Research article

'It is like texting at the dinner table': a qualitative analysis of the impact of electronic health records on patient–physician interaction in hospitals

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ABSTRACT

Background   Electronic health records (EHRs) may reduce medical errors and improve care, but can complicate clinical encounters.

Objective   To describe hospital-based physicians' perceptions of the impact of EHRs on patient–physician interactions and contrast these findings against office-based physicians' perceptions.

Methods   We performed a qualitative analysis of comments submitted in response to the 2014 Rhode Island Health Information Technology Survey to gain a more in-depth understanding of individual physicians' experiences using their EHRs. Office- and hospital-based physicians licensed in Rhode Island, in active practice, and located in Rhode Island or neighboring states completed the survey about their Electronic Health Record use.

Results   The survey's response rate was 68.3% and 2,236 (87.1%) respondents had EHRs. Among survey respondents, 27.3% of hospital-based and 37.8% of office-based physicians with EHRs responded to the question about patient interaction. Five main themes emerged for hospital-based physicians, with respondents generally perceiving EHRs as negatively altering patient interactions. We noted the same five themes among office-based physicians, but the rank order of the top two responses differed by setting: hospital-based physicians commented most frequently that they spend less time with patients because they have to spend more time on computers; office-based physicians commented most frequently on EHRs worsening the quality of their interactions and relationships with patients.

Conclusion   In our analysis of a large sample of physicians, hospital-based physicians generally perceived EHRs as negatively altering patient interactions, although they emphasized different reasons than their office-based counterparts. These findings add to the prior literature that focuses on outpatient physicians, and can shape interventions to improve how EHRs are used in inpatient settings.

Keywords: doctor-patient relationships, electronic health records, physician satisfaction, qualitative research

INTRODUCTION

Electronic health records (EHRs) were developed for billing and documentation, but have increasingly shifted administrative tasks to physicians, fundamentally changing their work, workflow and interactions with patients. Although EHRs may reduce medical errors and improve care through compliance with guidelines, improved care coordination and access to health information,[1–3] their use can complicate clinical encounters and impact patient–physician interactions.[4,5]

Literature on how EHR use affects patient–physician interactions is mixed and focused on the outpatient setting. Some investigators describe improved communication and increased patient satisfaction[5–7] as well as enhanced patient–physician collaboration.[8] However, many studies suggest that EHRs negatively impact patient–physician interactions; for example, physicians with EHRs spend more time on documentation, potentially leading to less time with patients.[9,10] Physicians may communicate less effectively when using EHRs, perhaps due to time spent looking at the computer, more keyboarding and less time for conversation and periods of silence during the consultation while physicians enter data.[11–15] EHRs' interference with face-to-face interactions substantially worsens professional satisfaction[16, 17] and has been the topic of many editorials by physicians.[18–22]

Because research on EHRs' impact on inpatient interactions is limited, we undertook a qualitative analysis of a statewide physician survey across specialties to assess hospital-based physicians' perceptions about how using an EHR affects interactions with patients. Our findings may inform development of interventions to improve the use of EHRs during inpatient clinical encounters.

METHODS

Data source

Under a data use agreement with the Rhode Island Department of Health (RIDOH), we obtained a merged data set containing data from the 2014 Rhode Island Health Information Technology (HIT) Survey[23] and physician licensure applications. The data set does not contain identifiable information; therefore, the Brown University Institutional Review Board determined that this analysis did not constitute human subjects research.

Survey instrument and administration

RIDOH and its public reporting contractor, Healthcentric Advisors, regularly administer the Rhode Island HIT Survey to measure the presence and use of HIT by physicians caring for Rhode Island patients. RIDOH then publishes structural measures at the individual level and shares aggregate data with state agencies and other stakeholders.

The survey asks respondents to provide information about their practice setting and specialty, indicate how often they use EHR and e-prescribing functionalities, and answer several free-text questions. This includes the open-ended question we examined in this analysis: 'How does using an EHR affect your interaction with patients?' We included this open-ended question to gain a deeper understanding of physicians' experiences balancing their EHR use with patient interactions; such experiences are not easily captured with multiple choice responses.

