

## Receiving the Patient Record into Practice: A Journey from a Log to Logging In

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Healthcare organisations are undergoing a momentous transformation from a paper-based patient record to one that is electronic. In this paper I will address how such technology is received by medical work practices. I will refer to the technology in question as the electronic patient record (EPR), concentrating on how healthcare workers in primary and speciality care practices receive the EPR in terms of ‘acceptance’ and ‘resistance’. To begin, a brief history of how the patient record evolved and its effect on the transformation of work processes will be discussed. I will then demonstrate how the unique context in which the record coexists contributes to its receptiveness. Examples of how EPR systems are accepted and resisted from the literature will follow. Finally, I will reflect on the factors themselves, discuss means of improving acceptance and conclude with the need to bridge research in medicine with other institutions for a more thorough understanding of technology resistance in work practices.

### Introduction

The area of introducing technological innovations into work practices, especially organisations as complex as medicine, has been a source of much research. Though this paper concentrates on primary and specialty care practices, the same themes of acceptance versus resistance are found in hospital settings (Berg et al., 1998; Sicotte et al., 1998; Berg & Toussaint, 2003). The characteristics unique to the two work environments will be discussed. Upon integrating the new information and communication technology (ICT), the goal of the organisation, in either setting, is to achieve a “synergistic interrelation” among healthcare workers—or a level of synergy comparable to that in the paper-based environment (Berg, 2000, p. 487). The ICT in question is the electronic patient record (EPR), though several similar acronyms are prevalent in the literature: electronic medical record (EMR), electronic health record (EHR), computer-based patient record (CPR), and patient care information system (PCIS), a more comprehensive term. Issues with aligning this new artefact with existing work practices have generated extensive research. Factors of acceptance found in the literature when analysing the response of healthcare workers (physicians or clinicians, nurses, and clerical staff) to EPRs will be addressed. To thoroughly understand the effects EPRs have on work practices, one needs to take a holistic perspective in considering the record’s history, the effects of its format transformation, and the context in which it subsists (Berg, 2000; Berg & Toussaint, 2003).

### Historical Context

In order to understand how the record is received into primary and specialty care practices we need to first appreciate how it came to be. In accordance with Berg and Toussaint (2003), it is not sufficient to simply identify successful EPR implementations, instead, assigning meaning to the record in terms of its historical context provides for a richer argument. The notion of medical recording has evolved over the centuries; it is only until the twentieth century that the record materialised from a physician’s logbook to the record that we are most familiar with today (Berg, 2000; Anderson & Forsythe, 1970;

Berg, 2004). The notion of systematically reporting patient information was seen as unnecessary since the physicians towards the end of the nineteenth century worked independently, focusing only on their own patients. There was no need for a uniform means of recording data given that many physicians used their memory as a primary means of relaying patient information (Berg, 2000; Anderson & Forsythe, 1970; Berg, 2004). However, at the turn of the twentieth century a more standard means of record keeping emerged in Western medicine (Berg, 2000). Work routines had to be adjusted to accommodate for the new patient-centred record; medical professionals were now held responsible for ensuring the completeness of the record (Berg, 2000).

Attempts to automate the patient record date back to the late 1950s and early 1960s when Western medicine was confronted with the digital computer (Berg, 2000; Berg, 1999). The process of integrating EPRs into the medical work environment is complicated. The patient record has acquired so much value through the centuries that a mere translation from that which is physical to that which is digital is naive. Researchers have argued that the paper record connotes more than simply patient data; much can be inferred from the weight, appearance, and handling of the record itself (Berg, 2000; Berg, 2004; Heath & Luff, 1996; Berg, 1999). Heath and Luff (1996, p. 359) argue that the “handwriting in the paper record...provides a rich array of resources to practitioners” in that the “doctors’ ability to recognise the handwriting of their colleagues...[gives] a certain flavour to statements”.

