Implementing Training Videos for Student Clinicians to Improve Charting and Utilization of EHR Capabilities

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Abstract

Introduction: In 2014, the student run Health Outreach Partnership of EVMS Students (HOPES) clinic at Eastern Virginia Medical School (EVMS) implemented Practice Fusion, a free, web-based electronic health records (EHR) system. Since then, the goal has been to increase EHR utilization to improve clinic flow and to facilitate data gathering for clinic quality improvement purposes. EHR training videos were developed to orient student clinicians to the EHR prior to their arrival in clinic. This investigation serves to assess whether EHR utilization has increased since the implementation of the training videos.

Methods: A retrospective chart review was performed to evaluate completeness of 47 encounters following the implementation of EHR training videos compared to a baseline measurement of 40 encounters prior to implementation.

Results: 95% of encounters were signed by an attending pre-implementation of videos vs. 100% post-implementation. 70% of encounters had student clinician signatures pre-implementation while 72% were signed post-implementation. No screenings/preventive measures were documented pre vs. 4.2% post. 55% of encounters had smoking status pre vs. 70% post. 30% of encounters had a social history pre vs. 43% post. 45% had past medical history pre vs. 72% post. 68% had allergies recorded pre while 70% had allergies recorded post-implementation.

Conclusion: Utilization of EHR capabilities by student clinicians has improved since the development of instructional videos. Students have increased the charting of information in appropriate fields with significant improvements in documenting past medical history and smoking status. However, further improvements can be made in all fields. Encounters in which student clinicians utilized the categorical fields of the EHR least tended to be during specialty clinics (ophthalmology, dermatology). Future changes include alerting specialty clinic coordinators to our findings to help facilitate EHR utilization with verbal reminders during clinic.

Background

HOPES Free Clinic in Norfolk, Virginia, cares for local, uninsured residents and is run by students at Eastern Virginia Medical School (EVMS). In 2014, HOPES clinic implemented Practice Fusion (Practice Fusion Inc., San Francisco, California, USA), a free, web based, electronic health records (EHR) system after having used paper charts since the clinic's inception. Studies have shown that EHR adoption reduces adverse drug events, enhances preventive care and aids in chronic disease management.[1]

82% of EHR users in ambulatory clinics nationwide reported improved clinical decision-making in 2008.[2] In addition, chart review is more efficient and feasible with EHR and allows for easy tracking of quality measures, especially under the

constraint of small staff and lack of access to the clinic facility outside of clinic hours.[3] The goal of the EHR team at HOPES has been to expand utilization of the EHR system to maximize clinic flow, improve quality of care and to facilitate gathering of data for quality improvement purposes.

Student clinicians write patient notes after interviewing and examining each patient. After the transition to EHR, student clinicians wrote free-form notes in the EHR for each encounter. High turnover of volunteers created limitations in training and retaining volunteers with a strong working knowledge of the EHR; hence many of the EHR capabilities (e.g., templates, allergy field, past medical history field) were underutilized or not utilized at all. On average, a student at EVMS volunteers as a student clinician two to three times per semester. Therefore, in-person EHR training for student clinicians that covered all aspects of the EHR was not feasible.

When students arrive at the clinic, an EHR team member provides each clinician team with a laptop and brief orientation to Practice Fusion. However, the EHR team member is limited to a 20 minute time period in which he or she must provide in-person training to a minimum of five teams of two student clinicians during each clinic. This time constraint hinders the EHR team member from informing clinicians of the many features available to chart information in Practice Fusion resulting in clinicians writing their notes in free-form and under-utilizing structured fields available for patient data entry.

One of the limitations of writing free-form notes is that information cannot be gathered easily for quality improvement purposes. In addition, information is not organized and readily viewable during subsequent encounters. Greater utilization of EHR capabilities allows for organization of data.[4] To run reports in Practice Fusion and to have important patient information readily viewable, patient data

must be entered into specific fields in structured format. Without the use of structured fields, gathering data for reporting requires manual chart review, which requires more staff and more time. In order to better utilize the EHR for quality improvement purposes, it was decided that student clinicians needed a more in depth orientation to Practice Fusion so that patient information could be entered into appropriate structured fields.

Unfortunately, there is a paucity of studies evaluating the effect of training on clinician performance in student-run clinics. However, one study in a hospital setting found that protocol adherence by healthcare professionals improved after exposure to an online video package.[5] In this study, a short educational video lasting less than ten minutes was developed to increase adherence to safety-critical tasks during rapid sequence induction of anesthesia. Video format was chosen for training because it is easily accessible, cost-effective and could be uploaded to web-based platforms such as YouTube (Google Inc., Mountain View, CA, USA). Failure to adhere to safety-critical tasks between the pre- and post-intervention period significantly decreased. According to Lorenzi et al, EHR training should be brief, high quality, specific to the practice's needs and timed closely to the point of need in order to be effective.[6]

