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Physician Perspectives on Training for an EHR Implementation

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Abstract

In 2017, a US academic medical center switched to a commerical EHR system using the "specialist training the specialist" model, which combines peer-to-peer training, classroom based training, and web-based training. We conducted semi-structured interviews with physicians at multiple training levels to investigate the impact of this EHR switch and to explore the training experience of physicians and their perception of the training quality pre and post Go-Live. Our team used Grounded Theory methodology to classify the interview information. Themes that emerged from the interviews included stress and anxiety, the desire for more realistic training environments tailored to specialty needs, and concerns about the duration of time between training and In future implementations, we implementation. recommend more data-rich test patients and the demonstration of real-world workflows during training.

Keywords:

Electronic Health Record, Physician

Introduction

Physicians worldwide are concerned about the complexity of today's electronic health record (EHR) systems even though the technology has been available and evolving for more than 50 years. [1] Organizations use multiple techniques to prepare and train clinicians for an impending electronic health record implementation from remote phone training, class-room training, role-based training, web-based training, [2] and the *"specialist training the specialist"* training model. A 2015 study showed that interns, who had a physician led, skills based EHR curriculum focusing on case-based simulation and skills rather than in-class or even online lectures during on-boarding, performed better on an EHR skills test and rated their training as more useful. [3] A critical question for health care facilities around the world is how to train physicians effectively to use new electronic health record systems.

Our health care system (Vanderbilt University Medical Center (VUMC)) in Nashville, Tennessee, USA selected a replacement system for the existing EHR. This change provided an excellent opportunity for a pre and post implementation study of physicians' perspective of the selected training method.

To judge the success of the implementation, our research effort focused on the perception of physicians regarding their training before and after implementation of the new electronic health record system. VUMC elected to use the "specialist training the *specialist*" model for implementation. This model combines peer-to-peer training, class-room based training, and web-based training. Due to a paucity of research focused specifically on physician training, we chose to focus the research on the physician's perception of training effectiveness, the effect of new electronic health record system on physicians, and the perceptions of the similarities and differences of the legacy home-grown EHR with the new commercial electronic health record system before and after the implementation.

Methods

In the context of switching to a new electronic health record system, the research goal was to explore physician perception of the training experience and of the training quality pre and post Go-Live. Our sampling goal was to recruit a balanced cohort of residents, fellows, and attendings with the intent to interview 40 participants in each data collection phase. We also collected demographic data for the physicians including medical specialty, gender, age, and training level.

The research process consisted of a written survey and structured interviews with a cross section (senior physician, fellows and residents) of physicians. The pre and post Go-Live surveys/interviews consisted of five topics:

- The physician's expectation for using the new system with patients.
- Use of alternatives to the training to prepare for the new system, and if so, which alternatives were used?
- Anticipations of advantages using the new system with patients.
- Anticipations of disadvantages using the new system with patients.
- Expectations about how the technology might affect the physician on a personal basis.

The actual pre and post Go-Live questions used during the semi-structured interviews are presented in **Figure 1**.

The pre Go-Live interviews occurred in October 2017 (one month prior to the EHR Go-Live) and the post Go-Live interviews occurred in February 2018 and continued into March of 2018 (approximately three to four months post EHR implementation). The selection of physician participants was based on a convenience sampling, and the direct interview process was conducted with the same set of physicians. The data collected from the interviews were classified according to the Grounded Theory methodology.[4]

The Grounded Theory methodology allows respondent answers to be coded by one author and validated by a second (RR and

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CP). The codes were then evaluated for central themes. Questions about perception of the training and overall implementation were identified as being amenable for more quantitative analysis.

We focused on physician perception of training pre and post Go-Live and how technology affected the physician personally. We also focused on advantages and disadvantages of the EHR compared to the previously used proprietary system. We also collected the thoughts about training that could have improved their post-implementation work-flow.

Results

During the pre Go-Live phase, we interviewed 37 physicians. This cohort consisted of 21 residents, 3 fellows, and 13 attending physicians from a variety of specialty disciplines. Internal Medicine provided the majority of respondents with 21 physicians. Other specialties included Pulmonary and Critical Care with 5 respondents, Emergency Medicine with 4, Internal Medicine and Pediatrics with 2, Cardiology with 2, Pediatric Emergency Medicine with 2, and Pediatrics with 2 physicians. Our respondents' age range varied, however most of our cohort fell into the 26-30 category with 20 physicians recording their age in this range which accounted for 54 percent of our cohort and a median age range of 26-30. Other categories consisted of 10 physicians in the 31-35 category, 1 in the 36-40 category, 3 in the 41-45 category, 1 in the 56-60 category, 1 in the 61-65 category, and 1 in the 66-70 category.