However, others argue that a paper record is not dependable and hence a computerised managing system is necessary to ensure quality care (Burton et al., 2004). The EPR system standardises the record’s layout and contents, which positively contributes to medical work practices (Burton et al., 2004; Heath & Luff, 1996). Though not all agree: “the system therefore removes the economy, gestalt, and tailorability of the paper medical card which is an essential part of the ways practitioners are able to use the record for professional practice within the consultation” (Heath & Luff, 1996, p. 359).

As gathered from the above literature, the record itself is a multifaceted artefact. Thus, implementing EPRs is not a

smooth process and should not be handled using a traditional information systems development approach (Berg, 2000; Walsham, 1993). We need to delve deeper into the context in which the record must coexist with human and nonhuman entities within the organisation (Berg, 2000).

### **Organisational Context**

It has been argued that a comprehensive understanding of the context in which the technology cooperates has been ignored by systems developers (Heath & Luff, 1996). Thus, to improve the acceptance of EPRs it is crucial that “their production not only [is] sensitive to the local ‘goings on’, but also to the potential circumstances in which [the records] will be read and accessed (Heath & Luff, 1996, p. 361). Therefore, one cannot separate the record from its context; they are interrelated and interdependent. The unique characteristics of the medical environment will now be discussed to ensure that the reader has a thorough understanding of how the records need to be contextualised for an EPR system to be accepted and used in work practices.

Understanding the context in which any information system interacts is vital to its success. Therefore, in understanding the role of EPRs we must view the technology in question as a social system in which medical information is constantly interacting with the organisation and its components (Checkland & Howell, 1998). This “contextual nature of medical information” co-evolves with the organisation, hence its newly acquired fluidity (Berg & Gloorman, 1999). Van der Lei in Berg and Gloorman (1999, p. 56) presents a contradictory argument in that the information is “context-bound”; however, it plays an active role in accumulating and coordinating information enabling the record’s meaning to be acceptable in other contexts (see Berg, 1999). Berg and Toussaint (2003, p. 226) also note the record’s functional, not static, qualities in stating that “medical knowledge as a fluid category...is constantly [adapting] to local needs and changing circumstances”. As an active part in the social system, the record depends on organisational arrangements for full functionality and meaning (Checkland & Howell, 1998). The responsibility lies with the healthcare workers to create the record and assign it value; it is through the layout of the record itself where this meaning is generated (Berg & Toussaint, 1999; Heath and Luff, 1996). Consequently, this constructed meaning transforms the information system to that of a social system, where it subsists through the communication and interpretation of the people in the organisation (Checkland & Howell, 1998).

In a medical organisation, healthcare workers communicate and interpret information via the patient record. It becomes the focal point of the interrelation between human and nonhuman entities (Berg, 2000). The flow and management of documents between such entities within the organisation is fundamental to their effective interaction. The patient-centred record evolved from such a need to coordinate this interactivity (Berg, 2000; Strauss et al., 1985). Berg and Toussaint (2003) also support this notion of information flow in that the key components of the organisation “cannot be conceptualized as atomic bits”, therefore, the nature of the “work is inevitably improvisational, ad hoc, and reactive” (Berg & Toussaint, 2003, p. 228). The interconnectedness of unpredictable tasks present a “never ending stream of contingencies”, further emphasising the fact that primary care practices are “complex

adaptive systems” (Strauss et al. in Berg, 2000, p. 493; Singh et al., 2004, p. 235; see also Berg, 1999).

Though the focus of this paper has been confined to primary and specialty care, the same contextual characteristics discussed above can be applied to hospitals (Flood & Scott, 1987; Strauss et al., 1985; Berg et al., 1998). It is important to note that the literature does not necessarily distinguish between the different environments (e.g. primary care versus hospitals); therefore, an overlap is not only prevalent but also acceptable. For the purpose of this paper, defining healthcare organisations as social systems is sufficient in evaluating how EPR systems are received by their environment in terms of work practices. The attributes that best demonstrate the complex interrelation of activities in the aforementioned practices are unpredictability, uncertainty, and ad hoc routines; all need to be considered to ensure the desired receipt of the ICT in question.