In mid-2014, RIDOH and Healthcentric Advisors administered the survey to 3,761 physicians licensed in Rhode Island, in active practice, and located in Rhode Island, Connecticut or Massachusetts. These physicians received mailed notices and, if email addresses were included with licensure information, email notifications and up to two reminders.

Data analysis

Each author has expertise relevant for this analysis: all three completed graduate-level training in qualitative analysis methods; one is funded for mixed-methods research and one has clinical expertise in both inpatient and outpatient settings.

We performed a directed[24] qualitative analysis using a combination of deductive and inductive coding. We selected a qualitative approach because of the subjective nature of physicians' experiences when interacting with patients. These methods allowed us to gain a more in-depth understanding of individual experiences while also deriving overall themes to inform interventions to improve physician satisfaction and patient experience with EHRs and to identify future research questions. First, one of the authors created an *a priori* codebook based on existing EHR literature. Second, each author independently examined and coded data using the codebook and any new codes identified. We excluded responses such as 'no comment'. Third, we met to review coding discrepancies and agree on major themes. We considered the frequency of words and codes, intensity of language and specificity of comments. Fourth, we individually performed second-level coding, during which we categorized codes into the agreed-upon themes and rank-ordered themes for each setting based on each theme's prevalence. We selected quotes from each theme to present in the results; no single respondent was quoted more than once in order to represent the widest possible range of respondents' views. Finally, we compared demographic information for physicians who did and did not answer the patient interaction question to assist readers with assessing the transferability of our findings and for us to explore why we found what we did, examine response bias and refine further research questions stemming from our findings.

RESULTS

The 2014 Rhode Island HIT Survey's overall response rate was 68.3%, with 2,567 of 3,761 physicians completing the survey. Among the survey respondents, 2,236 (87.1%) had EHRs; and among those hospital-based physicians with EHRs (969), 265 (27.3%) responded to the open-ended question asking how EHRs affected their patient interactions. Compared to hospital-based physicians who did not answer the question, hospital-based physicians who did were more likely to be older and to practice primary care or emergency medicine (Table 1). About 40% (479) of office-based physicians with EHRs (1,267) responded to the open-ended

question. Compared to office-based physicians who did not answer the question, office-based physicians who did were also older and more likely to practice primary care.

Four main themes emerged (Table 2). Hospital-based physicians consistently conveyed that EHRs have a negative impact on their interaction with patients: the majority of responses and derived themes were negative or neutral. Positive responses focused on information access and use in patient care. We noted the same four themes among office-based physicians, but the rank order of the top two responses differed by setting: hospital-based physicians commented most frequently that they spend less time with patients because they have to spend more time on computers, office-based physicians commented most frequently on EHRs worsening the quality of their interactions and relationships with patients. Comments that were generally positive and comments that detailed the patient's perspective comprised the least commonly observed themes for both settings.

Major themes

EHRs mean less time to spend with patients because more time is required for documentation

The most common theme among hospital-based physicians, and the second most common theme overall, focused on the additional time spent using a computer for documentation that then takes away from time spent directly interacting with patients.

Table 1 Characteristics of respondents who have EHRs (N = 2,236)

	Responded to open-ended question about impact of EHR on patient interaction, n (%)			
	Hospital-based (N = 969)		**Office-based (N = 1,267)**	
Age (in years)	**Yes (n = 265)**	**No (n = 704)**	**Yes (n = 479)**	**No (n = 788)**
<40	37 (14.0)	213 (30.3)	48 (10.0)	123 (15.6)
40–49	79 (29.8)	196 (27.8)	119 (24.8)	230 (29.2)
50–59	80 (30.2)	185 (26.3)	159 (33.2)	257 (32.6)
>=60	69 (26.0)	110 (15.6)	153 (31.9)	178 (22.6)
Practice size				
<5 clinicians	22 (8.3)	79 (11.2)	187 (39.1)	335 (42.5)
5-10 clinicians	66 (24.6)	157 (22.3)	158 (33.1)	208 (26.6)
>10 clinicians	176 (66.4)	468 (66.5)	133 (27.8)	244 (31.0)
Physician specialty*				
Primary care	62 (23.4)	130 (18.5)	279 (58.2)	360 (44.2)
Medical and pediatric subspecialties	38 (14.3)	135 (19.2)	51 (10.6)	116 (14.7)
Surgery and surgical subspecialties	22 (8.3)	45 (6.4)	36 (7.5)	96 (12.2)
Emergency medicine	52 (19.6)	84 (11.9)	1 (<1.0)	5 (<1.0)
Obstetrics/gynecology	13 (4.9)	22 (3.1)	26 (5.4)	47 (6.0)
Psychiatry	37 (14.0)	76 (10.8)	30 (6.3)	46 (5.8)
Other	41 (15.5)	212 (30.1)	56 (11.7)	130 (16.5)

