Information in practice

Kaiser Permanente's experience of implementing an electronic medical record: a qualitative study

J Tim Scott, Thomas G Rundall, Thomas M Vogt, John Hsu

Abstract

Objective To examine users' attitudes to implementation of an electronic medical record system in Kaiser Permanente Hawaii.

Design Qualitative study based on semistructured interviews.

Setting Four primary healthcare teams in four clinics, and four specialty departments in one hospital, on Oahu, Hawaii. Shortly before the interviews, Kaiser Permanente stopped implementation of the initial system in favour of a competing one.

Participants Twenty six senior clinicians, managers, and project team members.

Results Seven key findings emerged: users perceived the decision to adopt the electronic medical record system as flawed; software design problems increased resistance; the system reduced doctors' productivity, especially during initial implementation, which fuelled resistance; the system required clarification of clinical roles and responsibilities, which was traumatic for some individuals; a cooperative culture created trade-offs at varying points in the implementation; no single leadership style was optimal—a participatory, consensus-building style may lead to more effective adoption decisions, whereas decisive leadership could help resolve barriers and resistance during implementation; the process fostered a counter climate of conflict, which was resolved by withdrawal of the initial system.

Conclusions Implementation involved several critical components, including perceptions of the system selection, early testing, adaptation of the system to the larger organisation, and adaptation of the organisation to the new electronic environment. Throughout, organisational factors such as leadership, culture, and professional ideals played complex roles, each facilitating and hindering implementation at various points. A transient climate of conflict was associated with adoption of the system.

Introduction

Electronic medical record systems have great potential to improve the quality of health services. However, few service providers have adopted them. Cost, limited evidence linking adoption and improved outcomes, and concerns about disruptions during implementation may be important barriers.[1–5]

Electronic medical record systems may challenge beliefs about how health care should be organised; using physicians to enter data may be inefficient and perceived as demeaning, and clinicians and managers may need to learn how to use specific software, causing frustration. Formal evaluations of electronic medical records rarely address these organisational issues.[6] This missing information could enhance the viability of existing electronic medical records and greatly inform the implementation of new systems such as the UK National Programme for IT (NPfIT) for the NHS.[7–9]

We examined the experience of implementing an electronic medical record system in Kaiser Permanente Hawaii. Using semistructured interviews, we identified the critical events in the system implementation, the impact of organisational culture and leadership, and the effects on clinical practice and patient care processes as perceived by the system's users.

Methods

Background

Kaiser Permanente is the United States' largest non-profit healthcare system, serving 8.2 million members in eight regions. Kaiser Permanente Hawaii has 26 primary care teams in 15 clinics, and one hospital. It serves 234 000 members across three islands. The average team has four doctors, three nurses, and nine other staff members.

Kaiser Permanente compared two electronic medical record systems in the 1990s, EpicCare, developed by Epic Systems, and Clinical Information System (CIS), jointly developed by Kaiser Permanente and International Business Machines (IBM). In 1999, the second-generation CIS system was chosen for all its regions, starting with Hawaii.

Hawaii began to prepare for CIS in December 1999 with a planned starting date of October 2000. After a 12 month delay related to the operating system, the first site started using CIS in October 2001. However, in 2003 the company decided that the EpicCare system had matured beyond CIS, and now was

P+ *The interview prompt sheet used in the study appears on bmj.com*

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better able to meet its needs. All Kaiser Permanente regions halted implementation of CIS and began planning for implementing EpicCare.

At that time, a third of the company's Hawaiian sites had implemented CIS fully, and the rest had read-only access, some with order entry functionality. For many in Kaiser Permanente Hawaii, the 28 month experience had been, to use a Hawaiian surfing metaphor, truly a "wild ride."

Interviews

JTS held semistructured, recorded interviews with 12 clinicians and five managers in four teams, located in four clinics and the Kaiser Permanente hospital, and with nine CIS project team members during March and April 2003, about one month after the announcement to halt CIS implementation. Preparation for the new electronic medical record system began during the interview period. In the clinics with CIS implemented, it remained in use until replaced by EpicCare in 2004.