### **EPR Reception**

The amount of literature that discusses clinical outcomes post-EPR implementation is rather extensive. Though a common lens from which the research is presented is lacking. Some studies concentrate on a specific aspect of the EPR system, such as health maintenance reminders and electronic communication (Schellhase et al., 2003; Kittler et al., 2004; van der Kam, 2000) while others are more comprehensive in their approach by addressing the system as a whole, which is the focus of this paper. Questions then emerge of whether or not EPR implementation issues (strictly in terms of the record itself) can be learned and then applied towards implementing the special features. The issues of acceptance discussed in this paper are specific to the use of the records in an EPR system, excluding any additional EPR capabilities. Though this limits my scope, it provides for a stronger argument in terms of categorisation. Additionally, it should be noted that measuring satisfaction is subjective (Davis et al., 1989). Drawing from my own interpretations of the literature, I have categorised the determinants of satisfaction versus dissatisfaction and reasons thereof in the following sections.

Furthermore, the selected literature takes into account an initial time lapse since no convincing systems development project forces the technology upon its organisation without some sort of transition period (e.g. from paper-based to electronic). This waning period is incremental by nature. Katzenberg et al. (1996) and Singh et al. (2004) introduce a partial implementation when measuring acceptance of EPRs. Moreover, examples from the following literature demonstrate that the institutional issues previously discussed contribute greatly to the technology’s acceptance in primary and specialty care practices.

### **Resistance**

In reviewing the literature I found six factors that contributed to healthcare workers resisting the EPR system in their everyday work practices: opposition to change; negative attitude towards computers; lack of involvement in early stages; lack of user-friendliness; and increased work load. Burton et al. (2004), Gleiner (1996) and Mechanic in Engestrom (1988) found that healthcare workers are reluctant to modify their

role in the organisation and therefore do not support the effort to improve current work practices. Gleiner (1996, p. 4) states that “clinicians are perfectly happy with their paper records, as long as the record is complete and available at the point of service”. Negative attitudes towards computers, including information management, create resistance among workers (Davis et al. in Lankton & St. Louis, 2005; Engestrom, 1988).

Furthermore, even when there is an overall acceptance of the system, the fear of error reporting, commonly associated with computer use, creates a hostile setting (Singh et al., 2004). Another prevalent factor of EPR resistance concerns user participation in the design process, resulting in uncertainty in system expectations (Karsh et al., 2004). The lack of user-friendliness, defined as inflexibility of the records themselves and disruption of work routines, has considerable impact on acceptance. In terms of inflexibility, healthcare workers saw the record as constraining to the pre-existing environment in that they had to “work around individual patient trajectories to be highly varied, ad hoc, and adapted to the particular needs” of the patient (Berg, 2000, p. 493; see also Heath & Luff, 1966; Javitt in Engestrom, 1988). Specifically, there was difficulty in retrieving data and viewing the record in its entirety in order to obtain an overview of the patient’s medical condition (Bayegan et al., 2002; Heath & Luff, 1996; Resier in Berg, 2000; Nilsson et al., 2002).

Further, Hodge (2002, p. 20) argues that it is physically disruptive to increase the number of workstations: EPRs create “workflow issues...physicians are nomadic by nature in making rounds...[therefore] sitting down at a terminal and logging on each time is inconvenient”. Finally, introducing EPRs into the work routine increases the workload of healthcare workers in that there no longer exists the anticipation that previously ensured a smooth workflow. The “pre-structured forms”, instead, create an “additional burden” (Berg, 2000, P. 497; Heath & Luff, 1996).

