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Perspectives of healthcare practitioners: An exploration of interprofessional communication using electronic medical records

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Abstract

Contemporary state-of-the-art healthcare facilities are incorporating technology into their building design to improve communication and patient care. However, technological innovations may also have unintended consequences. This study seeks to better understand how technology influences interprofessional communication within a hospital setting based in the United States. Nine focus groups were conducted including a range of healthcare professions. The focus groups explored practitioners' experiences working on two floors of a newly designed hospital and included questions about the ways in which technology shaped communication with other healthcare professionals. All focus groups were recorded, transcribed, and coded to identify themes. Participant responses focused on the electronic medical record and while some benefits of the electronic medical record were discussed, participants indicated use of the electronic medical record has resulted in a reduction of in-person communication. Different charting approaches resulted in barriers to communication between specialties and reduced confidence that other practitioners had received one's notes. Limitations in technology - including limited computer availability, documentation complexity, and sluggish sign-in processes - also were identified as barriers to effective and timely communication between practitioners. Given the ways in which technology shapes interprofessional communication, future research should explore how to create standardized electronic medical record use across professions at the optimal level to support communication and patient care.

Keywords

Interprofessional Collaboration; Interprofessional Communication; Qualitative research; Focus groups

Introduction

Communication and collaboration are essential elements to creating safer hospitals; high quality communication and collaboration between healthcare staff reduces the likelihood of adverse events and relates to lower levels of patient morbidity (Davenport, Henderson, Mosca, Khuri, & Mentzer, 2007; Fewster-Thuente & Velsor-Friedrich, 2008). To improve communication and patient care, healthcare facilities are incorporating or have incorporated technology into their buildings (Reiling, 2006; Smith, 2004). The 2001 Institute of Medicine

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report, *Crossing the Quality Chasm*, recognizes the important role that information technology plays in regards to patient safety (Institute of Medicine, 2001). Similarly, the 2012 Institute of Medicine report, *Best Care at Lower Cost: The Path to Continuously Learning Health Care in America,* calls for a vision of efficient and effective healthcare that involves improvements in science and informatics Institute of Medicine, 2012). Technological innovations are expected to improve patient care via streamlined care, faster response to adverse events, identifying errors, and supporting decision making (Bates & Gawande, 2003). For instance, computerized systems for identifying medication interactions are more accurate at catching necessary adjustments than unassisted humans (Chertow et al., 2001). Computer-based clinical decision support systems have also demonstrated improved physician delivery of preventive care (Hunt, Haynes, Hanna, & Smith, 1998). Similarly, computer-based alerts have led to better outcomes among hospitalized patients (Rind et al., 1994).

Despite these potential benefits, many clinicians still view technology as unimportant for practice and academic medical centers tend to prioritize development of therapy modalities more so than decision support systems (Bates & Gawande, 2003). While technology holds great promise for improvements in care, technological innovations may also have unintended consequences. Buntin and colleagues reviewed articles examining health information technology in relation to quality, efficiency, and satisfaction and acknowledged some practitioner dissatisfaction highlighting the need for additional research into the challenges of information technology implementation (Buntin, Burke, Hoaglin, & Blumenthal, 2011).

A few studies have explored challenges involved with use of information technology.

For example, one study examining the effects of an electronic medical records (EMR) system on doctors' work practices in an emergency department found that use of the EMR increased documentation time and reduced physician time with patients and nurses by increasing time spent charting in designated charting areas (Park, Lee, & Chen, 2012). Other research also suggests that implementation of an EMR may reduce face-to-face communication between physicians and nurses (Taylor, Ledford, Palmer, & Abel, 2014). This decline in synchronous communication may decrease the likelihood that verification and clarification occur and increase the likelihood that incomplete and fragmented communication result (Robinson, Gorman, Slimmer, & Yudkowsky, 2010).

