Just One More Patient: Optimizing EMR Documentation in Ambulatory Care

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Abstract
The adoption of electronic medical records (EMRs) in primary care settings is on the rise in the United States and many are feeling the stress. The introduction of the EMR or transition to a new EMR is known to create workflow challenges for primary care providers and their office staff, as was the case in our health system. This study evolved out of an attempt to alleviate stress by defining the best practice or most optimal way to document office visits, allowing providers to see just one more patient each day. We leveraged a change management model that encourages looking for what is working vs. throwing resources at problem areas. By doing so we identified several distinguishing behaviors among providers who were doing exceptionally well with the EMR. We deployed an intervention aimed at enhancing the identified behaviors in a group of providers and it resulted marked improvement in efficiency.

Introduction
The transition to using an electronic medical record (EMR) in primary care offices can be quite difficult. In fact, several studies have shown that EMR adoption contributes to increased cognitive load, stress, burn out, and job dissatisfaction in primary care providers.[1,2,3] In this paper we share the findings of a project aimed at identifying best practices for primary care office visits, as a means to improve the work experience of primary care providers working in our health system. We uncovered two key factors that differentiated providers' use of the EMR for documentation. After implementing an intervention to enhance these two key factors, we found significant improvement in office visit documentation that occurred outside of business hours. Further, we found significant differences in specific EMR documentation actions of physicians who had the most successful office visits.

The Challenge
Parkview Health transitioned to a new EMR provider in the spring of 2012 and rolled out the application to all primary care offices in the system over the next two years. Going live with the EMR brought about much unhappiness. During the transition, providers were 'slow and low.' Providers complained of major delays in completing visit documentation and were becoming distressed about the impact on their office workflow and lengthy hours at work. Part of this was behavioral because there was not a strong pre-existing culture of EMR use, part was due to fatigue from the transition, and part was due to a reduction in productivity. Providers who had felt like an expert at all things medical before beginning use of EMR now struggled to get through basic work.

As Chief Medical Informatics Officer and a practicing primary care physician, the first author challenged the EMR company to provide a 'best practice' or most effective approach to completing all that needs to be done in an office visit. But when pressed for the *best* way the company could only respond by sharing what other organizations were doing – not an optimal method. In this particular EMR, there are many ways to complete a particular task, which allows for flexibility but also can create a cognitive burden and stress for the practicing physician.[1] While the EMR training provided to primary care physicians was very task specific and technical, there was little attention paid to individual physician workflow. This left a gap in understanding what makes an office visit successful in the context of EMR use, what are the key metrics, and how do we get providers interacting with the EMR at an optimal level? The objective of out study was to enhance productivity, efficiency and quality of office visit documentation. In particular, the goal was to identify ways in which physician providers could spend less time in the system doing work and see *just one more patient* each day.

Interested in "What makes success?" vs. "What are the majority doing?"
It was a book on change management that inspired this work. In their book *Switch*, the Heath brothers describe a paradigm shift that can be affective when facing major obstacles against change, which they call finding the bright spots.[4] In this analogy the authors describe a scenario where the problem solver looks in the community for successful efforts worth repeating instead of the common approach of deploying massive resources to those who

struggle. In the environment of change brought about by EMR adoption, a common approach is to focus all efforts towards low performers but this did not work for us. Things were not getting better and people who were doing well were being ignored. So we decided to look for the 'bright spots' in order to examine what was working well in the primary care practice use of the EMR. To do so, we identified several physician providers who seemed to be unfettered by the integration of the EMR in their practice. Importantly, we were not simply focused on what they did but rather on identifying what EMR practices were similar and which were true differentiators for those physicians practicing in the bright spots. In our data-driven approach we were careful not to use the words 'high performers' and 'low performers,' in order to avoid the obvious negative emotions that could be evoked. Rather, we relied on the metaphor 'cheese finder' used in another change management book, Johnson's *Who Moved My Cheese* wherein finding cheese is synonymous with effectively navigating change.[5]

Methods

We conducted a 3-month study that included an observational pilot from which an intervention was designed. Outcome measures were collected in the final phase of the study to determine the impact of the intervention and to differentiate EMR actions of cheese finders when compared with controls.

Study Setting

Parkview Health is a system of 8 hospitals located in 6 counties in northeast Indiana. Parkview serves an area with a population of approximately 890,000. As a Health System, we have nearly 9,000 employees and 1,600,000 patient encounters each year. Parkview physicians group (PPG) has experience rapid growth and is currently comprised of 35 primary care service areas with 352 physicians (average age of 50) who are practicing across 120 locations. PPG serves counties in Northeast Indiana and Northwest Ohio with 1,253,000 clinic visits annually.

