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Physician Interaction with EHR: The Importance of Stakeholder Identification and Change Management

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Chapter 5
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EXECUTIVE SUMMARY

Research Medical Center is a regional medical center that meets the needs of residents of a rural area in the Midwest. It is part of a large healthcare system. The primary care hospital implemented the Electronic Health Record (EHR). The endeavor to implement Health IT applications including Computerized Physician Order Entry (CPOE), EHRs, nursing documentation, and paperless charts, adverse drug reaction alerts, and more were introduced with the corporate initiative. The core applications were clinical and revenue cycle systems, including CPOE. The planning, implementation, and training was developed by the parent operating company and efforts to engage the local physicians were minimal. There were over 300 physicians involved. The physicians were primarily not hospital employees. They had the ability to choose to adopt the EHR and adapt their social, work, and technology practices, or to avoid usage. Follow up research indicated the change management and support efforts were not successful for the physician stakeholder.

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ORGANIZATION BACKGROUND

Living the traditions, visions and values of healthcare, Research Medical Center is a regional medical center that meets the needs of residents in a rural area of the Midwest. Research Medical Center partners with other community healthcare providers to sponsor a regional cancer center, paramedic services, hospice services, a freestanding surgery center and a variety of other health services.

Research Medical Center has earned more national recognition for quality patient outcomes than any other hospital in the region. The medical center has earned multiple honors for its leadership and excellence in several clinical areas including cardiac care, orthopedic services, vascular surgery, stroke care, and cancer care. The organization is home to the only Level II Trauma Center in the area, and provides a vital, lifesaving link to rural areas via Air Care, the hospital's helicopter ambulance service.

Research Medical Center is a member of a large healthcare system. The parent company's vision is to be a leader in improving health care delivery with technology initiatives. They became an industry leader, embracing leading leading-edge technology and implemented an Electronic Health Record (EHR). The record is supported by Cerner, and the hospital went live with several Cerner modules to support patient care, including FirstNet, INet, physician computerized order entry. The EHR goal was to reduce errors, streamline documentation, improve clinical quality, and create a more efficient process. The planning and implementation was created from with a centralized, corporate perspective. To provide consistency and achieve the goals of integrated systems, the implementations for all parent company hospitals were achieved with the same goals, objectives, and project plan.

SETTING THE STAGE

Research has shown that the healthcare industry is plagued by rapidly increasing costs, poor quality of service, lack of integration of patient care, and lack of information access to EHR. According to the Institute of Medicine (IOM, 2001), medical errors are a major problem that decreases the quality and increases the costs of the U.S. healthcare system. Medical errors result in 98,000 deaths a year and many more injuries, and as a result, patient safety has become a top priority in U.S. healthcare.

The use of Information Technology (IT) has the potential to help healthcare organizations improve quality of service while reducing costs. The Institute of Medicine (IOM, 2001) reported that the U.S. healthcare system is "fundamentally broken" and called on the federal government to make a major investment in information

technology in order to achieve the changes, such as the "commitment to technology to manage the knowledge bases and process of care" (p. 178), needed to repair the broken healthcare system.

During the past 25 years, many medical records have been converted from a handwritten record format to an EHR format, and studies have indicated that EHR is complicated and requires a serious, sustained commitment to human resources, process re-engineering, technology, and funding. The healthcare system has been slow to take advantage of EHR and realize the benefits of computerization (McDonald, 1997): that is, improved access to and records of patient data, enhanced ability to make better and more-timely decisions, and improved quality and reduced errors.

It is commonly assumed that U.S. healthcare services organizations are approximately 10 years behind the Information Systems (IS) curve when compared to organizations from other industries of comparable size and complexity. According to IOM (2001), "healthcare delivery has been relatively untouched by the revolution in information technology that has been transforming nearly every other aspect of society" (p. 15). This inability to take full advantage of computerization is unfortunate because EHR has the potential to improve patient care and patient safety. In 2007, however, the American Hospital Association reported that only 11% of hospitals had fully implemented EHR, and these hospitals were likely to be large, urban, and/or teaching hospitals. Vishwanath and Scamurra (2007) reported less than 10% of physicians in different practices and settings in the US use EHR, whereas more than half of the physicians in countries like Sweden, Netherlands and Australia have adopted EHR. Blumenthal (2009) cites only 1.5% of US hospitals have comprehensive EHR systems. A similar 2009 study by the American Hospital Association shows less than 2% of hospitals use comprehensive EHR and about 8% use a basic EHR in at least one care unit. According to a study published in the New England Journal of Medicine, United States patients get appropriate medical care only 55 percent of the time. Greater use of EHRs could improve care by tracking patients' medical history and providing electronic reminders about needed test and treatments.