During the post Go-Live phase, the cohort included 27 physicians: 18 residents, 0 fellows, and 9 attending physicians. The research goal was to interview the same people pre and post implementation. However, 10 physicians were not interviewed in the post Go-Live phase of the study secondary to issues such as schedule conflicts and the inability to speak with us for an extended period of time. Therefore, we were unable to connect with everyone who was originally interviewed. Internal Medicine provided the majority of the cohort with 19 respondents. Other specialties included Cardiology (2), Pediatric Emergency Medicine (2), Pediatrics(1), Pulmonary Critical Care, Internal Medicine-Pediatrics dual appointment, and adult Emergency Medicine all with 1 each.

The respondents' age range also varied in the post Go-Live interviews, however most of our respondents fell into the 26-30 category with 16 physicians recording their age in this range which accounted for 59 percent of our cohort and a median age range of 26-30. Other categories consisted of 7 physicians in the 31-35 category, 1 in the 36-40 category, 1 in the 41-45 category, 1 in the 61-65 category, and 1 in the 66-70 category. (See **Table 1** for a detailed list of respondents).

For the extensive open-ended grounded theory analysis, the codes generated and the number of times they were applied are provided in the *Figures and Graphs* section. Figure 2 shows that the physicians' perception of the training received turned from an overall positive opinion prior to Go-Live to a decidedly negative opinion in the post Go-Live period. The initial opinion began at 54% positive prior to Go-Live, declining to 19% post Go-Live. Figure 3 shows that the perception of the impact of the EHR technology change turned from a more negative perception before to a more neutral after Go-live with 73% negative opinion declining to 50%.

To illustrate how perceptions of training and EHR experience changed by individual, **Tables 2** and **Tables 3** compare the quantitatively post Go-Live perception to the pre Go-Live response. Perception of training shifted markedly towards the negative for respondents, who had been neutral and positive pre Go Live with 63% and 57% of respondents switching from

positive or neutral to native responses. However, the perception of the technology change generally improved with 35% of respondents who had a negative initial response switching to a positive response.

End-User Perceptions of the Technology Change

Based on training experience, 85% of clinicians were positive or neutral prior to Go-Live. We heard comments such as: "That [Epic] is an EMR that I will now be using; Pretty neutral as far as my opinion on that...I'm sure it will be better in some ways and worse in others."

After implementation, there were 65% of respondents who felt negatively regards to the training received. They tended to focus on concerns about better tailoring the training to the actual needs of the clinician. "The training I did with e-Star covered a lot of different Epic functions but not many of them that I use in my clinical practice. It was a broad training but not tailored [to what] I do in my daily work. Currently [I use] stuff [that] I learned in the weeks post, not [in] the training [...] beforehand...Having a very broad training applicable to clinicians did not apply very specifically to my work flow in the ICU."

A significant concern related to the need for more practical, on the job training especially immediately after implementation was expressed as: "It seemed like we needed [to do] actual work ... to feel out what was necessary. I wish there were more knowledgeable people after Go-Live. Too many people with only half of the right answer."

Desired Training Alternatives

The most common concern regarding training before and after implementation was the lack of verisimilitude of the training. The training provided to all clinicians included a walk-though of a general medicine inpatient, outpatient, and emergency department encounters. Physicians identified gaps in training as compared to their regular activities. One respondent commented, "I do wish they had a class where they would have us admit a patient from step 1 in the playground environment. I felt like 'talking about it and half-way doing it' was not enough."

The need for better personalization of the vendor's system was another major concern. One respondent stated: "It would have been nice to have set up notes, order sets, etc. We did have personalization[,] but I felt like I was left on my own and did not really get the help I needed and had to try and figure things out for myself."

Benefits of New System

Except for two physicians, all respondents described some benefits of the new EHR usually focusing on improved clinical and coding efficiencies. There was little change in perception over time. About half of providers cited increased clinical efficiency as a benefit and the remainder focused on a variety of benefits including improved communication, mobile interface, and billing. However, 15% of clinicians felt there were no benefits to the new system after implementation: " that's a good question...I cannot think of anything...there is literally nothing."