In the 60-90 minute interviews we sought respondents' views on four implementation issues: (*a*) critical events in the implementation of CIS; the roles played by (*b*) organisational leadership and (*c*) culture; and (*d*) the CIS related changes in clinical practice (see bmj.com). Interviews were transcribed and analysed inductively and thematically. Responses were coded and collated to create themes. Unclear responses were clarified with interviewees. We held regular discussions to review themes and clarify facts. This paper reports only themes that were mentioned by at least four respondents.

Results

Critical processes in the implementation of CIS

Selection of the electronic medical record system

Only one respondent expressed approval of the CIS choice at the time of the interview: 18 reported dissatisfaction with the choice, 10 thought clinicians had not adequately "bought into" the decision, and seven identified conflicting priorities between the organisation as a whole and individual clinicians.

"It was a bit of a turkey. I was actually on the group that picked it. So we had to go out and defend a product that we knew was flawed. And other people knew it was flawed."—Clinician, implementation team member

"With CIS it seems the highest priority was, 'How can we document as completely as possible and then extract information easily so we can get paid and so maybe we can do research?' but had very little to do with taking care of the patient who comes to your office."—Clinician

Nine respondents criticised the higher than anticipated and escalating implementation costs, and felt that Kaiser Permanente disproportionately bore the software development costs.

"We had a 12 month preparation period. The product wasn't delivered for another 14 months. That affects your culture."—Clinician manager

"The delay had multiple consequences to our whole experience with this. Lot of time goes by, lot of things happen in people's lives. And my internist needed to go do other things. And my paediatrician also needed to move. So the implementation date is shifting, and my players are (too)."—Clinician

"Any improvements we had to pay for. So we're paying for IBM's entire development costs."—Clinician, implementation team member

Respondents consistently recalled suspecting that CIS was the wrong choice for Kaiser Permanente Hawaii, but may have been biased by the recent negative experience. At interview, 24 respondents were optimistic that EpicCare would prove a better system. All respondents thought the hardest challenge—to change from paper to computer—had been accomplished with CIS and that the new implementation would be easier. But at least eight respondents were also cautious. Formal evaluations of the new EpicCare system are ongoing.

"Even [EpicCare] is going to take us more time. On a bad day we might see 30 patients. There's no way that you can do that on a computerised system unless you're going to do as lousy a note as possible."—Clinician

Design and early testing

Twenty three respondents reported substantial software problems.

"It was pretty clear that this product had a lot of problems—from our very first site."—Clinician, implementation team member

"The problem for internal medicine is that they go through a more complex process to arrive at a diagnosis, but CIS isn't really designed to do that. CIS assumes that the diagnosis is known at the beginning, or shortly after the beginning, of the visit."—Implementation team member

Adaptation of the electronic medical record for widespread use

Four respondents noted the difficulty and expense of modifying CIS software. Clinicians sought improved usability and flexibility, whereas national headquarters prioritised business and executive functions such as accurate coding and reimbursement.

"We wanted to make a whole lot of changes, and [IBM] would point out why it would take time and cost money, and the smallest change would be a fight and it would cost tens of thousands of dollars."—Implementation team member

Adaptation of the organisation to the new electronic medical record environment

Seventeen respondents reported that CIS had reduced clinician productivity, primarily because of extra work, such as processing laboratory result reports, entering orders, and navigating through the system. Fourteen clinicians reported that the extra time burdens from using CIS (estimated to be 30-75 minutes a day) persisted even after the initial learning period and affected patient care (such as by making it more difficult to fit in "overload patients"). The reasons varied: eight respondents said CIS required too many steps to accomplish simple tasks; 12 felt the system was too cumbersome to accommodate the range of clinical needs or patients with multiple problems, requiring multiple templates; and nine reported a lack of clinical capacity to absorb changes during implementation.