At Research Medical Center's parent company, the member hospital teams and clinical operations improvement and information systems have set the goal to enable the organization to extract full value from its technology investments while positioning it to take advantage of future quality improvement and cost saving opportunities. The clinical components are to increase patient safety and quality of care with evidence based, decision making tools and standardized best practices. The revenue management components contribute by improving financial performance, securing revenue more effectively by enabling insurance verification at time of registration and improving claims editing.

There is increasing pressure to operate efficiently in health care. Costs are spiraling out of control, due in part to huge amounts of redundancy and waste. Medical errors arise because of process failures and ineffective communication. Prior to the implementation of the electronic medical record, the hospital used a paper medical record for documentation.

CASE DESCRIPTION

Technology Concerns

Electronic Health Records (EHRs) and Computerized Physician Order Entry (CPOE) are revolutionary technologies that transform the way medicine is being practiced, taught, and advanced. However, these are merely technology tools. The tools are only as good as the process behind them. True quality care through health IT is achieved by automating processes based on evidence in order to provide better outcomes and safer care. At the same time, automation can eliminate unnecessary steps in order to increase clinicians' productivity and efficiency.

The enterprise change and transition from departmental 'silo' systems to the integrated system is relatively simple from a technology perspective, but difficult from a people perspective.

Typical allocation of cost for these large IT endeavors is 12% for hardware, 15% for software, 15% for data conversions, 43% for developing work processes (reengineering), and 15% for preparing employees for the new system (training and change management).

Technology Components

Health IT applications including CPOE, EHRs, nursing documentation, and paperless charts, adverse drug reaction alerts, and more were introduced with the corporate initiative. The core applications were clinical and revenue cycle systems, including Computerized Physician Order Entry (CPOE).

The clinical components were expected to increase patient safety and quality of care with evidence based, decision making tools and standardized best practices to support the transformation of patient care delivery. The vendor, Cerner, provided pharmacy, emergency department clinical documentation, CPOE and medical records modules. A clinical data repository is developed and utilizes "expert rules" functionality to leverage the value of turning data into information.

Goals of the revenue management components were to improve financial performance, secure revenue more effectively by verifying insurance and improved claims editing.

Systems are designed with full redundancy to hold downtime and failure to a minimum. In event of a disaster, it is estimated only 60 seconds of clinical data will be lost. Historical tape backup systems risked loss of 24 hours of data.

Management and Organizational Concerns

There is increasing pressure to operate efficiently in healthcare. Costs are spiraling out of control, due in part to huge amounts of redundancy and waste. Medical errors arise because of process failures, ineffective communication, and lack of information. It is time to make the best use of new technology in every phase of a patient's experience to drive out efficiencies, eliminate errors, and enhance communication. Capturing the benefits from EHRs is the next step in the journey to make hospital care better and safer for everyone. However, the required process changes for the implementation of systems of this magnitude cause management concern. Losses in revenue, profits, and market share results when core business processes and IT systems fail or do not work properly.

The organization will undergo changes in communication, process, and teamwork. "Implementing CPOE is very much not an IT project, this is a clinical project that has huge IT aspects to it" (Chessen, 2005). It will transform the way the medical staff and all hospital staff do their work. One obvious change is the way nurses and physicians will communicate. Physicians are able to access patient information far beyond the hospital walls. Clinicians have access to the electronic record. They can review the information together. On the process side, hospitals are better able to measure true clinical improvement in various activities.

Teams to define improved care processes and how to integrate the processes into the electronic health care record system are centralized. The success will be measured by the ability to improve core clinical indicators, productivity measures, patient satisfaction, and financial performance.

In a CPOE environment, the number of physicians who utilize the application and the percentage of orders made via computer gauge success. However, few healthcare providers boast 100 percent utilization. For one, introducing CPOE into daily workflow and patient care flows is no easy feat. CPOE is all about a change in the practice of medicine. The cultural changes posed by CPOE, plus the idea that physicians can be resilient to computer technology, the limited amount of CPOE products on the market and the complexity of implementation has hindered adoption.