Observational Pilot

We started by identifying 12 cheese finders who met three criteria. 1) Productivity: Work Relative Value Unit (wRVU) ratio greater than 0.9; 2) Efficiency: less than two charts per week completed outside of regular office business hours; 3) Quality: content of note were complete and effectively communicated office visit events. We then matched 24 controls equally to the 12 cheese finders (2N:N) along specialty area and office setting (e.g. time since EMR deployed).

We developed a checklist of 35 items (see Figure 1) based discussions with cheese finders as to what they think makes them successful and also based on our observations of those doing well. Checklist information was obtained the information for all study subjects, either by direct observation in the office setting or by interviewing physician providers or their nurse. The objective of the checklist was to identify qualities that differentiated cheese finders from controls.

Intervention

The content of the intervention was focused on enhancing two actions that were identified in the observational pilot as a differentiating behavior of cheese finders. The intervention included two 5-minute educational videos deployed on Share Point. The videos were designed for everyone who was not a cheese finder as means to encourage behaviors that would lead to greater productivity. Participants were purely motivated by the potential to improve efficiency and recover personal time spent charting in the EMR. There were no other incentives to participate. Controls were individuals that either did not watch the videos describing the two interventions that could lead to higher productivity or they did watch the videos but chose not to change practice.

Outcome Measures

Outcome measures were selected keeping the end goal in mind: to enhance productivity, efficiency and quality of office visit documentation. In particular, the goal was to identify ways in which physician providers could spend less time in the system doing work and see just one more patient each day. Scope of EMR interaction was limited to documentation and ordering (to augment findings from observational pilot). Specific measures included the percentage of charts completed outside of office business hours and user interaction data collected with a tool offered by the EMR company – the user action log (UAL). The UAL tool allowed the capture of keystrokes, mouse clicks, menu interaction, and navigation sequences. So, this provided more detailed analysis of cheese finder behaviors than what was done in the observational pilot (e.g. time spent ordering, number of keystrokes per note). UAL data was collected for a 2-week period of time on both cheese finders and controls. Data analysis was completed using IBM SPSS Statistics for Windows, Version 21.0.

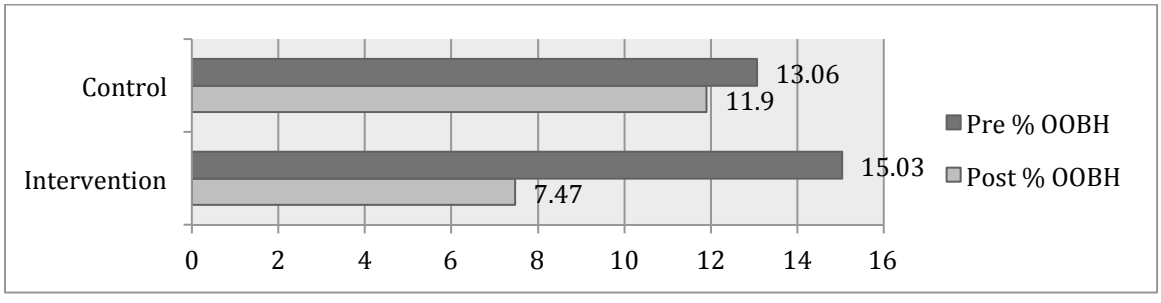
1. Is there any clinical "chart prep" completed? Example: Are charts reviewed prior to a scheduled appointment to look for recent test results or other missing data?	17. Is provider using a system smartphrase to pull in lab results in the note?
2. Does information get scanned prior to patient appointment or do you leave on paper for physician to review on paper for office visits?	18. Is provider using a personal smartphrase to pull in radiology results into the note?
3. Are there perceived bottlenecks at the front, impeding timely rooming of patient?	19. Is provider using a prescription smartphrase?
4. Does rooming staff fill in chief complaint?	20. Is provider using a review of systems (ROS) smartphrase?
5. Does rooming staff document vital signs every time?	21. Do you use a personal preference list for ordering?
6. Does rooming staff review and update allergies every time?	22. Is provider using a macro for ROS?
7. Does rooming staff do med rec?	23. Is provider using a macro for physical exam?
8. Does rooming staff review smoking status?	24. Is note being completed before seeing the next patient?
9. Does rooming staff start the history of present illness (HPI)?	25. Does provider enter all of his/her own orders?
10. Does provider reference a snapshot view prior to entering exam room? Fill in blank	26. Is Dragon used for placing orders?
11. Are providers updating the problem list in the exam room?	27. Are orders placed by provider in exam room?
12. Are smartsets being used?	28. Is visit diagnosis completed in exam room?
13. For progress note documentation, is provider using a smart phrase for a whole note template?	29. Is the problem list utilized for quick documentation of the diagnosis?
14. Is provider using Dragon for HPI?	30. Is the level of service documented in exam room?
15. Is provider using Dragon for assessment/plan?	31. Is follow-up appointment documented prior to patient leaving?
16. Is provider using Dragon for prescriptions?	32. Are notes routed by provider?
	33. Is provider able to close the encounter at end of visit?
	34. Does provider print own after visit summary?
	35. Does clinical staff enter any orders in the system?