Although the CIS implementation included temporary provision of extra clinicians to help with the initial additional workload, several respondents doubted whether they would be able to achieve pre-CIS productivity levels.

"We'd started out in the high 90th percentile in terms of our utilisation, so when we tried to add the constraints of the system, basically it broke."—Clinician

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Sixteen respondents said that CIS preparation had revealed a variety of questionable practices and sharpened people's sense of accountability. Eleven respondents believed implementing CIS had clarified staff responsibilities for clinical decisions, but these tasks required much unanticipated work.

"Somehow it has changed the psyche of people, they are more aware of what they are putting in the chart. It's almost like they didn't really care what they wrote on paper, but now it's electronic and people can read everything."—Implementation team member

Revised roles created shifts in work responsibilities, which led some doctors to complain that they were becoming expensive order entry clerks. Others welcomed the greater accountability.

"No question in my mind, it's forced me to be more organised, more accountable. It's forced me to do what I should have been doing all along."—Clinician

Respondents also reported innovative adaptations, such as allowing nurses to act as results managers to screen laboratory results. Medical assistants started prioritising electronic task items. Some clinics started developed new appointment types, such as greater use of telephone consultations.

"We've seen more sharing of responsibility, having nurses do follow-up phone calls, and understanding specifically what a [medical assistant] can do, and shifting some work off the physicians on to others."—Clinician, implementation team member

Organisational culture and implementation

Respondents characterised Hawaiians as averse to conflict and likely to interpret negative feedback as personal criticism. The culture minimised active resistance but also inhibited criticism before and during implementation, thus depriving decision makers of important feedback.

"Hawaii's culture is very non-confrontational, you know, 'Just be nice, agree'; so the feedback has been relative to that."—Implementation team member

Organisational leadership and CIS

Fourteen respondents discussed the importance of leadership. Respondents often stated that the electronic medical record system selection process needed to be more participatory, but in the implementation phase some respondents valued decisive hierarchical leadership. Respondents described local leaders as consensus seeking, which at times exacerbated implementation challenges or encouraged passive resistance.

Conflict

As these critical processes unfolded, a climate of conflict associated with CIS arose. Five respondents reported internal conflict between their commitment to "going electronic" and scepticism about CIS, and some initially receptive clinicians became alienated by the implementation. A mingled feeling of relief and loss was associated with the withdrawal of CIS.

"What got docs here frustrated was nobody really seemed to listen. And they had to compromise their values and ethics to help the system work. That's where I saw very amiable, nice, quiet people starting to talk stink behind the scenes."—Clinician

What is already known on this topic

Electronic medical record systems have great potential to improve the quality of health services, but implementing such a system can be extremely disruptive

Better understanding of organisational contexts and responses to implementation may help to minimise disruption, but few formal evaluations have been made

What this study adds

Introduction of an electronic medical record system to a non-profit healthcare organisation created several challenges: many users felt the selection of the system was detached from the local environment, sparking doubt and resistance; problems with software development increased local resistance, as did clinicians' reduced productivity

The system first clarified and then changed roles and responsibilities—often, though not always, for the better

The organisation's cooperative culture minimised overt resistance to change but also inhibited constructive feedback during implementation. Leadership also had varying effects: participatory leadership was valued during selection of an electronic system, but hierarchical leadership was valued during implementation

Discussion

Seven key findings emerged on the implementation of the CIS electronic medical record in Kaiser Permanente Hawaii:

- Many users perceived the initial selection of CIS to be detached from the local environment
- Software design and development problems increased local resistance
- CIS reduced clinicians' productivity
- CIS initially clarified and then changed roles and responsibilities
- Culture had varying effects: cooperative values minimised resistance to change early on but also inhibited feedback during implementation
- Leadership had varying effects: participatory leadership was valued for selection decisions, but hierarchical leadership was valued for implementation
- An overall effect was a counter climate of conflict in the company, which withdrawal of CIS resolved.