CPOE represents a huge change in operations for the hospital. It involves a change in physician practice. Not only because the physician is being asked to enter orders

on the computer rather than scribble them on a chart or call them in on the phone, but the whole value of this is in the decision support and the standardization of care. Order sets are being developed for certain diagnoses and the doctor is expected to use them. Other staff members affected because some of the task used to be done by the unit clerks, some of is used to done in pharmacy and nursing.

Probably the biggest barrier to CPOE adoption is the cultural one. It is difficult for physicians who have been in practice for a decade or two to adopt computers in medicine. Information technology has been used by many organizations for the past 40 years. Manufacturing, banking, finance, and other industries have capitalized on new technology and experienced increased quality, lower costs, and a competitive advantage. There are many examples of IT's benefits: (a) improved customer relationship management and knowledge management, (b) cost reductions, and (c) improved quality. IT, however, has produced less significant results in the healthcare system. It is routinely possible to access bank accounts electronically from anywhere in the world, but it is often impossible to access medical information from an office next door. IOM (2001) claimed that the healthcare system needs to join the IT revolution, and improved information systems may be a critical factor for improving the healthcare system because of the pervasive need to access, record, and share information in order to provide high-quality medical care (Thrall, 2004). EHR is a journey that has just started (Ondo, Wagner, & Gale, 2002).

Knowledge and learning play important roles in the use of IT, and researchers have developed the diffusion, adoption, and acceptance theories to explain how people adopt, accept, and use complex organizational technologies. Attewell (1992) defined complex organizational technologies as "technologies that, when first introduced, impose a substantial burden on would-be users in terms of the knowledge needed to use these technologies effectively" (Fichman & Kemerer, 1997, p. 1346). From an organizational learning perspective, Attewell defined technology assimilation as "a process of organizational learning in which individuals and an organization as a whole acquire the knowledge and skills necessary to effectively apply the technology" (Fichman & Kemerer, 1997, p. 1345). The burden of learning creates a knowledge barrier that inhibits the diffusion of IT. In these cases, the use of IT can be inhibited as much by the ability to adopt IT systems as the desire to adopt these systems. Consequently, IT penetration into the market from which the stakeholders could benefit is seriously affected and the benefit undermined.

The healthcare system is a complex organization characterized by knowledge workers working as independent professionals. The ability for these knowledge workers to access data effectively and efficiently would improve the quality of work processes and patient care. However, EHR, which enable people to work effectively and efficiently access data, have been underused by U.S healthcare professionals

such as physicians. In order to improve the use of IT in the U.S. healthcare system, it is necessary to understand what healthcare professionals, especially physicians, think about the use of EHR.

"To be a professional includes three ideals: 1) that one has skill acquired through specialized training; 2) that one can have a rational account of one's own activities, explaining the 'whys'; 3) that one is dedicated to using one's skills for the well-being of others" (Benveniste, 1987; Weick & McDaniel, 1989). Professional organizations are created to apply professional values and expertise to the resolution of difficult, often ambiguous problems. One can view a professional organization as a strategy for reducing uncertainty about what can be done using professional expertise and should be done using professional values (Anderson & McDaniel, 2000). Often the physicians' expertise is based on specialized cognitive knowledge and specialized skills. Healthcare organizations are "unique among professional organizations in that rather than one profession occupying all the major professional roles, there are several different professions that are central to the organizations success. Historically, physicians have a dominant role in the medical model of healthcare" (Anderson & McDaniel, 2000). Physicians have experienced highly demanding educational and specialized training and are experts in their own profession and accustomed to practicing in a particular way or style similar to which they were trained. Findings from prior research suggest physicians are reluctant to give a positive response to implementation of an IS that interferes with their traditional routines (Chau & Hu, 2002). A key element in understanding physician use of EHR is the critical role played by expertise and values in their work processes. Anderson and McDaniel feel professional expertise and values can be powerful inhibitors of innovation.

In addition, when the implementation of information systems interferes with physicians' traditional practice routines, they are not likely to be accepted by physicians (Anderson & Aydin, 1997). According to Anderson, physicians will oppose any systems that impose major limitation on how clinical data is recorded and how the medical record is organized. Physicians feel it interferes with the way they organize their thought processes in caring for patients. A key element in understanding physician perspective of EHR is the critical role played by expertise and values in their work processes. Understanding how physicians work with knowledge in the healthcare domain and the knowledge identities they utilize is an important step in understanding the physicians' perspective on EHR usage.