Figure 1. Observational Checklist

Results

The observational pilot findings uncovered two EMR actions that distinguished cheese finders from the rest of the cohort. A chi-square test was performed and a relationship was found between cheese finders and the frequency of using Dragon software to document the history of present illness, $X^2(2, N = 32) = 5.722751$, $p = 0.016746$. Likewise, a chi-square test revealed a relationship between cheese finders and the frequency of placing orders in the exam room, $X^2(2, N = 32) = 4.097354$, $p = 0.04295$. There were no other relationships found from the observational/ self-report data.

The intervention (two 5-minute educational videos) was the deployed, focusing on encouraging the use of Dragon to document history of present illness and placing orders while in the exam room. Post-intervention measures showed a marked improvement of roughly 50% fewer charts being completed outside of office business hours (Figure 2).



*Outside of time range 0800-1759 hours

Figure 2. Percentage of Charts Completed Outside of Office Business Hours (OOBH) Pre- & Post- Intervention

The findings from the UAL also revealed significant differences between the actions of cheese finders when compared to controls. Visit documentation metrics show cheese finders spent significantly less time ($p=0.028$), fewer keystrokes ($p=0.002$), and less clicks ($p=0.014$) when documenting office visits (see Figures 3-5, respectively). Office ordering metrics show that while there was no significant difference in time spent ordering

(p=0.126), cheese finders spent less time clicking (p=0.062) and had fewer clicks (p=0.061) in the process of placing orders when compared with controls (see Figures 6-8, respectively).

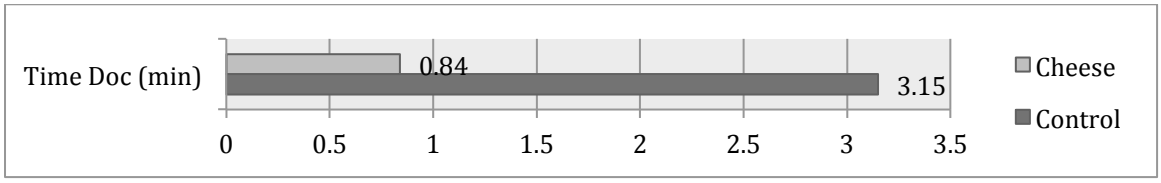


Figure 3. Difference between "Cheese Finders" and Control: **Visit Documentation Time** (p=0.028)

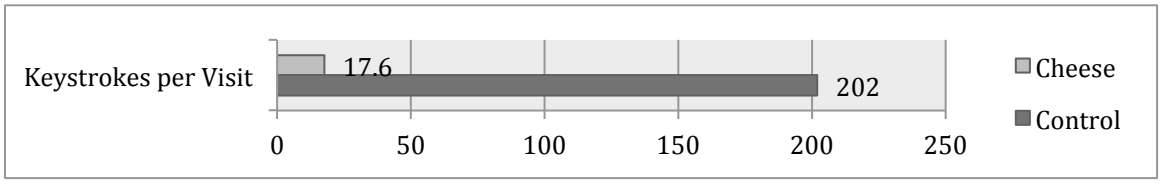


Figure 4. Difference between "Cheese Finders" and Control: **Visit Documentation Keystrokes** (p=0.002)

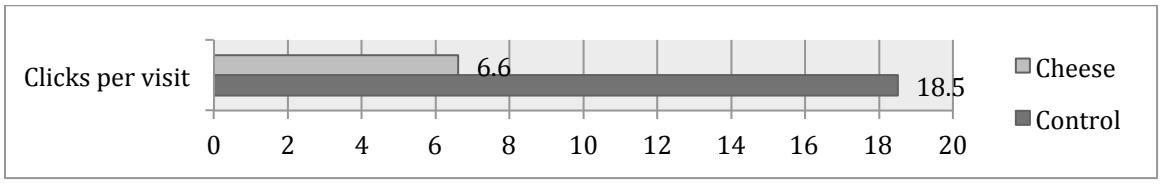


Figure 5. Difference between "Cheese Finders" and Control: **Documentation Clicks/Visit** (p=0.014)

