with differential outcomes.

6.1.1 New Roles and Responsibilities

The EPR system was intended to enable the ordering and retrieval of patient tests, and allow staff to make multidisciplinary referrals to other wards. Nurses were no longer required to fill in order forms and wait for doctors to sanction tests. Rather, they were expected to use EPR to order tests themselves – a change in both responsibilities and required skill sets. Ward managers found that a high value was now placed on the use of computers for conducting their daily work practices, with an added emphasis on the use of a number of different systems – including EPR – as management tools.

Numerous members of the nursing staff gave the impression that the IT director and other members of the management team had been successful in persuading them of their new roles and responsibilities. For example:

I think it [EPR] is becoming more a part of the job role.

Things were more time consuming before IT came along, e.g. like getting results.

With EPR, information can't go missing. If we didn't have EPR, where do you store all the notes? It's about getting in line with the 21st century. EPR makes things easier and helps the overall IT strategy.

When I was a junior nurse, stuff was done manually. I don't think my boss did very much on the computer and that was about 3 years ago, but now there has been a change in the job role of a ward manager.

These statements suggest that nurses and ward managers accepted not just the new roles and responsibilities but also the problematization of previous working practices. However,

during observation sessions on both wards it became clear that there was a marked disparity between rhetoric and reality. When interviewing nurses, the majority claimed that they used EPR in their daily working practices for ordering patient tests, checking the results of tests, printing sample labels, checking a patient's MRSA status and making referrals to multidisciplinary teams. Ward managers claimed that they used EPR for tracking processes, such as the activities of staff members and overseeing patient care. In practice, nurses did not use EPR as much as these claims indicate, as we go on to discuss.

6.2 A Breakdown in the Interessement Process

6.2.1 An Interessement Device

LTH management did not attempt to offer incentives or rewards to nurses for using EPR to support their work practices. Some training was provided, but the extent of these sessions varied among members of staff. A nurse who had been involved in the pilot implementation of EPR on a cardiac ward seemed particularly satisfied with the way the benefits of EPR had been presented to her, but the post-pilot sessions were patchier. The IT director made the most of this earlier success, in the form of an interessement device which he employed during the roll out of EPR:

> *After a little while what happened is that I poached some of the cardiac nurses from the cardiac wards to come and work for me on my team, because they had experienced it [EPR], they were very good at selling it to the other nurses.*

The nurses "poached" were referred to as "clinical analysts". They were persuaded to accept new roles in which they would promote the benefits of EPR to nursing staff and other health care professionals, aligning their interests with the management agenda problematizing existing work practices. This small influential population no longer worked as nursing staff the on wards, although they aimed to be the voice for this body of people. However, recruiting clinical analysts proved difficult, owing to the mix of skills required. Discussions with nursing staff on both wards revealed that the clinical analysts have not yet targeted the areas addressed by our study.

6.2.2 Ignoring and Bypassing EPR

Although the wards concerned were different from each other – Ward A being an elective ward and Ward B a medical ward – it was apparent that the use of EPR was not embedded within the daily work practices in either case. The majority of nurses' work on both wards consisted of tending to patients and manually documenting nurse's notes and patient's medical notes. Indeed, on ward B, both nurses and doctors regularly congregated around the EPR work station to review and manually write up patient notes, while the technology in their midst remained virtually unused. Consequently, there was still a very mixed economy of paper and electronic records on the wards, without the desired integration of patient notes, nurse's notes and individual patient care plans onto the EPR system.

One nurse in particular eschewed the system. She openly refused to accept the problematization of existing work practices and the challenges it presented to her sense of identity as a nurse:

I find it [EPR] very time consuming – I could have just filled in a form. Very often the computer will tell you something is going on when it isn't. When the computer goes down it can be a problem, but I still do things manually.

In my day we were taught basic nursing care e.g. bed washes. A computer can't teach you that. Real hands on nursing, you won't get that from a computer, real hands on nursing is what it's [nursing] about.

Other nurses attempted to find a way around using EPR. They would ask ward clerks to use the system for them – for example, to print off blood sample labels. It later became evident that this course of action was common among nurses across the trust. Ward managers also made limited use of EPR, sometimes delegating their responsibilities to members of their staff. In short, despite nurses listing a variety of functions and activities that could be carried out using EPR, it was clearly unnecessary for them to use the system to support many of their work practices.