The physician perspective reflects the unique role and responsibilities of the physician. The physician role is characterized with professional autonomy, status role, expertise, experience, and intuition. The ability to incorporate technology into physician practice based on specialized training, experience and intuition is a challenge that requires more than merely providing the opportunity of technology.

The physicians are asked to adopt order sets. Most physicians recognize that medicine is a combination of science and art. As you go to order sets, you are taking out a bit of the art and that is another barrier (physicians) have to overcome. Thirdly, these are not out-of-the-box applications that hospitals can just use intuitively. It takes a bit of learning, which has been a significant challenge for clinicians. The systems were not written for the way clinicians work. It has been a growing process and we are constantly working to improve the application.

In this case, the physicians identified organizational process categories providing challenges to them. These are the organizational processes that were obtained from analyzing their responses. These categories illustrate the bundles of meaning relating to how physicians perceive the support or lack of support in their adaptation of EHR. The data indicates the physicians feel the EHR decision was made without their input and buy-in. They feel they were 'mandated' to adapt to the EHR and were not considered as primary users. They felt they were left out of key decision-making processes, yet were required to adjust to the EHR functions by 'becoming the highest paid user doing the lowest paid work.' These are further analyzed in Table 1 with the categories, number of positive instances, number of negative instances and total number of instances in each category.

The physician communication and change management category explains the physician perspective of the communication and change management efforts directed towards physician engagement. All of the physician coded instances in this category were negative. This indicates an area of failure for this implementation. Future implementations would benefit from attention to the influence of physician communication and change management.

Table 1. Influence of administration on physician adaptation of EHR

Administration	Description	Positive (n)	Negative (n)	Total
Physician Communication and Change Management	The physician perspective of physician communication and change management	0	39	39
Value Perception of Administration	The physician perspective of the value perception of administration related to EHR. Physician perspective of administrations view on HER	0	22	22
System Changes	The physician perception of lack response, delivery and communication on issues where opinion was requested	2	7	11
Physician Input and Buy	The physician perspective of the importance of inclusion of physician in planning, input and buy-in phase.	4	35	39
Total		6	86	92

Value perception of administration is the physician perspective of the administration valuation of EHR and the physician value related to EHR. It primarily describes the lack of value associated with the increased amount of physician efforts and the perceived administrative stance of 'rosy view of EHR.' All of the physician instances in this category were negative. The importance of value of physician effort cannot be ignored.

System change is the physician perspective of response, delivery, and communication on issues of system changes, fixes, and enhancements. The data indicates the physician requests for system changes and modifications are not met. They suggest their work processes are made less efficient and their productivity declines as a result of the slow response to requests.

Physician input and buy-in is the physician perspective of the importance of inclusion of physician in planning, input and buy-in phases. As physicians feel they were not included in the planning, input and buy-in phases, the physicians feel this contributed to the lack of support provided by the EHR for their work practice needs.

Therefore, this case specifically focuses on the physician aspect of the system implementation and the physician perspective. Physicians are key stakeholder in the EHR efforts. Their professional work and knowledge process requires attention to the integration of EHR into their work.

CURRENT CHALLENGES FACING THE ORGANIZATION

There is increasing pressure to operate efficiently in health care. Costs are spiraling out of control, due in part to huge amounts of redundancy and waste. Medical errors arise because of process failures and ineffective communication. Changes in billing, quality, and reimbursement strategies continue to impact healthcare.

After the implementation of the system, the hospital experienced a drop in census. There was a shift in admissions to the other healthcare alternatives in the community. Physicians were dissatisfied with the approach to organizational change, lack of acknowledgement of increased physician work and the resulting decrease in physician productivity levels. The lack of effective training and change management for physicians became apparent. In the competitive healthcare environment, the physicians had choice of hospital and choice of adoption of the technology and choice of adaptation of technology into their work requirements.

The biggest barrier is the hospital first encountered CPOE was that it took to long to use and was not intuitive for physicians. The system was originally built for ward clerks and pharmacy clerks, not for physicians. After major renovation, the current limiting factor is the resources to train doctors on how to properly use

the system. Initial CPOE usage rates failed to meet the target goals. Eventually, the CPOE usage rate struggled to 50 percent.