While research has explored how information technology influences interactions between physicians and patients and nurses, a comprehensive understanding of how information technology influences interprofessional care delivery is lacking (Hsu et al., 2005; Kossman & Scheidenhelm, 2008; Park, Lee, & Chen, 2012; Taylor, Ledford, Palmer, & Abel, 2014). While technology can support interprofessional communication, the complexity of healthcare suggests its success will be influenced by the fit between the people, the processes, and the technology itself (Brault, Therriault, St-Denis, & Lebel, 2015; Kuziemsky & Reeves, 2012). Recent research suggests four dimensions of awareness that are shaped by health information technology and influence interprofessional collaborative care; these dimensions include awareness of patients, team members, decision-making, and the clinical environment (Kuziemsky & Varpio, 2011). Patient awareness can include information

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pertaining to patient status and treatment plans and goals. Team member awareness can include knowledge of which professions are part of the care team and the roles of each team member. Decision-making awareness can include knowledge of the deliberation process during collaboration, including an awareness that one's own input was taken into account in the decision making process. Environmental awareness can include awareness of communication channels involved– including paper, oral, and electronic options as well as limitations of the physical infrastructure.

Recognizing the complexity of healthcare delivery, the purpose of this study is to better understand, from the perspective of healthcare practitioners, how technology influences interprofessional communication within a hospital setting. With the increasing incorporation of technology into healthcare practice, it is important to develop a nuanced understanding of how technology shapes communication to identify design or practices changes that may be warranted to help ensure safe and effective patient care delivery.

Methods

We chose an exploratory approach so that participants could provide their perceptions and perspectives of how technology affects interprofessional communication. In particular, we selected a focus group approach so that fellow participants could help stimulate thoughts and responses to our prompts.

Setting

This study took place on two floors of a newly designed academic medical center hospital. These two floors included neuroscience, with a stroke sub-unit, trauma surgery, general surgery, and orthopedics. Each floor included an intensive care unit, progressive care unit, and acute care unit. The EHR used in this facility was sunrise clinical manager (SCM) which supported management of orders and documentation for medication administration and daily patient care. SCM was used across healthcare professions.

Data collection

Nine focus groups were conducted with a range of healthcare professionals. Seven of the groups were homogenous by profession or level: three registered nurses groups, two nurse manager groups, one physician group, and one group of certified nurse assistants. There were two groups of mixed professions (e.g. pharmacy, occupational and physical therapy). Focus group participants included two pharmacists, one occupational therapist, one chaplain, three patient care facilitators, one physical therapist, one physical therapy assistant, one social worker, 12 nurses, four patient care managers, two fourth year medical students, two physicians, and five certified nursing assistants. Ten of the participants were male and 25 were female. Participants reported an average of 10.8 years in healthcare, ranging from 2 years to 32 years. All but five of the 35 participants had been working in the new hospital since it opened.

Participants were recruited through emails sent out by their respective services and through posters in their working areas. Focus groups were conducted approximately a year and a half after the new floors of the hospital had been opened. An experienced focus group facilitator

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conducted the focus groups and was accompanied by a note taker to help with matching participants to their responses. Participants completed an informed consent prior to participation in the focus groups. All participation was voluntary and light snacks were provided as incentive. The focus groups explored practitioners' experiences working on two floors of the newly designed hospital and included questions about the ways in which technology shaped communication with other healthcare professionals, e.g. "tell us about the communication technology that you work with. Has it changed the way you work? How is interprofessional communication initiated? Can you talk about the level of collaboration on the patient floors?" The particular EMR in place at this hospital had been in use for approximately two years. Focus groups lasted an average of 46.61 minutes, ranging from 25.77 minutes to 55.68 minutes.

In order to enhance the trustworthiness of the findings, we engaged in an iterative analysis and member-checking process; we discussed initial findings from earlier focus groups with subsequent groups. This enabled us to confirm we were interpreting responses as participants intended and to refine and clarify initial insights.

Analysis

All focus groups were audio-recorded, transcribed in entirety, and coded using an inductive, line by line approach to identify themes. Coding was conducted by an experienced qualitative researcher (who had also previously served as the focus group note taker) and was critically reviewed by a second experienced qualitative researcher (who had conducted the focus groups). Any codes that were unclear or omitted were discussed between the two researchers until a final coded transcript was created for each focus group.

Ethical considerations

This study was approved by the University of Kentucky Institutional Review Board before it commenced.