Disadvantages of New System

Prior to implementation, the majority of physicians felt the most pressing disadvantage was the cost associated with changing/transitioning systems: "I think the transition will be rough, [...] but in there will be probably some changes to the workflow but overall I think it will be better." After the transition, the physicians' focus was mostly on work-flow disruption and an increased burden of documentation and the resulting increased time spent interfaced with the EHR. "Too many clicks. Especially in outpatient. When you are trying to write a note, you click on a problem, then assessment, and plan...just let me click on one thing."

Personal Impact of Technology Change

Most clinicians felt they were significantly affected by the technology change, both before and after implementation. Before implementation, anxiety and concern about the transition itself were prominent: "It has caused some anxiety over if it will slow me down in the ER and make it more difficult for me to see patients efficiently." These nonspecific concerns became more focused on a variety of ways that the system had altered healthcare delivery making processes more and less difficult. Even several months post implementation, "I finally empathize with all the headlines from 10 years ago with all of the doctors who were 60 years old who thought that it was just too much of a lift and retired."

An especially concerning sentiment was a loss of confidence in the clinician's ability to deliver reliably high-quality care: "I think in the first couple of months, it was slowing down note writing and chart reviewing although that has gotten better. Ordering is slower and messaging is much more difficult... I don't have confidence that what I am ordering is actually happening."

Discussion

Interviews with physicians before and after implementation were conducted to explore possible opportunities to improve the experience of implementation of a new EHR prior and after the implementation. The physicians interviewed expressed significant concerns in the pre implementation period on how the new EHR would affect productivity and work-flow. While concern is natural given the significant role of the EHR in the modern medical environment, it was notable that there were more concerns prior to implementation than afterwards suggesting that the fear of change was worse than the change itself.

As physician expectations for the new system were low after training and before implementation, an opportunity for improvement may include better communication of the benefits of the new system prior implementation. The importance of robust change management strategies has previously been identified in the implementation of an EHR from paper, but our results indicated its continued importance even when transitioning between EHRs.^{5, 6}

Part of the EHR implementation challenge is that user experience varies widely, which can make a workflow solution for one physician disruptive to another. Further, the differing perspectives and priorities of different specialties and provider types challenge any communication effort and make it difficult to train a large array of specialties prior to the implementation. As a result, many work flow solutions had to be discovered by providers once the system was operational.

The nature of the training emerged as a primary concern for our physicians. One limiting factor for the training process included the fact that the system was not completely built while physicians underwent training thus omitting important workflows or features that were finally available when the system went live. This issue created physician frustration with functionality not having been discussed or experienced in training, functionality not working as described in training, or tools not performing appropriately at Go-Live. Further, many users expressed a desire for more realistic simulations of their work-flow during training to allow them expectation setting for Go-Live. This concern was described previously with physician training⁷ and emerged in our interviews as one of the most substantial challenges for physicians.

Ideal training would walk physicians accurately through a day in their life in a data-rich practice with complex patients. In our training, the lack of integration of specifically tailored workflows in a specialty clinic or an intensive care unit provided physicians with only a very generalized simulation of the clinical environment lacking verisimilitude to clinical reality and omitting critical details important to efficiently discharge their documentation, ordering, and other duties. While increased training specificity would have further magnified the logistical challenge of training, its lack was found to be frustrating and likely reduced the impact on physician preparedness for clinical workflow optimization and documentation.

The final major themes were the proximity of the training to Go-Live. Many physicians expressed that the long period of time between training and Go-Live resulted in a reduced retention of learned and practiced content by the time implementation took place. Unfortunately, in a large organization, the logistical challenge may be insurmountable to train every end user immediately prior to Go-Live, but physicians suggested an abbreviated refresher course the week prior to Go-Live. While those with a negative opinion of their training prior to Go-Live continued to feel that way after, it is notable that there was a significant shift in perception among physicians, who felt positive pre Go-Live, to negative afterwards.

Conclusions

In conclusion, many physicians felt passionate about the training they received and the EHR technology transition. Training needs to reflect the experience of physicians in their day to day lives and must be in a narrow time window to implementation to be recalled and be impactful. The more practical and tailored to clinical reality the training can be, the more it is appreciated by physicians. Otherwise, as was experienced in this implementation, physicians will experience significant frustration with the quality of training and may develop resentment towards the technology change.