A second significant barrier was the manner in which the system functionality and the order set use was introduced. Physicians had developed unrealistic expectation regarding the system. The introduction and use of enterprise systems requires relatively consistent usage by the end users. This was the first exposure to standardized order sets.

Overall, the clinical staff worked significantly more hours during the preparation and Go-Live time period. The continued stress of the implementation resulted in low staff morale (see Table 2).

The process and infrastructure issues are IT context issues. They primarily deal with the physician perspective of how the system was developed and implemented, training, support and functionalities of the system. IT context issues have the potential power to influence IT Adaptation (Beaudry & Pinsonneault, 2005, p. 505). The following data instances are examples of IT context issues identified by physicians. They are:

What is currently happening is the clinicians are being asked to pay for it, especially the ones that are on productivity, are being asked to pay for it out of their productivity dollars and they are not going to make a return from it.

I think that one concern is that you actually spend less face-to-face time with people whether it is personal family/friend time or patient care, too.

Education, the education process I think was too compact. I think over time the process could have been a little bit more user friendly.

One of the things we hear with the Computerized Physician Order Entry system we have here, CPOE, is that most providers will tell us that it costs them time.

Overall, the data indicates the physician perspective does not find the influence of processes and infrastructure as a positive influence on adaptation. The above analysis suggests that the technological difficulties surrounding EHR have affected the physician adaptation and their level of comfort with the technology. The technological adaptation of EHR by physicians is negatively affected as a result of these technical difficulties described above.

Further analysis of this case suggests that technological adaptation comprises of additional characteristics that are unique to the ways in which physicians perceive technology and its usefulness to them. In particular, the case indicates value in

Table 2. Influence of processes and infrastructure on physician adaptation of EHR

Processes and Infrastructure	Description	Positive (n)	Negative (n)	Total
Systems Development	The physician perspective on the development aspects of the EHR specific to their functionality.	0	29	29
Hardware & Configuration	The Physician perspective on the hardware and configuration aspects of the EHR	0	10	10
Training	The physician perspective on the training aspects of the EHR specific to their functionality	6	41	47
Documentation	The physician perspective on the documentation aspects of the EHR specific to their functionality	0	17	17
Knowledge & Learning	The physician perspective on the knowledge and learning environment (e.g. barriers, difficulties, positive impacts).	3	31	34
Desire Integrated Systems	The physician perspective on the desire to have integrated systems across functions and organizations specific to their functionality – actual request for integration	31	5	36
Duplicate System Difficulties	The physician perspective on the difficulties encountered due to duplicate systems.	0	21	21
Downtime Concern	The physician perspective on the issues related to EHR usage and downtime	0	28	28
Total		40	182	222

consideration for digital native and digital immigrant difference (Prensky, 2001) and diffusion theory influences.

It is possible that physician interaction with EHR is affected by generational differences: That is, some physicians may be digital natives, and some of them may be digital immigrants. According to Prensky (2001), digital natives are people who have "spent their entire lives surrounded by and using computers, video games, digital music players, video cams, cell phones and all the other toys and tools of the digital age" (p. 1). Digital natives are used to receiving information quickly, like to parallel process and multitask, prefer their graphics before their text, prefer random access, perform best when networked, and thrive on instant gratification and frequent rewards. Digital immigrants tend to adopt and use technology, but they retain their digital immigrant accent, which can be seen in such things as turning to the Internet for information second rather than first, reading the manual for computer use rather than assuming the program will teach them how to use it, or printing their email. The differences between digital natives and digital immigrant are frequently a focus of training and education efforts, and these two groups of IT

users tend to favor learning in different environments and learn effectively from different methods.

Diffusion theory provides insight on the use and adoption in organizations. It provides insight into one of the most challenging topics in the IT field: that is, how to improve technology assessment and adoption. Diffusion theory provides tools for assessing the likely rate of technology use in an organization and identifies factors that facilitate or hinder technology adoption. These factors include the characteristics of the technology, characteristics of adopters, and the means by which adopters learn about and are persuaded to adopt the technology (Rogers, 2003).