Interestingly, the senior management of the trust did not try to coerce the nurses into adopting the use of EPR. The IT director provides some insight into the issues involved:

Nurses are quite powerful on the wards. Next month – August – we have an intake of junior doctors who are a bit wet behind the ears and they don't really know what's going on and they will be advised by the nurses. But getting the nurses keen on the system means they can advise the doctors and tell them, for example if they wanted to look up results, how to do it on the system. Obviously we train the doctors, but if they forget, the nurses can hold their hands and show them how to use the system. The nursing population are a very powerful population.

Clearly, nurses have a powerful and influential status within the trust, not least because of their part in training junior doctors. We will return to this point later on.

6.2.3 A Lack of Engagement

Neither nurses nor ward managers seemed aware of how much involvement there had been of nursing staff in the development of the EPR system at LTH, although most stated that they thought nurses would have had minimal input. In practice, a small group comprising several senior managers and a few nurses defined the requirements for EPR. Clearly though, the nurse members of the team did not consult with staff on all wards nor were they representative of them.

A similar situation was found when discussing NPfIT with nurses. Again, the majority knew nothing of government plans to connect different trusts together with increased sharing of electronic files. When the researcher explained the nature of NPfIT, nurses expressed mixed feelings. Some appeared quite enthusiastic, feeling that it would improve patient care in the long run, with safer practices being in place. Others were less keen and expressed concerns about the security of such a network of systems, feeling that it may have severe implications for the relationship between patients and nurses. Several felt that the national programme would increase the workload of nurses making work processes more time consuming.

The lack of involvement of nursing staff in the development of information systems at LTH and their lack of awareness concerning NPfIT demonstrates a breakdown in the interessement process. This is further reflected in the following statement:

> *In terms of the involvement of nurses in the development of the systems, nurses are not really involved that much. They don't know what bedside nurses want. People in management positions make the decisions and people are not willing to get involved because they haven't been involved.*

6.3 Partial Enrolment and Mobilisation

Clearly, there was a failure to engage staff at LTH. In some cases this resulted in open resistance towards EPR, in others it meant that nurses did not use EPR in the way intended. A key concern centred on the inadequate training nurses had received on EPR. The main issue was the amount of time allocated to nurses during the training sessions. This ranged from as little as ten minutes up to two hours, on a one off basis. Once the nurses had received this training, they were expected to use EPR. However, many did not feel confident using the system at first, and much learning was based on trial and error or learning from one another, particularly from colleagues who already had some knowledge of computers. It became apparent that managers had underestimated the type of training that nurses needed; in particular, some nurses felt that training on basic computer skills had been neglected.

One nurse, who had taken part in the pilot implementation of EPR, recalled the state of affairs on the medical ward when she joined it:

> *When I came to the ward I had knowledge of EPR because I was part of the pilot. When I came, 70% of nurses didn't know how to use EPR, they didn't have passwords and simple things they couldn't do e.g. seeing blood, urine, or stool results, so they had to wait for the doctor. A personal challenge I set myself was to train the nurses and sort out access for them to use EPR.*

While highlighting inadequacies in the EPR training provided for nurses, this passage also shows how other individuals within an actor-network can be vital in enrolling support for a new system. Although this was the role envisaged for clinical analysts, they had not been active on the wards we studied. However, this nurse felt sufficiently motivated to take on responsibility for training other staff on the ward, with some success. For example, under the new working practices, nurses could order patient tests and make multidisciplinary referrals without waiting for authorisation from a doctor, and some welcomed their new-found independence. Indeed, one of the clinical analysts claimed that EPR had led to unexpected changes in nurses' status. She asserted that nurses had become more proactive in the administration of patient care and that EPR had facilitated a better working relationship between doctors and nurses, with nurses now seen as colleagues rather than subordinates. However, such identity changing experiences were not the norm among the groups we studied. Rather, due to the unsuccessful outcome of the interessement process, a limited number of nurses were using EPR, and often to a lesser degree than originally intended. Thus the enrolments were unstable, and the constraining alliances necessary to fully mobilise the actor-network were not in place.

7 CONCLUSIONS

In this paper we examine one aspect of the government's plans to modernise the NHS through the introduction of electronic patient records. We examine experience at a London teaching hospital, LTH, focusing on the extent to which EPR has supported (or not) the daily work practices of nurses. Our findings revealed that the current state of the art in nursing practice still involves a considerable amount of manual record keeping, such as the maintenance of individual patient care plans, medical notes and nurse's notes with limited use of EPR to support daily work practices. These findings run counter to the EPR rhetoric at national and local levels. The government's vision of a health service desperate for modern information systems and the local claims that EPR were becoming embedded in the work practices of nursing staff were not borne out by our study. Judging by their actions, only a few nurses – specifically those who became clinical analysts – willingly accepted the new roles and responsibilities entailed in moving to an electronic system of patient records. Indeed, several nurses found ways around using EPR by delegating their responsibilities to other members of staff.