*Primary care includes family medicine, geriatrics, internal medicine (general), medicine/pediatrics and pediatrics. Medical subspecialties include specialties such as cardiology and gastroenterology. Other includes those not in the preceding categories, such as anesthesiology and radiology.

Table 2 Major themes in free text responses from physicians

Themes	Sub-themes	Illustrative quotes	
		Hospital-based	Office-based
Less time spent with patient, more time spent on computer	N/A	Reduces the amount of time I spent with patients due to need to spend time documenting in EHR.	It [takes] 90% of the time that would otherwise go to the patient.
Reduces quality of the interaction and patient–physician relationship	Impedes eye contact/looking directly at patients' faces	I can't stand typing instead of making eye contact with a patient. The computer limits my observations during visits.	I feel like I spend most of my visit looking at the computer screen instead of at my patient.
	Depersonalizes and distracts	Can depersonalize as we try to enter data while also speaking to patients.	Creates a less personal experience for the patient.
No effect on patient interaction	Truly no effect	Does not affect my interaction with patients.	I have been able to maintain my interaction with patients.
	No effect due to altered workflow by the physician	None, I interact with the patients and then I go to the computer. I don't use the computer with the patient present.	I do not use the EHR when I am with patients. I have tried this in other settings, and it degrades the quality of my interactions with patients. It's rude as well.
Improves information access	Helps physicians feel prepared for interaction.	Allows me in the ED to look at an old record before I see the patient to learn some history.	I get results from labs, x-rays and consults much quicker and in a more organized fashion.
	Ability to share information with patients	Able to provide up to date data to patients.	I use a laptop in the exam room and show patients their data.
	Increases communication between physicians	More up to date information communication esp[ecially] p[atien]ts seeing other MD specialists.	Only helpful with patients I do not know and am covering as compared with a paper model.
Negative but non-specific	N/A	Markedly adverse impact.	Impedes, of course!

'We spend less time at bedside and more time interacting with our computers'. [Hospital-based Respondent]

'I now spend much less time [with] patients because I know I have hours of data entry to complete'. [Hospital-based Respondent]

Physicians distinguished between time spent on documentation that resulted in less time in the exam room or at the bedside, versus the time spent looking at a computer during the clinical interaction itself. Hospital-based physicians more commonly described less time in the exam room or at the bedside, compared to office-based physicians who commented more about time spent looking at a computer and not the patient.

EHRs reduce the quality of the patient–physician interaction and relationship

The second most common theme among hospital-based physicians was the negative impact of EHRs on the quality of interactions with patients and therefore physicians' relationships with patients.

'Negatively [affects interactions]. Interacting with computer rather than my patient. Like having someone at the dinner table texting rather than paying attention'. [Office-based Respondent]

Decreased eye contact while documenting during the clinical encounter emerged as a prominent sub-theme.

'My nose is now burrowed deep into my computer interface, leaving markedly reduced time to make eye contact and actually interact one on one with my patient'. [Hospital-based Respondent]

We identified as a second sub-theme the perception that using an EHR depersonalizes the interaction and distracts both patient and physician. Comments included words such as intrusive, impersonal, limits, interferes, distracts and disruptive to describe how using an EHR affects patient interaction, and physicians often referred to the EHR as a barrier.

'I don't feel connected as I am always looking at the [screen]/typing. The art of medicine and treating is lost in this process'. [Hospital-based Respondent]

'Detracts from face to face contact with patients. I [a]m looking at a screen to make sure that I've checked off all the necessary data points irregardless of whether they have any relationship to the reason the patient is being seen'. [Office-based Respondent]

EHRs have no effect on patient interaction

A smaller proportion of physicians in the hospital setting commented that EHRs have no effect on their interaction with patients. This was the third most commonly observed theme among hospital-based physicians, and two distinct sub-themes emerged. The first sub-theme, more common among hospital-based physicians, was that EHRs truly did not affect their interaction because it was not a major part of their workflow or because they had learned to incorporate EHRs without difficulty.