Diffusion is defined as "the process by which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 2003, p. 5). Rogers claimed that individuals move through five stages when making a decision about whether to adopt or reject an innovation: (a) awareness, (b) interest, (c) evaluation, (d) trial, and (e) adoption. Rogers synthesized the results from more than 3,000 studies that examined adoption and diffusion and made several generalizations about innovation diffusion: (a) Innovations possess certain characteristics (i.e., relative advantage, compatibility, complexity, trialability, and observability), which, as perceived by adopters, determine the ultimate rate and pattern of adoption; (b) some potential adopters are more innovative than other adopters and can be identified by their personal characteristics (e.g., cosmopolitanism or level of education); (c) the adoption decision unfolds as a series of stages (i.e., flowing from knowledge of the innovation through persuasion, decision, implementation, and confirmation), and adopters are predisposed to different types of influence (e.g., mass market communication versus word of mouth) at different stages; (d) the actions of certain types of individuals (e.g., opinion leaders and change agents) can accelerate adoption, especially when potential adopters consider these individuals to be similar to themselves; and (e) the diffusion process usually starts out slowly among pioneering adopters, reaches a take-off point as a growing community of adopters is established and the results of peer influence take effect, and levels off as the population of potential adopters becomes exhausted, which leads to an S-shaped cumulative adoption curve (Fichman, 1992, p. 196).

The above analysis suggests that the technological difficulties surrounding EHR have affected the physician adaptation and their level of comfort with the technology. The technological adaptation of EHR by physicians is negatively affected as a result of these technical difficulties described above. Further analysis of this data suggests that technological adaptation comprises of additional characteristics that are unique to the ways in which physicians perceive technology and its usefulness to them. Table 3 illustrates the sub-categories discovered through open coding and the perceptions of physicians within those categories.

Table 3. Technological adaptation

Tech Adaptation	Positive	Negative	Total
Diffusion (Rogers)	28	30	58
Digital Native Digital Immigrant– Generational Age Difference	21	9	21
Total	40	39	79

Diffusion is defined as "the process by which an innovation is communicated through certain channels over time among the members of a social system" (Rogers, 2003, p. 5). Rogers claimed that individuals move through five stages when making a decision about whether to adopt or reject an innovation: (a) awareness, (b) interest, (c) evaluation, (d) trial, and (e) adoption. Open coding of the data revealed the physician perspective on EHR. The diffusion does appear to be influenced by digital immigrant/digital native or generational influence.

Technological adaptation amongst physicians appears to be influenced by their level of comfort and experience with technology. While older physicians are opinion leaders with respect to clinical decisions, younger physicians are frequently leaders in using information technology (Anderson, 1997). This is supported by this research as indicated by the data, such as:

rather than sitting down and thinking "could this be something else, what am I missing, what else could it be?" and we don't have time to that anymore, you don't have time to use our clinical skills to take care of our patient. Now, with that being said, we have a whole generation of physicians coming up that are not as good at their clinical skills. I am not as good at my clinical skills as my elder colleagues. They can walk into a room and diagnose something because they were good clinicians.

Now, with that being said, we have a whole generation of physicians coming up that are not as good at their clinical skills. I am not as good at my clinical skills as my elder colleagues. They can walk into a room and diagnose something because they were good clinicians. Now we look at a patient and say what do they have and then we look at the data and make the data fit what we want it to. Does the data fit what it could possibly be rather than I think it's this, what do I need data-wise to confer? And so I think with EHR we are doing a lot of it, we are spending more time trying to find out what it could be with data rather than talking to a patient.

I think that people that are coming out of training in the last 5 years would have similar thought processes to me on use and benefits of technology. I think that every

10 years you are going to see a generation of different people that even it's just more of who they are and what they do.

I think that the exact opposite…the people that have been here for 20 years and have had a little tough time adapting to, not just new technology, but how fast new technology is updated. The change process and the changes continue to happen… it's a logarithmic progression. Every 5 years the change, I mean, the change we have seen in the last 5 years is exponentially greater than the change we saw in the 5 year period 10-15 years ago. You have to learn to use a new phone and computer every couple of years now.

As the case indicates, there are challenges to resolve related to physician interaction with EHRs.

SOLUTIONS AND RECOMMENDATIONS

It is recommended to have a physician system interface that allows doctor to enter orders as quickly or faster than they can hand write them or else the chances of success will be slim. If the system can be made faster than on paper, all you have to do is incentivize the doctors through the learning curve.