In order to address the requirements for successful training and to improve student clinician adherence to EHR protocols, three instructional videos, each less than two minutes and thirty seconds, were created via the screen capture software Camtasia (Version 2.10.6, TechSmith, Okemos, Michigan, USA). Videos were uploaded to Youtube and website links were sent to student volunteers less than a week before their scheduled shifts. These videos walk students through different functions of the EHR and fields that must be completed during a patient encounter. The videos were created using dummy

patient charts and a dummy Practice Fusion account to maintain privacy of patient information. The links to the videos are sent to each student volunteering at the clinic on the Sunday prior to the student's shift (shifts are either on Wednesday or Thursday). The goal of the EHR training videos was to orient students in a high turnover position to the EHR prior to their arrival in clinic in an effort to improve the charting of patient information. The training videos eliminate the time constraints of in-person training and also allow students to complete their training at home prior to arriving in clinic, in an environment with less noise and distractions. The videos are also available to watch again in clinic if necessary.

Currently, there are three YouTube videos that students are required to watch prior to their clinic shift. Once each video is open, the topics covered and the EHR related tasks that are expected to be completed by students are listed in the "description" of each video. The first video, "How to Find Patient Chart in Practice Fusion" reviews accessing an individual patient's chart via the schedule or via the patient search option. The second video "How to Find and Complete the SOAP Note" shows students how to find the encounter note, how to access templates and which

parts of the note must be completed. It also reviews the various fields that students must fill in, including but not limited to: allergies, past medical history, family history, social history and medications. The last video, "Miscellaneous Items" shows students how to find scanned documents and how to tell if a physician has signed off on the patient note. The contents of each training video are detailed in Table 1.

The purpose of this study is to determine the utilization of the EHR training videos and the completeness of EHR charting following the implementation of these instructional videos.

Methods

A retrospective chart review was performed to evaluate completeness of all encounters following the implementation of EHR training videos compared to encounters pre-implementation. 47 encounters during the month of September 2016 (after the implementation of the training videos) were compared to 40 encounters from July 2016 (prior to the implementation of training videos). A total of eleven fields including the attending and student signatures in the note were checked for completeness.

The contents of each encounter were classified into true or false values for each field. These values are recorded in Table 2. Completeness of each field between the pre-video implementation and post-video implementation was compared. Given the nominal variables used and our limited sample size, the significance of the changes ($p < 0.05$) was determined using Fisher's Exact Test. To analyze the data, SPSS Statistics (IBM Corp. Released 2016. IBM SPSS Statistics for Windows, Version 24.0. Armonk, NY: IBM Corp.) was used.

Additionally, the YouTube videos were monitored for number of views between September 2016 and November 2016 to determine how many student clinicians had watched the videos

Video Title	Length of Video (mins:sec)	Contents
How to Find Patient Chart in Practice Fusion	0:53	• Finding the schedule • Searching for patients
How to Find & Complete the SOAP Note	2:29	• How to find an encounter • Assigning note to attending physician • Chief complaint • Vital signs • Assigning ICD-10 diagnosis code • Allergies • Medications • Social history • Past medical history • Accessing templates • Saving note • Student signatures in note
Miscellaneous Items	1:11	• How to tell that a note has been signed by attending physician • How to find scanned documents

Table 1: Training video lengths and content

prior to their arrival in clinic. The number of views was compared to the number of students who had volunteered in clinic during the same time period.

Results

A total of 40 encounters pre-implementation of training videos were compared to 47 encounters post-implementation for completion.

Of note, the increase in completeness of the Past Medical History and Smoking Status fields after video training was statistically significant. In addition improvements in Attending Signature, Social History, and Screenings approached significance.

The total number of student clinician positions filled between September 1, 2016, and November 10, 2016, was 131.

Conclusion

Utilization of EHR capabilities by student clinicians has improved since the institution of instructional videos. Students are increasingly charting information in appropriate fields rather than entering the

information free-form, making it easier to find the information during subsequent encounters and improving the ease of data gathering for quality improvement purposes.

Attending physician signature of patient notes was fairly consistent at 95% pre-implementation of videos but improved, as it was documented 100% of the time post-implementation. The attending physician's signature is critical to verify that the attending physician reviewed the note written by student clinicians and made any necessary changes. The documentation of student clinician names improved by 2% post-implementation of videos. Verbal reminders in clinic are still given to remind students to sign notes with their names and roles (junior vs. senior clinician and year in school).

The number of encounters with the diagnosis field populated dropped post-implementation. There are many factors contributing to a lack of documentation of a specific diagnosis code in the diagnosis field. Often times, at HOPES clinic, physicians will list differential diagnoses because a final diagnosis has not been made due to pending laboratory or imaging studies that are necessary for the

Charting Field	Pre-Video Implementation (# complete/total)	Post- Video Implementation (# complete/total)	p-Value
Attending Signature	38/40	47/47	0.121
Student Signature	28/40	34/47	0.81
Diagnosis	29/40	28/47	0.206
Chief Complaint	40/40	46/47	0.353
Past Medical History	18/40	34/47	**0.01**
Family History	16/40	18/47	0.871
Smoking Status	22/40	36/47	**0.033**
Social History	12/40	20/47	0.16
Allergies	27/40	33/47	0.785
Screenings	0/40	2/47	0.187

Table 2: Univariate Analysis of Charting Field Completions Before and After EHR Training Videos

diagnosis. In this case, student clinicians do not enter a specific ICD-10 diagnosis code. The chief complaint field was completed consistently in pre and post-implementation encounters.