> '*Minimal [effect], as most of my patients are newborn infants. EHR is of some help in communication with parents*'. [Hospital-based Respondent]

> '*Doesn't [affect interactions] . . . Medical ass[istan]t in the room acts as a scribe during p[atien]t encounter*'. [Office-based Respondent]

While this theme was also the third most common among office-based physicians, a notable difference is that office-based physicians more commonly described that EHRs do not affect patient interactions because physicians have altered their workflow to prevent the EHR from having a negative impact, which emerged as the second sub-theme.

> '*I have to do my documentation after seeing the patients because I am not going to type into the computer while they are trying to talk to me*'. [Office-based Respondent]

Many of these office-based physicians who described altering their workflow also noted that this approach resulted in longer work days to complete the required documentation:

> '*I have tried to keep the [patient]-doctor interaction at the forefront of this work, so I mostly jot notes on paper in the room . . . this means I have hours and hours of work at home, but I can't and won't stop putting the patient at the center*'. [Office-based Respondent]

EHRs improve access to information, which benefits patient interactions

Hospital-based physicians described how easy access to information has a positive impact on their interactions with patients. This was the fourth most commonly identified theme, and we identified several sub-themes. First, hospital-based physicians commented that viewing problem lists and lab results help them prepare for the clinical encounter and make it more efficient.

> '*Helps me with the past medical history before I see the patient which is beneficial in the ED*'. [Hospital-based Respondent]

A second sub-theme encompassed how physicians used EHRs to facilitate communication, by allowing the patient and physician to review test results together and by providing ready access to educational materials.

> '*I love [showing] Google images to the patients in the office for the purpose of patient education. I save meaningful graphic representatives with which to teach. I use numerous we[b]-based tools . . . [However], for some visits it reduces eye contact*'. [Office-based Respondent]

A third sub-theme captured how EHRs improved communication with other physicians, most commonly through access to notes, and how this access facilitated their interaction with patients.

> '*Allows me in the ED to look at an old record before I see the patient to learn some history*'. [Hospital-based Respondent]

This theme was also the fourth most commonly described among office-based physicians, although differences were noted among the sub-themes. Office-based physicians commented more frequently about using EHRs during the visit to facilitate communication and noted improved communication with patients via patient portals, while they less frequently commented that viewing problem lists and lab results help them feel more prepared for the clinical encounter.

Negative or positive, but non-specific comments about patient interactions

In the remaining quotes (separate from the four main themes), some physicians expressed that using EHRs had an undesirable impact on their interactions, without providing additional detail. Similarly, physicians expressed positive but non-specific statements; this was the least commonly identified. No major differences were found between settings.

DISCUSSION

Our analysis of a large sample of hospital-based physicians across most specialties demonstrates that they generally perceive EHRs as negatively altering patient interactions, but emphasize different reasons than their office-based counterparts. Hospital-based physicians commented most frequently that they spend less time with patients because they have to spend more time on computers; office-based physicians, on EHRs worsening the quality of their patient interactions and relationships.

These findings add to the literature by focusing on hospital-based physicians and contrasting their perceptions with office-based physicians in the same statewide sample. The difference in frequency of the top two themes likely reflects fundamental differences in how inpatient and outpatient physicians work, with hospital-based physicians frequently using computers situated outside of patient rooms and office-based physicians increasingly bringing laptops into exam rooms. Both groups described strategies to adapt to an increasing documentation burden, with some hospital-based physicians describing the use of problem lists and lab results to feel more prepared for the clinical encounter, and office-based physicians choosing to work additional hours at the office or at home.