Study Limitations

Our study was limited to the implementation of one large vendor system at a large academic medical center. Because inperson interviews require a substantial amount of time and resources, we had to limit the number of participants in the study and had difficulty scheduling interviews with the same individuals post-implementation. We also were not able to fully represent all specialties in our research sample (e.g. surgical specialties), which may have provided additional perspectives on training. Online surveys may be helpful in broadening the reach of this type of research, although the in-person interviews helped with gaining a deeper understanding of physician experiences and perceptions. Figures and Tables

Research Questions for Physicians e-Star Implementation -Pre Go-Live

1. After your training and receiving information about e-Star, what is your perception about using e-Star with patients?

2. What other options do you wish you would have experimented with to prepare for the implementation of e-Star?

3. If you had one wish of how e-Star could improve throughput/workflow post implementation, what would it be?

4. What are your expectations of the advantages with using e-Star with patients? What are your expectations of the disadvantages with using e-Star with patients?

5. Tell me a little more about how this implementation and technology change is affecting you.

Research Questions for Physicians e-Star Implementation – Post Go-Live

1. After using e-Star for a little over a month now, what is your perception of your training and preparation for the implantation?

2. Are there any other avenues you wish you would have experimented with to prepare for the e-Star implantation?

3. After using e-Star over the past few weeks (or months), what would you have changed about your training to improve your post-implementation work-flow?

4. What are the advantages or disadvantages you noted when using e-Star with patients over the past few weeks (or months)? How does this compare with StarPanel or is it similar to StarPanel?

5. Tell me a little more about how this implementation and technology change is affecting you.

Figure 1- Research Questions

 Table 1- List of All Study Participants by Specialty, Position,
 Gender and Age Range

C	D	C	A
Specialty	Position	Gen- der	Age range
Internal Medicine	Attending	F	26-30
Pulmonary and Critical Care	Attending	М	41-45
Emergency Medicine	Attending	Μ	56-60
Emergency Medicine	Attending	Μ	26-30
Pulmonary and Critical Care	Attending	F	41-45
Internal Medicine	Attending	F	26-30
Cardiology	Attending	F	36-40
Cardiology	Attending	Μ	66-70
Pulmonary and Critical Care	Attending	М	31-35
Peds Emergency Medi- cine	Attending	F	41-45
Peds Emergency Medi- cine	Attending	М	61-65
Pediatrics	Attending	F	31-35
Internal Medicine	Attending	Μ	31-35
Pulmonary and Critical Care	Fellow	F	31-35
Pulmonary and Critical Care	Fellow	М	26-30
Emergency Medicine	Fellow	F	31-35
Internal Medicine	Resident	Μ	26-30
Internal Medicine	Resident	Μ	26-30
Internal Medicine	Resident	F	31-35
Internal Medicine	Resident	Μ	26-30
Internal Medicine	Resident	F	31-35
Internal Medicine	Resident	Μ	26-30
Internal Medicine	Resident	F	31-35
Internal Medicine	Resident	F	26-30
Emergency Medicine	Resident	Μ	26-30
Internal Medicine	Resident	Μ	31-35
IM/Peds	Resident	F	26-30
Internal Medicine	Resident	Μ	26-30
Internal Medicine	Resident	F	26-30
Internal Medicine	Resident	Μ	26-30
Internal Medicine	Resident	М	26-30
Internal Medicine	Resident	F	26-30
IM/Peds	Resident	F	26-30
Internal Medicine	Resident	F	31-35
Internal Medicine	Resident	F	26-30
Internal Medicine	Resident	М	26-30
Internal Medicine	Resident	М	26-30



Figure 2- Question 1: Perception of Training



Figure 3- Question 5: Effect of Transition

Table 2 - Quantitative Comparison of the Post Go-Li	ve
Perception to the Pre Go-Live Response	

	Post Go-Live				
		positive	neutral	negative	
Pre Go- Live	positive	4	2	10	
	neutral	1	2	4	
	negative	0	0	3	

Table 3 - Quantitative Comparison of the Post Go-Live Perception to the Pre Go-Live Response

		Post Go-L	ive	
		positive	neutral	negative
۲.	positive	1	1	1
e G Live	neutral	1	1	1
	negative	7	2	11

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