

Do Technical Implementations Help Physicians: An Evaluation of a New Procedure Documentation Tool on Provider Efficiency in the Electronic Health Record

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Received Feb. 1, 2024; Accepted for publication July 22, 2024; Published online Sept. 5, 2024
<https://doi.org/10.17161/kjm.vol17.21681>

ABSTRACT

Introduction. Provider time spent in the electronic health record (EHR) continues to increase, adding stress to an already demanding field. This study quantified the impact of a new EHR procedure documentation tool designed to reduce charting burden.

Methods. This retrospective cohort study was conducted at the University of Kansas Health System and involved ambulatory physicians from all hospitals who were granted access to a new procedural documentation tool. Data on time spent per chart and clicks per chart per office visit were gathered from the hospital's EHR system. The cohort also completed a survey regarding their self-perceived efficiency in the EHR and charting burden.

Results. The procedure documentation tool was used for 68% (25/37) of eligible procedures at one-month post-implementation. There was no significant difference in minutes per chart between the group that used the tool and the group that did not, although the group using the tool had lower charting time (median difference [MD] = 5.517; 95% CI, -0.283 to 13.317; $p = 0.066$). A similar trend was seen with clicks per chart, with an MD of 4 (95% CI, -3 to 11; $p = 0.25$).

Conclusions. While the difference was not significant, this study achieved its goal of quantifying the impact of a health information technology (HIT) project and indicates the need for further examination of how to quantify future projects. It lays the groundwork for future evaluation of similar tools and studies. *Kans J Med* 2024;17:100-102

INTRODUCTION

Burnout among physicians is a significant issue, with the prevalence among physicians rising or remaining steady despite interventions.^{1,2} One of the perceived leading causes of burnout is poorly designed electronic health record (EHR) systems.³ As a result, many EHR vendors and health information technology (HIT) teams have attempted to introduce functionality and features to reduce physician charting burden. Despite these interventions, burnout remains high with about 50% of physicians citing too much EHR time as a leading factor for their burnout and dissatisfaction.⁴

Reduced charting time has been associated with reductions in burnout and improvements in efficiency.⁵ Prior research has done little to define efficiency quantitatively. Methods have included the number of standard tools (such as order sets) used, self-report efficiency, and amount of time in the EHR.^{6,7} Sinsky et al.⁸ have proposed seven core EHR use measures, which include total EHR time, work outside of work, time on encounter note documentation, time on prescriptions,

time on inbox, teamwork for orders, and undivided attention.

While there is literature on the impact of EHR implementation on efficiency for physicians and the transition between EHR systems, little information is currently available on the effect of upgrades or add-on features to an EHR.^{9,10} HIT teams at hospitals often implement upgrades or additional features to ease the charting burden or make more tools available. However, it is unknown whether these upgrades achieve their goal.

We aimed to use one of the seven core EHR measures, encounter note documentation, to identify the effect of a new procedure documentation tool on physician charting efficiency at the University of Kansas Medical Center (KUMC). Additionally, we sought to create a framework for future evaluations of similar tool implementations.

METHODS

Study Design. The author conducted this retrospective cohort study at KUMC from July through September 2020, with approval from the KUMC Institutional Review Board (IRB). The study aimed to evaluate the impact of a new procedure documentation tool on provider charting efficiency. The tool, developed by Epic Systems, an EHR company, was optimized by the KUMC team, including physician informaticians, clinical content experts, and information technology professionals. The study period spanned four weeks before implementation of the tool through four weeks post-implementation. Physicians had the option to use the tool for documenting in-office procedures but were not required or prompted to do so.

The study comprised two parts: a retrospective database extraction and a physician survey. For the database extraction, the EHR automatically collected and stored data on physician time spent in each patient's chart. The survey, conducted four weeks post-implementation, involved a convenience sample of family physicians, and assessed their efficiency and satisfaction with the EHR. Survey data were collected and managed using REDCap electronic data capture tools hosted at KUMC.^{11,12}

Participant Eligibility Criteria. All physicians practicing at the KUMC family medicine department were eligible, except those contracted through an outside vendor. Written consent was obtained from all survey participants.

For database extraction, chart information was anonymously extracted for physicians performing eligible procedures, including bladder catheterization, endometrial biopsy, colposcopy, laceration repair, nail removal, foreign body locations, cast application, suture removal, incision and drainage, skin lesion biopsy, skin tag, nerve block, tendon sheath, spirometry, vasectomy, ultrasound guidance, botulinum toxin injection for migraines, cardiovascular stress testing, and skin tag removal.