There was significant improvement in completion of the past medical history field as the number of encounters that had the field populated increased from 45% to 72% post-implementation. There was no improvement in the completion of the family history field. One factor contributing to this may be that student clinicians are employing a more focused history and physical during specialty clinics such as orthopedics and dermatology.

Completion of the smoking status field improved significantly from 55% of pre-implementation encounters to 77% of post-implementation encounters. Smoking status is especially important because hypertension and diabetes are two of the top five most common diagnoses at HOPES clinic per chart review. Because smoking is a major risk factor for hypertension and a risk for cardiovascular complications in patients with diabetes, HOPES clinic staff make every attempt to initiate smoking cessation counseling, patient education and provision of resources for smokers at each patient visit.

Completion of the social history field increased from 30% pre-implementation to 43% post-implementation. Improving documentation of social history including living situation, work, diet, exercise and stress is critical as many of these contribute directly to disease processes. Documentation of this information is also necessary to identify potential

barriers to healthcare.

There was minimal change in the documentation of the allergies field post-implementation of the training videos: it remained low at 70% completion. In the future, further verbal reminders will be given to document allergies, especially drug allergies so that physicians are aware before prescribing a new medication. The completion of the screenings field remained extremely low as completion rates increased from 0% to only 4% post-implementation of the videos.

The results show that some of the most important information, like the attending physician's signature, is included in 100% of encounters, and the student clinicians' signatures are included in 72% of encounters. However, we hope to reach a goal of 100%. Improvements can be made in all fields. We found that the encounters that utilized the categorical fields of the EHR least were specialty clinics (ophthalmology, dermatology), as they tend to perform a more focused history and physical exam. Future changes include alerting specialty clinic coordinators to our findings to help facilitate EHR utilization with verbal reminders during clinic.

While there was a maximum of 94 total views for the video instructing students on how to find the patient chart, the remaining two videos were only viewed by 74 and 69 students (Table 3). These numbers show that students are either not watching all of the videos or they may be repeating specific videos. However, after adding up the number of student clinician positions filled between when the videos were implemented until now, there is a

Video Title	Number of Views
How to Find Patient Chart in Practice Fusion	94
How to Find and Complete the SOAP Note	74
Miscellaneous Items	69

Table 3: Number of views on YouTube for each EHR training video

discrepancy between the number of volunteers and the number of views. 131 student clinician positions were filled between September 1, 2016 and November 10, 2016. However, the 131 filled positions do not represent the number of unique students as many students volunteered multiple times. The discrepancy between the number of positions filled and the number of views can partly be accounted for by the fact that students volunteering multiple times may not watch the videos multiple times.

One of the main limitations of this study includes our inability to link post-implementation charts with students who had watched the instructional videos, making it difficult to determine how much of the charting changes that were observed post-implementation were a direct result of the instructional videos. In addition, there was no objective or subjective measure of the student clinician's understanding of the EHR before and after watching the instructional videos. Finally, outside factors that could have contributed to better charting include: 1) more students were familiar with the EHR system later in the year 2) clinic staff made students more aware of their charting responsibilities and 3) an EHR team member staffs every clinic in case students have questions about the EHR.

In order to improve upon these limitations, future changes to this project include implementing a short survey for student clinicians to fill out before and after completing the instructional videos to determine how well they felt that the videos improved their knowledge and skills in using Practice Fusion. A Likert scale from 1-5, with 5 being the most improved and 1 being no improvement at all, would provide an objective means of recording students' impressions of the training videos effectiveness. This data would then provide another way to statistically analyze levels of improvement. Having clinicians fill out the surveys would also provide a means to link the clinician's improvement to the charts they completed, as the clinic already tracks which patients were seen by the clinicians. Furthermore, obtaining a larger sample size with more students from the start, would

improve statistical comparisons between how students performed before and after they watched the training videos. This would be in contrast to the current study, where we retrospectively reviewed charts that were filled out by different students before and after the training videos.

Overall, the EHR training videos have received informal positive feedback from student clinicians. The videos have also cut down the amount of time needed for EHR staff to orient student clinicians to the EHR during clinic, allowing student clinicians to begin seeing patients earlier. Finally, the implementation of the training videos has improved utilization of specific fields for patient data so that clinicians can reference these fields more easily at subsequent visits and so that quality measures can be tracked quickly and efficiently. Studies based in small to large medical groups in the United States show that few clinics initially used data to improve quality of care but over time, they used EHR reports more widely to focus on specific groups of patients within their practice that may be at higher risk.[7] It has been two years since HOPES clinic transitioned to EHR and more capabilities are being utilized with the aim of improving patient care by gathering data to develop and assess quality measures. In addition, improved EHR utilization has allowed the clinic to track at risk patient populations (i.e. hypertensive patients and diabetic patients) more efficiently in order to provide better care.

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