Findings

General uses of technology

Practitioners discussed a number of different technologies that were part of their daily work environment. These included computers, phones, radio frequency locator chips, and the EMR. While each of these technological features was discussed, the groups largely focused on the use of the EMR and consequently we focused our analysis on the EMR. Some respondents shared perceived advantages of the EMR. For instance, one tech shared how the EMR made charting more timely and efficient:

> We used to have to hunt down charts to chart, wait around for people to get done with their charting so we could chart.

Similarly, one of the nurses also shared her positive perceptions of how the EMR saved in terms of locating patient information:

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> It's working great, it's awesome. You can use tabs, and you know exactly what you are looking for. It's very easy to look through all their information in a short amount of time. As opposed to looking through all these papers.

Another nurse also shared her generally positive impression:

> I think that it [the EMR] is very useful in interdisciplinary communication, I think electronic charting as a whole is very beneficial to the patient because it allows a lot of different people to communicate.

This nurse however, went on to share the sentiment that the EMR is a pain for nurses.

Many practitioners discussed how the incorporation of technology into their work reduced face-to-face communication. One attending physician explained:

> It's [technology] supposed to [replace face-to-face communication], that's always been its role. A consultant leaves a note or we leave a note. That's how we communicate is the chart. It's just impractical and impossible to always have face-to-face, there's just too much going on.

This physician described the way in which communication occurs across multiple channels due to asynchronous care delivery, through which interprofessional practitioners have minimal face-to-face interaction. Another attending physician agreed with the advantages of the electronic medical record, but also acknowledged the possibility that some details may get lost, "It [communicating through the medical record] doesn't completely communicate all the nuances, but it is our durable means of communication." These comments reflect participants' understanding of the increasingly technological nature of healthcare provision – and their ability to identify and evaluate the role of the EMR in interprofessional communication. Participants emphasized two main barriers to effective and timely communication between specialties: different approaches to EMR use and limitations in technology. Each of these themes is discussed below.

Different Approaches to EMR Use

While acknowledging the medical record has the potential to facilitate access to information between practitioners, participants noted that this potential was often unrealized. Respondents expressed that different charting modalities and informational needs among different specialties served as a barrier to informational exchange and interprofessional communication. One medical student explained how documentation provided by some specialties, such as physical therapy (PT) and occupational therapy (OT), was often not in a helpful format for other practitioners:

> If you try to read those PT/OT notes, you just want the recommendation for acute rehab or sub-acute or whatever, and it [the charting template] goes through every single question they ask the patient while they are in there. It matters for them, I understand that, but when you are taking care of the patient and you are consulting them… commonly it seems that it [the recommendation] is buried somewhere in the body of the note and you kind of sort of need to glean it from the narrative.

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Participants frequently highlighted inefficiencies in the design and implementation of the EMR. The medical student describes the difficulty of finding key information that an MD may need but may not be readily available due to the way the electronic medical record is formatted. This leads to delays in care, unnecessary or redundant care delivery, and problems with clear communication between specialties.

Another medical student expressed how the problem of locating relevant information is further exacerbated by the fact that not all professions exclusively use the online record. Due to this lack of standardization in EMR use, practitioners sometimes need to search through both electronic and paper charts:

> There's a problem as far as not everyone is online yet. Some of the other consultants are still writing paper notes, and then you have the blue surgery team who puts their notes in the computer. It's kind of pain-staking to check the paper charts and then check the electronic charts all day long. And you have to constantly go back and check the paper charts because you have no idea when they are going to go drop their notes so you have no idea what their plan is unless you call them. But that kind of seems redundant if you are calling them and they are writing a note, to ask what their plan is.

Another potential problem with reliance on the record for communication is that not all notes may be read by other practitioners. Many participants expressed uncertainty that other professionals read their notes; respondents were unsure about the extent to which the information they recorded was conveyed to other individuals involved in the patient's care. For instance, the chaplain shared his experience that, while he documents in the medical record, "if I think it's pertinent enough, I'm going to find the nurse, because again, not a lot of people look for our notes, so I try to make sure it's a face-to-face communication."