Outcome Measures. The primary measure was the minutes spent charting per encounter. Secondary measures included the number of clicks per encounter and survey questions assessing tool efficiency and EHR use. These survey questions were rated on a 5-point Likert scale

(Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree) and were created by the authors. The survey items were adapted from internal IT evaluations and reviewed by two institutional physician informaticists to ensure they met the study's goals.

Statistical Analyses. IBM® SPSS (Statistical Package for Social Sciences; Armonk, NY), version 29, was used for these analyses. Normality of data was assessed using the Shapiro-Wilk test. Means were compared using Student's t-test or the Mann-Whitney U test. Survey responses were analyzed qualitatively.

RESULTS

Database Results. The procedure documentation tool was adopted by 68% (25/37) of eligible physicians in the family medicine department one-month post-implementation, indicating broad but not universal adoption. The Shapiro-Wilk test for normality of distribution was statistically significant for minutes spent in chart ($p < 0.001$) and clicks per encounter ($p < 0.001$), suggesting that neither sample was normally distributed. Therefore, the Mann-Whitney U test was used to compare the distribution differences between the samples.

There was no significant difference in the mean rank of minutes spent in the chart per encounter between the group that used the tool and the group that did not. The median minutes per chart for those not using the tool was 17.3, while for those using the tool, it was 10.5 (Figure 1). The median difference in minutes spent charting per encounter between the tool users and non-users was 5.5 (95% CI, -0.28, 13.3; $U = 160$; $p = 0.066$).

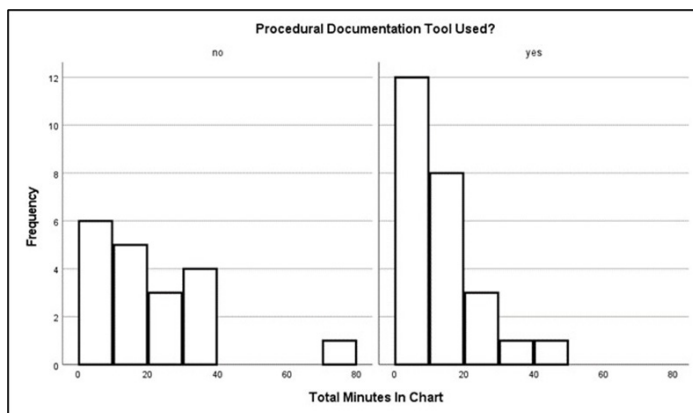


Figure 1. Histogram distribution of minutes spent per charting encounter. Note: When comparing groups who used the procedural documentation tool against those who did not, there was no statistically significant difference between total minutes in chart ($p = 0.066$). Although, there was a trend for the procedural documentation tool to have fewer minutes spent in the chart.

There was no significant difference in the mean rank of clicks per charting encounter between the two groups. The median number of clicks per chart for charts that used the procedural documentation tool was 22, while for charts that did not use the tool, it was 23 (Figure 2). The median difference in the number of clicks was 4 (95% CI, -3 to 11; $U = 189$; $p = 0.25$).

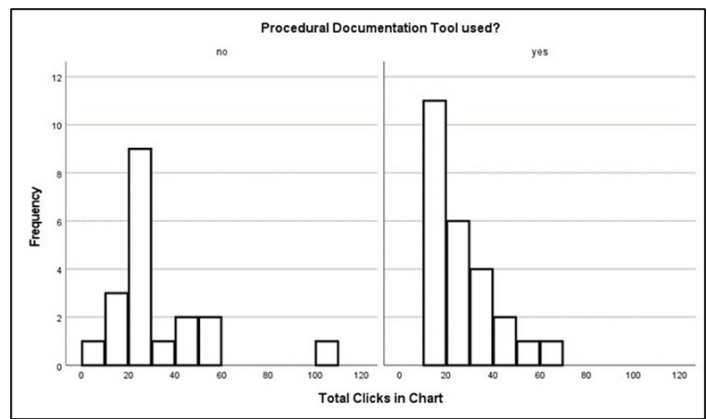


Figure 2. Histogram distribution of clicks per charting encounter. Note: When comparing groups who used the procedural documentation tool against those who did not, there was no statistically significant difference between total clicks in chart ($p = 0.25$). Although, there was a trend for the procedural documentation tool to have fewer clicks in the chart.

