

Emergency Physician Task Switching Increases With the Introduction of a Commercial Electronic Health Record

Natalie C. Benda, MS; Margaret L. Meadors, MA, MEd; A. Zachary Hettinger, MD, MS; Raj M. Ratwani, PhD*

*Corresponding Author. E-mail: Raj.Ratwani@MedicalHFE.org, Twitter: [@MedicalHFE](https://twitter.com/MedicalHFE).

Study objective: We evaluate how the transition from a homegrown electronic health record to a commercial one affects emergency physician work activities from initial introduction to long-term use.

Methods: We completed a quasi-experimental study across 3 periods during the transition from a homegrown system to a commercially available electronic health record with computerized provider order entry. Observation periods consisted of pre-implementation, 1 month before the implementation of the commercial electronic health record; “go-live” 1 week after implementation; and post-implementation, 3 to 4 months after use began. Fourteen physicians were observed in each period (N=42) with a minute-by-minute observation template to record emergency physician time allocation across 5 task-based categories (computer, verbal communication, patient room, paper [chart/laboratory results], and other). The average number of tasks physicians engaged in per minute was also analyzed as an indicator of task switching.

Results: From pre- to post-implementation, there were no significant differences in the amount of time spent on the various task categories. There were changes in time allocation from pre-implementation to go-live and go-live to pre-implementation, characterized by a significant increase in time spent on computer tasks during go-live relative to the other periods. Critically, the number of tasks physicians engaged in per minute increased from 1.7 during pre-implementation to 1.9 during post-implementation (difference 0.19 tasks per minute; 95% confidence interval 0.039 to 0.35).

Conclusion: The increase in the number of tasks physicians engaged in per minute post-implementation indicates that physicians switched tasks more frequently. Frequent task switching behavior raises patient safety concerns. [Ann Emerg Med. 2016;67:741-746.]

Please see page 742 for the Editor’s Capsule Summary of this article.

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INTRODUCTION

Background

The Health Information Technology for Economic and Clinical Health Act has encouraged eligible hospitals and providers to adopt certified commercial electronic health records, driven by the potential for incentive payments. For some providers, the transition was from paper medical records to a commercial electronic health record, whereas for others the transition was from a customized homegrown electronic health record to a commercial one. If designed and implemented appropriately, commercial electronic health records have the potential to improve the delivery of care in the emergency department (ED).^{1,2} However, there is often an incongruity between provider work flow and commercial electronic health record design, resulting in potentially serious shortcomings in supporting physician work processes.^{2,3} Furthermore, there may be unique

challenges associated with transitioning to a commercial electronic health record, depending on whether a provider is transitioning from paper or a homegrown electronic health record.

Physicians have reported increased workload because of the mismatch between commercial electronic health record functionality and clinical work flow in several qualitative studies; however, traditional time and motion studies do not always support this assertion.²⁻⁴ Researchers have recognized the need for studies that quantify changes in physician work activities, not just time allocation, from introduction of the commercial electronic health record to long-term use.⁴

Importance

The ED is a complex and dynamic environment in which emergency physicians with limited resources must manage multiple patients. Emergency physicians’ task

Editor's Capsule Summary

What is already known on this topic

The introduction of electronic records and computerized order entry into emergency departments often produces complaints of increased workload.

What question this study addressed

This single-organization study used direct observations of physician activities before, during, and 3 to 4 months after the transition from a homegrown electronic medical record to a widely used commercial electronic medical record with provider order entry.

What this study adds to our knowledge

During the go-live period, time engaged in computer tasks increased, whereas that for other tasks decreased, but this returned to baseline in the postimplementation period. However, the number of tasks engaged in per minute (a measure of task switching) increased significantly from pre- to postimplementation (the equivalent of 91 additional tasks per 8-hour shift).

How this is relevant to clinical practice

Frequent task switching poses a safety risk, suggesting a need for electronic medical record designs that can be better and more easily customized to fit clinical work flow.

prioritization shifts quickly to address competing demands, and the work environment is characterized by frequent interruptions.^{5,6} Given the complexities of the environment, electronic health records must be designed to support clinician work flow to ensure the safe delivery of care.⁷ Electronic health records that increase task demands may overextend the attentional capacity of care providers and result in adverse patient safety events.⁷⁻⁹

Studying the effect of electronic health record use on physician activity is imperative to ensuring safe delivery of care and for improving electronic health record design. To fully understand this effect, assessing physician work activity during both the initial implementation phase and the long-term use phase of electronic health records can illustrate the changes that occur as physicians become accustomed to new systems. Observing these changes can provide insight on how physicians adjust their work activities to accommodate new technology.

Goals of This Investigation

This study focused on changes in physician work activities across 3 periods: before the transition from a homegrown system to a commercially available one, immediately after implementation of the new system, and after long-term use. We quantitatively examined time allocation on broad task categories and the number of tasks physicians engaged in minute-by-minute, which served as an indicator of task switching.

MATERIALS AND METHODS

Study Design

This study used a quasi-experimental design with 3 observation periods: pre-implementation, 1 month before implementation of the new system; go-live, 1 week after implementation; and post-implementation, 3 to 4 months after widespread use of the system, when physicians had grown accustomed to the electronic health record.¹⁰

Setting

This study was completed in an urban, tertiary care, academic ED with 90,000 annual patient visits. Observations were conducted while the ED transitioned from a homegrown electronic health record to a commercially available one. The homegrown system allowed patient tracking and viewing of results (laboratory results, radiology results, ECGs, dictated reports, etc), with optional physician documentation. It would rank as an approximately stage 2 Health Information Management Systems Society electronic health record adoption model with picture archiving and communication system available outside radiology.¹¹ The implemented electronic health record added multiple new features: an interface for patient tracking and viewing results, all nursing documentation (including closed-loop medication administration), and, most notably, computerized physician order entry, approximately stage 5 and a significant change to work flow. Physician documentation remained unchanged, primarily on paper and scanned into the chart.

Selection of Participants

A convenience sample of emergency medicine resident and attending physicians was observed in the ED. Fourteen physicians were shadowed in each period (N=42 across the study) for 2 hours each (28 hours of observation per period, 84 total hours across the study). Within each observation period, the participants were unique; however, across the observation periods some participants were the same. A total of 24 unique physicians were observed across the 3 periods. Observation sessions were balanced across time of day to capture variability in patient volumes. The study

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