Many participants shared this skepticism that their notes were read and that information was effectively conveyed to other specialties. One attending physician discussed his preference for the old paper charts, describing how certain patient summary information was more easily viewable in paper form and suggesting that there was no electronic equivalent:

> I find the nurses' notes on the computer a lot more tedious to look through than in the old days, you'd just flip that vitals sheet right to the back and read the note immediately. Now you have to click on this, scroll that, open this, scroll down this, I've just said, "Forget it." And it's so tedious for the nurses to put in and half the information they don't even bother to put in. It's multiple clicks, just horrible design. I really miss the old paper chart. I could tell what was going on with the patient in 20 seconds what would take me 30 minutes in the computer to figure out.

This quote conveys physician frustration with finding information in the EMR. One of the nurses explained why physicians may have trouble finding information, "If you are not highly familiar with these very specific redundant spreadsheets, you are not going to find what you are looking for. That's why I feel like they've probably given up and they just ask us since we know."

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Some practitioners expressed concern that they were using the record to communicate with physicians, but as one nurse suggested:

> Nobody looks at it. It's basically the doctors talk to the nurses. I don't think they even look at SCM [the electronic record] unless they are looking for an X-ray or, like, totals, ins and outs for shifts, how much fluid they got, and lab results.

These healthcare professionals describe how different approaches to using (or not using) the EMR created communication barriers for them in their interactions and workflow with other professions. The format and complexity of the system resulted in multiple inefficiencies and the use of other channels of communication. For example, physicians would often use face-to-face communication in order to find out what they needed to know instead of the EMR.

Technical Limitations

Many healthcare professionals described how problems with the design and implementation the EMR impacted communication between practitioners. These technical limitations included challenges with information retrieval, speed, and computer availability. For instance, one patient care facilitator explained

> There's a lot of information put into SCM [the EMR], but there's not a good way to go find what you want quickly. You've got to look through 100 documents to find the information you are looking for.

Another patient care facilitator expanded on this unwieldy system, indicating that even when you information is retrievable, sometimes the details are lacking. She provided the following example, "You can't find a dressing change other than that it's been done, but what it entailed, what went in the wound…it's [the electronic record] great to feed, it is useless to retrieve." One of the patient care managers indicated that:

> Being able to retrieve information back from the electronic record has not been a good thing. So from people who - from experienced people who were here using flow sheets and hard copy, I would suggest that a high percentage of them would tell you that they would much prefer to use that because it was easier for them.

In the above example, the nurse manager explained that even though the electronic system had been in place for a couple years, many healthcare professionals believed that it reduced their efficiency in caring for patients.

Other participants spoke about frustrations with the speed of accessing the EMR. One attending physician shared his frustration,

> I think IT should be, well I won't say what should happen to IT, but it's horrible. Something as simple as looking up an X-ray can take five minutes.

One nurse explained how her frustration with the speed was enhanced by redundancies in the software design:

> [The electronic record] is the devil and I hate it. It's the most cumbersome system you could have for charting. It's so redundant for what we have to chart. And it's so

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> time consuming… I probably chart the same thing six times in the course of an assessment.

One attending physician explained how the slow speeds signing into computers encouraged the residents to work from a separate workspace rather than be more integrated into the unit:

> In regards to the computers, they absolutely are horrible. They are so slow. I think that's why the residents hang out in the resident work room. It's just the time it takes to shut down and start up another computer, it's just, it is killer. It can take several minutes to load it up and start working. If you add that on to 60 patients that's a couple of hours a day. [Every time the resident goes to a patient room] they have to log out, log in. They prefer the workroom because they don't have to continue doing that.

Residents' preference to return to their dedicated workspace physically separates them from the rest of the care team, decreasing opportunity for interprofessional collaboration.

Other practitioners, such as the physical therapist, indicated that computer availability was an issue. Due to the scarcity of computers she replaced her preferred method of documenting after each patient with documenting multiple patients later in the day:

> Sometimes you can't get a computer to document…it slows it up. Because I can write a note faster when it's fresher in my head if I can just get it done. So it kind of slows me up for the day to have to think back, what did he say?

She went on to explain how the intention with the hospital design was to document each patient in or right outside of the patient's room,

> You come out, you put your note on, you move on. They explained it to doctors that way; they explained it to us that way. And then, that was completely impossible. That was some fantasy world.