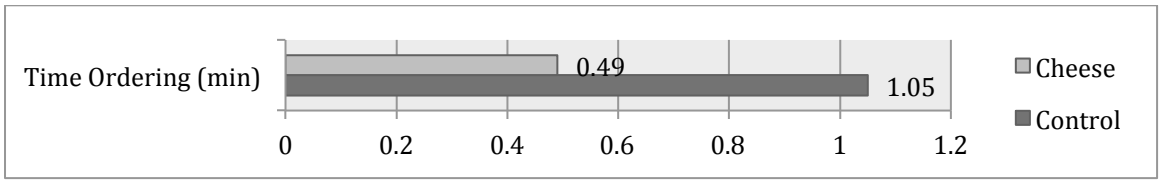


Figure 6. Difference between "Cheese Finders" and Control: **Ordering – Total Time** (p=0.126)

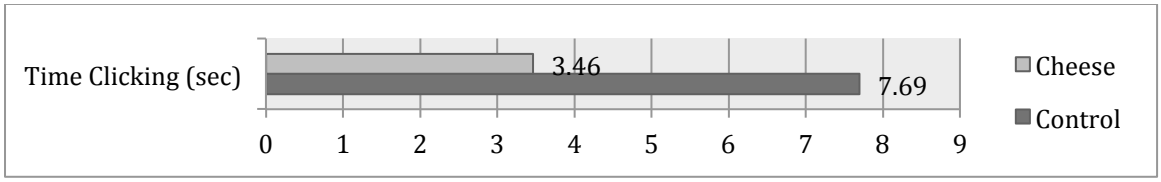


Figure 7. Difference between "Cheese Finders" and Control: **Ordering – Time Clicking** (p=0.062)

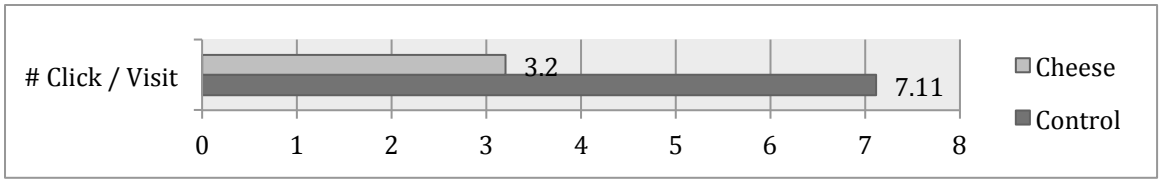


Figure 8. Difference between "Cheese Finders" and Control: **Ordering – Clicks/Visit** (p=0.061)

Discussion

In this study we were able to demonstrate the value of applying change management philosophies during the aftermath of EMR implementation in primary care office settings. Namely, looking for the bright spots and uncovering exactly what efforts make an office visit successful and how can we communicate these practices to other physician providers who want to improve and/or simply reduce their cognitive load and stress from interacting with the EMR. Taking this alternative approach (the Switch model) to allocate resources toward the bright spots vs. toward those who were struggling allowed us to uncover two differentiating behaviors (using Dragon for HPI documentation and placing orders while still in the exam room) that were then leveraged in a successful intervention. The video education intervention resulted in a marked reduction in documentation completion outside of regular office hours. Additionally, we found that cheese finders spend less time documenting and completing notes with fewer keystroke and clicks. Although there was no real difference in provider time ordering, there was a tendency for fewer clicks among cheese finders. Drawing a connection between the findings from the observational pilot and the UAL findings we are left to wonder if using Dragon for documenting HPI can explain the time documenting and keystroke gap between cheese finders and controls.

There were confounding factors that impacted the findings of this study, namely organizational pressure to make things better right away. There was also a time barrier presented by an update in the EMR software and the looming deadline for the next go-live date. Additionally, there were contentions around allocating resources to examine behaviors of successful physician providers. There are limitations to the findings of this work in that our sample size was quite small. Further, we could not account for the time, clicks, and keystrokes entered by office RNs, LPNs and medical assistants.

We are currently looking at this opportunity to identify best practices for optimal EMR use with a larger, more formal study. In this we hope to define specific criteria to be considered a cheese finder, beyond the three criteria used for this study. This will include defining targets for documentation time, keystrokes for specific visit types, and ordering time. Expanded UAL data may include studying in-basket work, data gathering activity (e.g. navigation sequences) and behaviors when documenting care for inpatients. We also plan to expand our lens beyond the physician provider actions to better understand the role of support staff in the efficiencies we identified in cheese finders. We hope that we can identify more ideas for goal oriented training and optimization, as we found in this study. Finally, we hope to validate our findings with those from other organizations.

Conclusion

Are there times when "what everyone else does…" is not the right approach? We believe this is the case and have found value in applying activation resources to the bright spots in our own organization to determine what is right for us. Ultimately, this approach allowed us to quickly develop an effective intervention and allowed for more effective utilization of our resources.

Acknowledgements

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References

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