### Acceptance

Evidence of incorporating EPRs into work practices where healthcare workers were receptive to the system in its entirety was less common. Though articles do exist, you have to question the motive. These journals, though described by journal-provider services as ‘academic’, seemed to be more promotional (Ruffin, 2002). In questioning their credibility, I chose not to include them. For literature I deemed more appropriate, I found three emerging themes of EPR acceptance: user involvement, unified vision, and user-friendliness. To increase the potential of user acceptance, Gonzalez-Heydrich et al. (2000) found that providing demonstrations to the workers and promoting criticism ensured a positive response. The most prevalent motive for acceptance was a unified vision or organisational census signifying a universal understanding of the advantages of the system (Singh et al., 2004; Burton et al., 2004; Katzenberg et al., 1996; Gonzalez-Heydrich et al., 2000; Berg, 2004). To ensure agreement throughout the project lifecycle, Katzerberg et al. (1996) specifically used an incremental approach, which seemed more credible and long-lasting than using a popularity contest (Gonzalez-Heydrich et al., 2000); however, both were effective.

### Approaches to EPR Implementation

In reflecting upon the comprehensive list of factors affecting how EPRs are received into work practices one might ask if the tool should fit the organisation or the organisation fit the tool—a topic of controversy in the literature (Berg, 2000). Aligning the organisation’s work routines with ICTs—the tools—may create the desired “synergistic interrelation”, but in the case of medical organisations it may also contribute to a loss in patient-centred care (Berg, 2000, p. 500). To achieve cooperation, a mutual understanding by both human and non-human entities should exist so that the health organisation can provide the best care, the workers and technology can function harmoniously, and synergy can ultimately be achieved (Berg, 2000; Berg, 1999).

A few underlying points need to be mentioned that were used in circumventing resistance: providing an incentive and using an iterative approach through prototyping (Burton et al., 2004; Gleiner, 1996; Berg, 2000). Incentives were used to ‘kick-start’ user acceptance of the ICTs and immediately increase interoperability, as exemplified by the “pay-for-performance model” which reduced workers’ initial prejudices towards ICTs (Burton et al., 2004). Furthermore, Katzenberg et al. (1996) and Berg (2000) suggest an iterative approach in which prototyping would be used to customise the ICT to a particular organisation’s needs. Healthcare workers have learned to cope with the unpredictability and uncertainty embedded in their work environment through anticipation in a paper-based environment (Berg, 2000). Therefore, using a more tailored approach to EPR implementation would allow the workers to readjust their work practices to deal with ad hoc routines and reintroduce the anticipation necessary in achieving synergy (Berg, 2000).

### Conclusion

Though detailed examples, specific to EPR systems, can be provided for each of the factors, it is important to note that the supporting evidence is not unique to health information systems. Issues of user participation, preconceived attitudes, motivation and unified vision, and user compatibility are common concerns in evaluating IS implementation projects (Sauer, 1993). This presents an interesting question: if medical organisations are so contextually unique then why can similar implementation issues be found that coincide with other IS projects, not specific to medicine? I agree that healthcare should be treated individually and not coupled with financial institutions, for instance, however, lessons can be learned from both domains.

Research involving the implementation of ICTs in healthcare lacks sufficient tools to effectively study the interplay between humans and technology as “emerging hybrids” (Latour and Walsham in Berg, 2000, p. 495). To ensure full functionality in this context, neither the EPR nor the routines of doctors and nurses should be submissive. The current means of analysing this interaction is limited since the environment itself is extremely complicated (Berg, 2000). With the increasing number of features being added to the EPR system, the need for analysing the interdependent entities is crucial to a more comprehensive understanding of the acceptance of EPRs in work practices. Moreover, Karsh (2004, p. 334) argues that “further research using comparison groups and longitudinal methods [is] needed to more completely uncover

how EPR implementation impacts perceptions of the technology". Though the field is rich with research, it is important to provide a more rigorous framework to structure future EPR implementation projects. This framework can then be used to address issues of receptiveness involving the implementation of supplementary EPR capabilities, since contextually speaking they are compatible. Furthermore, resisting change, especially concerning ICTs, is common in medical environments. Knowledge gained from analysing the aforementioned factors of resistance should not be restricted to medicine. In bridging the knowledge across various IS project domains (finance, education, government), extensive lessons can be learned from the resisters. The shared knowledge can be used to create commonalities for further understanding of IS acceptance versus resistance in work practices.

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