As a result, the transfer of patient information may be delayed until later than necessary, leading to potential loss of information and delays in patient care that could be avoided with timely, face to face communication.

One of the patient care managers described the work-around that her nurses had adopted due to both limited computer availability and slow processes for logging in:

> My staff has actually resorted to, so they set up their work station in the morning, you know, their papers that they need and they may have their water and whatever that they have and that's going to be their work station for today. They'll actually tape a sheet of paper to that computer that says "charting in progress, please do not use" so then they'll flip it up when they are working on it and then if they have to step away they'll flip that sheet of paper down so somebody knows that's their charting station and people know not to use it.

This practice further exacerbates the computer shortage, leading to resentment among other practitioners seeking computer workspace, and may also compromise the privacy of patient information. One of the attending physicians also expressed how delays in entering notes can occur:

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> Our team is notorious, notorious for putting notes in late in the day based on early morning information just because of the time it takes to put the note in, the time it takes to get everything else done. The last thing that goes in is the note which is how you communicate with other consultants.

As these quotes indicate, a reliance on the record for communication can lead to delays in information being conveyed. These delays can result in a loss of fidelity due to the possibility of forgetting details hours later. Further, delays may also lead to other members of the care team lacking a full and current picture of the patient's status, plan, and goals. These gaps in the patient record and in practitioners' understanding of a patient's care plan could present concerns for patient safety and limitations in quality of care. The limitations in technology that these professionals experience in their attempt to document or retrieve information and the limited computer speed and availability they experience act as barriers to timely and effective interprofessional communication

Discussion

This study examined EMR use and interprofessional communication in a hospital setting. While some respondents acknowledged advantages to the EMR, we found separate approaches by different professions to using EMRs and technical limitations that served as barriers to effective and timely communication. Physicians were more likely to use multiple communication channels, particularly face-to-face, when trying to address the perceived weakness in EMRs. Shortcomings in technology included limited computer availability, complexity in entering or retrieving documentation, sluggish sign-in processes, and other problems with ongoing implementation of EMRs. These findings suggest a similarity with Steers (2013) essay on the limitations and negative impact of EMRs, where he critiqued the overreliance on the EMR and its use for communication of both complex and simple information between practitioners. The barriers to communication found in this study indicate that a major shortcoming of EMRs is related to the inability to facilitate collaboration between practitioners. The findings in this study are also consistent with the four dimensions of awareness identified in Kuziemsky and Varpio's (2011) Awareness Model of Interprofessional Collaborative Care Delivery (AMICC) - patient, team member, decision-making, and environmental awareness. The current study suggests how the EMR may create challenges for each of these four dimensions of awareness.

Regarding patient awareness, respondents indicated frustration that the information they wanted to guide patient care was often hard to discern from the EMR. In some instances this was an overabundance of details obscuring a recommendation, e.g. PT/OT rehabilitation recommendations; in others, it was the omission of relevant clinical information, e.g. the details regarding a dressing change. Practitioners also highlighted how delayed entry of notes into the EMR may make patient data unavailable to other professionals.

The issue of team member awareness was also evident from many practitioners' concerns that others do not even know they enter notes. This conveys concern that reliance on the EMR interferes with a comprehensive understanding of the roles and responsibilities of the entire care team and also ties into decision-making awareness. Without the confidence that

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others read their notes, practitioners are also unaware of whether their input is considered in guiding decisions pertaining to patient care. If subsequent notes do not explicitly indicate how a decision was made, practitioners may be left with gaps in understanding pertaining to the rationale behind decisions. Finally, pertaining to environmental awareness, practitioners discussed challenges with knowing where to find information, both in the EMR itself, and also identifying when alternate paper-forms were being used in lieu of the EMR.