Survey Results. There was a 22% response rate (13/59) to the survey among the physicians in the department. Among the 13 participants who responded, 8 (62%) used the tool frequently to complete their workflows, and 10 (77%) felt that it allowed them to complete their workflows more efficiently (Table 1). Additionally, 11 respondents (85%) considered themselves highly proficient users of the EHR system. Only one respondent felt less efficient in using the EHR system after the tool's implementation compared to before.

Table 1. Most physicians used the procedure documentation tool at the follow up and found it to have a positive effect on their workflow.

Survey Questions on Efficiency	No. (%)		
	Agree	Disagree	
I feel I am a highly proficient user of the EHR system.	11 (79%)	3 (21%)	
I feel comfortable using tools and the EHR in general.	14 (100%)	0 (0%)	
I feel I am efficient in my use of the EHR system.	10 (71%)	4 (29%)	
Since its implementation, I am using the procedure documentation tool often to complete my workflows.	8 (62%)	5 (38%)	
The procedure documentation tool has allowed me to complete my workflows more efficiently compared to before it was implemented.	11 (85%)	2 (15%)	
I feel that I am more efficient in my use today of the EHR system than I was two months ago.	10 (79%)	3 (21%)	
I am satisfied with my experience in the EHR system.	12 (86%)	2 (14%)	
	Bothers Me	Is Not a Problem	Is Only a Problem Sometimes
Spending time in the EHR outside of normal business hours	9 (64%)	1 (7%)	4 (29%)

Note: List of items delivered in the qualitative survey and percentage respondents, divided based on agreement with the statement.

DISCUSSION

This retrospective cohort study evaluated the change that a new procedure documentation tool had on provider charting efficiency. This new tool was not associated with a statistically significant effect on charting time per encounter or clicks-in-chart per encounter, with p-values of 0.06 and 0.25, respectively. However, it did show a potentially clinically significant effect on charting efficiency for providers, as the tool was associated with a decrease in time in the chart by up to 10 minutes per encounter.

These findings are consistent with those of Sinsky et al.,⁸ proposing that time per encounter is one core measure that affects happiness in the EHR. Time per chart can significantly affect charting experience and burnout among physicians and further measures should be taken to help reduce charting burden.

Mostly self-reported highly proficient users responded to the survey and felt that it improved their workflow. Highly skilled users of the EHR may have benefitted more from the tool implementation than lower-skilled users, who would require more training or time to achieve an equal benefit.

Although the method showed value in determining the change in charting time, the value of the tool was undercut by a lack of utilization. The method is valuable on its own as the health informatics team can utilize the process we developed to understand the impact of future tools on charting experience. This information will greatly improve planning, execution, and retrospective evaluation of future IT tools.

Limitations. Limitations of this study include the small department size (59 total physicians), low survey response rates (22%), and the short time frame over which the data was evaluated (one month prior to tool implementation and one month after tool implementation). Only 37 eligible procedures occurred, insufficient for definitive conclusions. The low response rate was likely due to physician survey fatigue and the lack of monetary incentives.¹³ Additionally, a non-validated scale was used to gauge physician insights on the tool, which can limit the reliability of the results. Although Likert scales are well-known, the specific questions and response options need validation.¹⁴ Using a fully validated tool would improve the study. Additionally, leveraging the Cosmos database, which pools encounters from 256 million patients, could significantly enhance the study's power.

Next Steps. Next steps for the project include implementation of the analysis method on a tool with high utilization rates for a more accurate evaluation. Another step is to find other implementations to which the method can be applied and re-evaluate the procedure documentation tool in the family medicine department at one year. This would let us determine if more familiarity with the tool leads to more effective utilization. A future evaluation would be combined with an evaluation with the System Usability Scale, a reliable, validated scale used as a part of usability engineering to determine an assessment of usability.^{15,16} An alternative is to evaluate the tool in a subset of physicians who were already familiar with the procedure documentation tool and compare it to a subset who did not use the tool at all. Another step is to evaluate the quality of the procedure notes between the physicians who used the tool and those that did not. This would evaluate if the notes met billing standards necessary for reimbursement purposes.

CONCLUSIONS

This retrospective cohort study found no statistically significant difference in physician charting burden after implementing a new procedure documentation tool. However, it indicated the potential for interventions to reduce physician charting burden. The study quantified the impact of a HIT project on physician charting burden, laying the groundwork for evaluating future tools and identifying necessary future studies to assess the impact of HIT on physician charting experience.

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Keywords: electronic health record, burnout, professional, efficiency