Implications for other healthcare organisations

A participatory process in selecting the system and in fine tuning its capabilities is important. This grass roots involvement is important to generate commitment; there may never be a perfect software system for all users, or which will achieve specific local goals. Extensive software testing of the vendor's claims for baseline functionality and the system's adaptability to local needs is important before implementation. Users' frustration with software problems can quickly escalate and result in resistance to implementation.

Organisational culture and leadership—Building a supportive, cooperative culture may pay dividends during the stress of implementation, but special efforts may be required to obtain critical feedback. Different leadership roles and styles are needed in the process: during selection of the system, participatory leadership is needed; during implementation, however, decisive hierarchical leadership is needed.

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Roles, responsibilities, and relationships of clinical staff—During the early stages of implementation, changes in clinicians' productivity may require extra staff and the ability to make continuous adjustments. As the organisation adapts to the new electronic system, the capability is needed to document what care a patient received, who provided it and when, so processes may need to adapt to revised professional and legal standards.

Limitations of study

Our study captures only a snapshot view, during a volatile phase of implementation and transition from one electronic medical record system to another. The respondents' perceptions should be seen in this context. In fact, another Kaiser Permanente region had implemented an earlier CIS version successfully. However, our overall findings highlight issues likely to be faced by organisations implementing or modifying an electronic medical record system.

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Commentary: Trouble in paradise—learning from Hawaii

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Scott and colleagues have set before us the sad story of the failed implementation of an electronic medical record system in hope that readers can learn from the mistakes.[1] The English National Programme for IT,[2] as the largest implementation of an electronic medical record system in the world, is singled out by the authors as being a potential beneficiary of the lessons in this report.

There are parallels between what Kaiser Permanente tried to do in Hawaii and what is planned for the English NHS: Kaiser Permanente is a very large healthcare organisation, covering a widely geographically dispersed population of eight million patients across all health sectors (though this implementation covered fewer than 250 000 patients). The overall goal was to implement an electronic medical record for use by all clinicians, providing an integrated system. This evaluation looked specifically at the organisational issues—consultation, communication, leadership, decision making, education and training, change management—as it is well known (though often sadly ignored) that getting these things right is crucial for the success of any innovation that involves people changing the way they do things in the workplace.

The reasons put forward for the failure of the implementation will come as no surprise to those with experience of working in health informatics: the initial decision making was seen as remote from the clinical user base; resistance was increased by poor product design; clinical productivity was reduced (although this had been planned for in the implementation, many staff felt that they would be unable ever to return to their previous levels of performance); roles and responsibilities were unclear and were constantly changed; the cooperative culture so prized by Hawaiians inhibited honest feedback; leadership styles were not appropriate to the successive phases of implementation; and a climate of conflict was the result.

The authors suggest ways of avoiding such outcomes—all of them involving people, not technology. Their recommendations echo those of Nancy Lorenzi, president of the International Medical Informatics Association and an expert on change management in health informatics. She recently enumerated strategies for effecting successful change, none of which are new, but without which failure is inevitable: set and communicate clear objectives and formulate a strategic plan (and modify when necessary); work at achieving ownership of the plan by people at all levels; pay attention to the organisational culture ("culture eats strategy for breakfast") and whether it supports the changes being implemented; develop leaders and champions for the change (not just those in traditional positions of power); be patient and resist false urgency; stay involved and keep communicating; evaluate; seek feedback (and act on it); plan ahead for the next phase of change.[3]

There are now encouraging signs of increasing involvement of clinicians proficient in information technology within much of the National Programme for IT and an increasing level of informed and constructive debate, which is being listened to by NHS Connecting for Health. This is a positive and welcome development and one which must be fostered throughout the NHS; we simply cannot afford for this implementation to fail.

Competing interests: ST is strategic director of PRIMIS+, an educational programme that is fully funded by NHS Connecting for Health. She is also editor of *Informatics in Primary Care.*

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