These findings highlight that the existing design and use of the EMR create challenges for interprofessional communication. This suggests two possible approaches for moving forward. The first approach would be to modify the EMR to better support collaborative care needs (Wu et al., 2012). This approach would be responsive to trends in increasing reliance on the EMR. The alignment of this study's findings and the AMICC suggest that under this strategy, revisions to the EMR should explicitly consider how to support these four dimensions of awareness to enhance interprofessional collaborative care. For instance, interactive EMRs could adapt to practitioner preferences and more prominently display to each user the information he most utilizes in patient care. Approaches to enhance real-time electronic entry of clinical information – such as personal computer devices or scribe entry at the time of care – could also be explored. Further a data trail to support collaboration and help practitioners know if their notes have been read and how or why decisions are made could enhance decision making awareness and more fully enable each team member to contribute (Kuziemsky & Varpio, 2011). Consistent use of the EHR across specialties and human factors approaches to enhance the usability and readability of information within the EMR may also strengthen the concerns pertaining to environmental awareness (Lanham, Leykum, & McDaniel, 2012). The Institute of Medicine (2012) report explores goals and recommended strategies to help transform technology from merely capturing information, to being a useful tool that generates knowledge and application for guiding and supporting patient care. This report highlights the importance of interoperability and the need for coordinated communication strategies across professionals. This coordination, however, is unlikely to occur by chance, training across health professions in use of information technology is needed to enhance communication (Brault et al., 2015; Ellaway, Graves, & Greene, 2013).

The second approach for moving forward would be to recognize the limitations in EMR use for interprofessional communication and collaboration and attempt to shift practices away from a reliance on the EMR and ensure that alternate strategies for communication and collaboration are in place. This approach would recognize the EMR was initially intended for documentation rather than communication and acknowledge the prior research which suggests that EMR use tends to support individual care rather than team needs (Dorr, Jones, & Wilcox, 2007). Research has also suggested that EMR use may facilitate audits, billing, and research, but may actually make clinical work less efficient and less flexible (Greenhalgh, Potts, Wong, Bark, & Swinglehurst, 2009). Accordingly, it is worth considering whether we should continue down the path of trying to make the EMR fit healthcare needs or whether care may be compromised by trying to communicate using technology designed for other purposes.

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Future research should explore the pros and cons of these two approaches, incorporating both practitioner preferences and consideration of technological capabilities into the decision process. Training on the resulting EHR and its use should be interactive and consistent across specialties – and include discussion of the multiple purposes and uses of any information entered, not just the how to of navigating the system (Goveia, Van Stiphout, Cheung, et al., 2013). In addition, regardless of the approach chosen, the computing infrastructure should be recognized as critical to promoting optimal EMR infrastructure. Individuals in this study discussed limited computer availability and sluggish signing in processes as factors preventing timely entry to notes. These results are consistent with findings that suggest that EMR usage is influenced by both physical accessibility – availability of computers – and logical accessibility – ease of use, e.g. difficulty logging into system (Ilie, Van Slyke, Parikh, & Courtney, 2009). Informaticists should also be included in the healthcare team and new technologies should be tested through realistic, simulated environments to be improved prior to implementation in the real-world setting (Elias, Barginere, Berry, & Selleck, 2015; Gold, Tutsch, Gorsuch, & Mohan, 2015).

Limitations of this study include the following: this study was conducted at a single academic medical center, and thus the use of technology and its relationship with communication may differ in other settings. There is also likely to be a response bias in that individuals who volunteer to provide feedback through focus groups may choose to participate because they are particularly opinionated about their current environment. The robustness of these findings could be strengthened through future research in multiple healthcare settings and through complimentary research methods.

Despite these limitations, this study makes a valuable contribution to our understanding of perceptions related to the prominent role of EMRs in restructuring interprofessional communication. Respondents indicated how technological advantages have led to a decline in face-to-face communications and highlighted the challenges this creates for interprofessional communication. The current utilization also creates opportunities for information to be lost or delayed, which may compromise patient care and patient safety. This study serves as a reminder that when collaboration patterns adapt to the limitations in technology, work-arounds and inefficiencies may negatively impact patient care. Bates and Gawande (2003) discuss how technology alone is not enough; it is important to have carefully chosen, and well executed information technology systems. They lament, that unfortunately, “information technology has been seen by many health care organizations as a commodity, like plumbing, rather than as a strategic resource that is vitally important to the delivery of care.” (p.2533) The decision for how to move forward should be deliberate and evidence-based, rather than simply a response to trends and demands for increasing EMR use.

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