The limited usage of EPR, and its avoidance by some nurses, can be linked to a breakdown in the interessement process at LTH. Our analysis of this process identified a number of limitations in the way that managers at the trust sought to engage staff in the development and use of EPR. Although Callon (1986) claims that some actors may be enrolled without discussion, he argues that others need to be engaged by persuasion, transaction or coercion. At LTH little or no use was made of mechanisms other than the null option. No incentives were offered to use the system, there was limited promotion of its benefits, inadequate training for some staff, and no attempt to enforce the use of EPR. While one may argue that the use of coercion would have been unwise in the face of a lack of incentives, promotion and training, this argument does not explain why the promising rhetoric associated with the system was not supported by appropriate mechanisms to assist with its realisation.

Previous research has suggested that the NHS needs to win the support of its staff, by communicating with them about the NPfIT strategy so that they will be encouraged to make better use of the systems in place (National Audit Office 2006). While our study found that LTH management made limited efforts to engage staff in either the development of EPR or the broader national programme, we are sceptical that increased nurse participation would have encouraged wider usage of EPR. Nor are we convinced that providing more comprehensive training sessions, however useful they might have been, would have addressed the heart of the problem. In short, despite nurses' positive comments about the role and potential of EPR, there was evidence that its use was not fundamental in supporting their daily work practices. Rather, in nurses' judgements of what their job entailed and their sense of identity, the EPR technology was largely irrelevant. These findings lead us to conclude that the introduction of EPR has neither greatly constrained nor enhanced the abilities of the nurses we studied to do their job effectively.

Nevertheless, the nature of the wards was significant in the way that nurses used EPR. On ward A, the ward manager used EPR to check the MRSA declarations of patients due for admission onto the ward. This was the main use of EPR on that ward, and often it was the only use of the system on a given day. On ward B nurses did not use EPR for MRSA screening, but for printing labels and making referrals to multidisciplinary teams. Clearly, staff on one ward could plan their use of EPR to support their work

practices, e.g. the compulsory MRSA screening of patients before entering the ward, while staff on the other ward used EPR in an ad hoc fashion and therefore might experience contention for access to the work station. Thus the different work practices on particular wards can potentially impact the extent to which the use of EPR supports daily work practices. Further research might explore the potential of EPR for a range of areas of nursing work, on different wards and in different types of hospital. Such research might also explore the potential for using mobile technology as a solution to the problems that exist with stationary computer terminals which tend to be isolated from patients on the wards.

A key finding from our study was that LTH management was not enforcing the use of EPR nor striving in the short term to achieve the integration of patient care plans, medical notes and nurse's notes onto EPR. Although both the director of nursing and operations and the IT director cited the need for such integration, neither was able to suggest a target date for implementation. Lessons learnt from previous NHS experiences with ICTs played a part here. The IT director recalled how past IS failures within the NHS had been costly and had severe implications for staff morale. He also emphasised the influential position that nurses held within the trust, including their role in the training of junior doctors. Thus, management sought to avoid widespread confrontation with nurses about the use of EPR. This study affirms the findings of Timmons (2003) that, although resistance may not materialise in a verbalised form, even a silent form of resistance can have a bearing on the progress and rate of organisational change. Crucially, though, LTH was facing a number of operational challenges, including staff shortages, very busy wards and the need to contain costs, which had a substantial effect on nurses' use of EPR within their daily work practices. The following passage is useful for understanding some of the issues involved:

> *A typical ward may have five nurses – if you're lucky six – on a shift, with HCA's [Health Care Assistants] to help. You have to have at least 2 qualified nurses at any time on the ward and there is so much to do. In some cases the information is there, but it can only be used when wards are staffed properly. … But 50% of the time wards are not well staffed. The challenges are big because the nurses are given more responsibilities, but there needs to be someone to take some of those responsibilities. To get to the PC is difficult when there is so much going on and there are time constraints. (Clinical analyst)*

Contrary to technical/rational arguments that would suggest the behaviour of managers at LTH is either irrational or incompetent, we contend that their actions are a pragmatic response to changing circumstances. In the face of a government mandate to introduce a range of information systems with spiralling implementation costs, many trusts are facing problems maintaining staff levels and balancing their budgets (Hendy et al. 2007). In these circumstances, contributing to the rhetoric about the potential of the national programme while taking a light touch on implementation may be seen as perfectly rational and politically competent behaviour. Such findings do, however, prompt us to add to the growing number of calls for a wide-ranging review of the national programme.

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