Working with professionals requires understanding their work requirements. Recommendations for influencing physician interaction with EHR: 1) Emphasize clinical value; 2) Don't waste physician time; 3) Provide easy access login and sequence; 4) Provide tools for physicians to find their patients information; 5) Focus on streamlining the interface between the physician and the computer; 6) Identify medical staff needs; 7) Build a system that addresses the medical staff's needs (that is different than understanding what your hospital needs are and addressing your hospital needs); 8) Engage clinical leadership; 9) Prepare for culture shock. EHR and CPOE can improve patient safety. It must be a component with a larger culture of patient safety and it is a component that must be used carefully.

"To be a professional includes three ideals: 1) that one has skill acquired through specialized training; 2) that one can have a rational account of one's own activities, explaining the 'whys'; 3) that one is dedicated to using one's skills for the well-being of others" (Benveniste, 1987; Weick & McDaniel, 1989). Professional organizations are created to apply professional values and expertise to the resolution of difficult, often ambiguous problems. One can view a professional organization as a strategy for reducing uncertainty about what can be done using professional expertise and should be done using professional values (Anderson & McDaniel, 2000). Often the physicians' expertise is based on specialized cognitive knowledge and specialized

skills. Healthcare organizations are "unique among professional organizations in that rather than one profession occupying all the major professional roles, there are several different professions that are central to the organizations success. Historically, physicians have a dominant role in the medical model of healthcare" (Anderson & McDaniel, 2000). Physicians have experienced highly demanding educational and specialized training and are experts in their own profession and accustomed to practicing in a particular way or style similar to which they were trained. Findings from prior research suggest physicians are reluctant to give a positive response to implementation of an IS that interferes with their traditional routines (Chau & Hu, 2002). A key element in understanding physician use of EHR is the critical role played by expertise and values in their work processes. Anderson and McDaniel feel professional expertise and values can be powerful inhibitors of innovation.

In addition, when the implementation of information systems interferes with physicians' traditional practice routines, they are not likely to be accepted by physicians (Anderson & Aydin, 1997). According to Anderson, physicians will oppose any systems that impose major limitation on how clinical data is recorded and how the medical record is organized. Physicians feel it interferes with the way they organize their thought processes in caring for patients. A key element in understanding physician perspective of EHR is the critical role played by expertise and values in their work processes. Understanding how physicians work with knowledge in the healthcare domain and the knowledge identities they utilize is an important step in understanding the physicians' perspective on EHR usage.

Often new technologies fail to produce the benefits expected by an organization. A new technology is introduced, and the focus moves to other priorities. The diffusion of IT use, however, requires additional attention because IT has a history of following the 80/20 rule: 80% of the time, only 20% of the capability is utilized. According to Boynton, Zmud, and Jacobs (1994), absorptive capacity theory, when applied to the domain of IT use, suggests that an organization's development of a mosaic of IT-related knowledge and processes binds together the firm's IT managers and line managers: "An organization's absorptive capacity reflects its ability to 'absorb,' through internal knowledge structures, information regarding appropriate innovations so that these innovations can be applied in support of operational or strategic activities" (p. 300).

The physician perspective reflects the unique role and responsibilities of the physician. The physician role is characterized with professional autonomy, status role, expertise, experience, and intuition. The ability to incorporate technology into physician practice based on specialized training, experience and intuition is a challenge that requires more than merely providing the opportunity of technology. As innovative and exciting IT applications target individual 'professionals,' it has been important to investigate the perspectives of professionals (e.g. physicians) in their professional settings.

REFERENCES

Attewell, P. (1992). Technology diffusion and organizational learning: The case of business computing. *Organization Science*, *3*(1), 1–19. doi:10.1287/orsc.3.1.1

Benveniste, G. (1987). *Professionalizing the organization*. San Francisco, CA: Jossey-Bass.

Blumenthal, D. (2009). Stimulating the adoption of health information technology. *The New England Journal of Medicine*, *360*(15), 1477–1479. doi:10.1056/NEJMp0901592

Fichman, R., & Kemerer, C. (1997). The assimilation of software process innovations: An organizational learning perspective. *Management Science*, *43*(10), 1345–1363. doi:10.1287/mnsc.43.10.1345

Greenhalgh, T., Potts, H. W. W., Wong, G., Bark, P., & Swinglehurst, D. (2009). Tensions and paradoxes in electronic patient record research: A systematic literature review using the meta-narrative method. *The Milbank Quarterly*, *87*(4), 729–788. doi:10.1111/j.1468-0009.2009.00578.x

Institute of Medicine. (2001). *Crossing the quality chasm: A new health system for the 21st century*. Washington, DC: National Academy Press.