Prior studies have focused more narrowly on specific specialties or the outpatient setting.[15] For example, small studies

have illustrated that EHRs draw office-based physicians' attention away from patients and encroach on opportunities to connect with patients.[9,12,25–27] One investigator found that the addition of computers in the exam room impacted communication by altering the verbal, visual and postural connections between the patient and the clinician.[25] Computers can add complexity through the introduction of new physical tasks (e.g. typing) during the clinical encounter, but may also simplify the office visit by providing easier access to clinical data. Similar studies emphasize that office-based physicians are often unaware of the amount of time spent looking at screens and how little they are simultaneously engaged with patients.[12,26]

Inpatient studies are more limited, but they also reveal both positive and negative impacts.[28,29] One demonstrates that EHRs can reduce emergency medicine physicians' time and interaction with patients.[29] Another finds that allowing patients to interact with EHRs can enhance patient satisfaction and the patient–physician relationship. Future research could examine physician-level characteristics other than their physical location to identify any association with particular views or behaviours.

Some investigators have developed approaches to mitigate EHRs' disruption of patient interactions, primarily in the outpatient setting. Recommendations include positioning computer monitors so physicians' backs are not to patients, particularly when discussing sensitive topics[30,31] and so patients can easily see the screen,[26,30–32] briefly familiarizing themselves with charts prior to entering the exam room,[26,32] and 'Honoring the Golden Minute' by engaging with the patient before using the EHR.[32] Recommendations also include physicians telling patients what they are doing on the computer as they do it, to engage patients and minimize awkward silences, and pointing to the screen to highlight results.[30,31] Others noted the importance of learning how to touch-type, to maintain eye contact.[26] It is unclear how these recommendations would transfer to the inpatient environment, especially given the differences described in our findings.

In our study, physicians widely acknowledged EHRs as a permanent presence, saying they must adapt their work and workflow. EHR adoption has accelerated over the past 15 years, with estimates that physicians' use of any EHR system increased from 18.2% to 71.8% between 2001 and 2012.[33] The increase parallels burgeoning reporting requirements for physicians and hospitals seeking value-based payments,[34] which have necessitated profound changes in the way physicians write their notes.[16,35] Many physicians in our study said these documentation requirements compounded the already-challenging process of integrating EHRs into clinical practice and contributed to longer work hours. Addressing these findings will require more than simply incorporating strategies to use an EHR in a more patient-centred way. Future in-person research through focus groups or key informant interviews could investigate the derived themes in more detail and further explore feasible opportunities to address our findings.

Limitations

We note several limitations. First, physicians with EHRs and with greater comfort with technology may be more likely to respond to the Rhode Island HIT Survey, because of greater interest in the topic and because they are more likely to have the technical capacity to complete an electronic survey. Second, our analysis is limited to the approximately one-third of hospital- and office-based physicians who provided free-text responses to the single patient interaction question. Respondents may be more likely to answer this question if they feel strongly (negatively or positively) about the impact of EHRs on their interaction with patients. Among those who did respond, we could not complete further in-depth analysis because we were using secondary, written responses and unable to follow-up to probe for additional information. Third, we classified physicians as hospital- or office-based using survey responses; physicians may be subject to misclassification, as they can complete the survey for a different practice site if their main practice does not have an EHR. Finally, the survey was administered in a single state, which may limit its generalizability; however, the large sample size, high response rate, range of represented specialties and array of EHR vendors may mitigate this limitation.

CONCLUSION

EHRs were first developed for billing and documentation, but have increasingly shifted administrative tasks to physicians, fundamentally changing their work, workflow and, ultimately, how they interact with patients. Our qualitative analysis details hospital-based physicians' perceptions of the impact of EHRs on patient–physician interactions and contrasts these perceptions against those of their office-based counterparts, adding to the existing body of evidence focusing on outpatient physician–patient interaction. Although hospital-based physicians report benefits ranging from better information access to improved patient education and communication, unintended negative consequences are more frequent themes. When comparing themes across settings, we note that hospital-based physicians more frequently comment on the use of EHRs to feel more prepared for the clinical encounter, while office-based physicians more frequently comment on alteration of workflow and the depersonalization of relationships. Our findings can be used to shape interventions to improve how EHRs are used in inpatient settings and to tailor those interventions to specific specialties, with the end-goal of improving both physician satisfaction and patient experience.

Disclosures/conflicts of interest

The authors have no conflicts of interest to disclose, including no financial conflicts of interest.

The authors declare no potential conflicts of interest.

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