Lewin, K., & Minton, J. (1986). Determining organization effectiveness: Another look and an agenda for research. *Management Science*, *32*(5). doi:10.1287/mnsc.32.5.514

Manos, D. (2009, March 25). New study shows few hospitals have comprehensive EHR. *Healthcare IT News*.

Markus, L., & Robey, D. (1988). Information technology and organizational change: Causal structure in theory and research. *Management Science*, *34*(5), 583–598. doi:10.1287/mnsc.34.5.583

McDonald, C. J. (1997). The barriers to electronic medical record systems and how to overcome them. *Journal of the American Medical Informatics Association*, *4*(3), 213–221. doi:10.1136/jamia.1997.0040213

Niazkhani, Z., Pirnejad, H., Berg, M., & Aarts, J. (2009). The impact of computerized provider order entry systems on inpatient clinical workflow: A literature review. *Journal of the American Medical Informatics Association*, *16*(4), 539–549. doi:10.1197/jamia.M2419

Noteboom, C., & Qureshi, S. (2011). Physician interaction with electronic health records: The influences of digital natives and digital immigrants. In R. Sprague & J. Nunamaker (Eds.), *The Forty-Fourth Annual Hawaii International Conference on System Sciences*. Washington, DC: IEEE Computer Society Press.

Ondo, K. J., Wagner, J., & Gale, K. L. (2002). The electronic medical record (EMR): Hype or reality? *HIMSS Proceedings, 63*, 1–12.

Prensky, M. (2001). Digital natives, digital immigrants. *Horizon*, *9*(5). doi:10.1108/10748120110424816

Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). New York, NY: Free Press.

Simon, H. (1997). *Models of bounded rationality*. Cambridge, MA: The MIT Press.

Thrall, J. (2004). Quality and safety revolution in health care. *Radiology*, *233*, 3–6. doi:10.1148/radiol.2331041059

Vishwanath, A., & Scarmurra, T. (2007). Barriers to the adoption of electronic health records: Using concept mapping to develop a comprehensive empirical model. *Health Informatics Journal*, *13*(2), 119–134. doi:10.1177/1460458207076468

Weick, K., & McDaniel, R. R. (1989). How professional organizations work: Implications for school organization and management. In Sergiovanni, T., & Moore, J. H. (Eds.), *Schooling for Tomorrow Directing Future Reforms to Issues that Count* (pp. 330–355). Boston, MA: Allyn and Bacon.

ADDITIONAL READING

Blumenthal, D. (2009). Stimulating the adoption of health information technology. *The New England Journal of Medicine*, *360*(15), 1477–1479. doi:10.1056/NEJMp0901592

Greenhalgh, T., Potts, H. W. W., Wong, G., Bark, P., & Swinglehurst, D. (2009). Tensions and paradoxes in electronic patient record research: A systematic literature review using the meta-narrative method. *The Milbank Quarterly*, *87*(4), 729–788. doi:10.1111/j.1468-0009.2009.00578.x

Institute of Medicine. (2001). *Crossing the quality chasm: A new health system for the 21st century*. Washington, DC: National Academy Press.

Lewin, K., & Minton, J. (1986). Determining organization effectiveness: Another look and an agenda for research. *Management Science*, *32*(5). doi:10.1287/mnsc.32.5.514

Manos, D. (2009, March 25). New study shows few hospitals have comprehensive EHR. *Healthcare IT News*.

Markus, M., & Robey, D. (1988). Information technology and organizational change: Causal structure in theory and research. *Management Science*, *34*(5), 583–598. doi:10.1287/mnsc.34.5.583

Niazkhani, Z., Pirnejad, H., Berg, M., & Aarts, J. (2009). The impact of computerized provider order entry systems on inpatient clinical workflow: A literature review. *Journal of the American Medical Informatics Association*, *16*(4), 539–549. doi:10.1197/jamia.M2419

Noteboom, C., & Qureshi, S. (2011). Physician interaction with electronic health records: The influences of digital natives and digital immigrants. In R. Sprague & J. Nunamaker (Eds.), *The Forty-Fourth Annual Hawaii International Conference on System Sciences*. Washington, DC: IEEE Computer Society Press.

Simon, H. (1997). *Models of bounded rationality*. Cambridge, MA: The MIT Press.