Task Transition Decision Making During Downtime: Impact of EHR systems on Performance

Kristen Presleigh, MPH, Vickie Nguyen, MS, Nnaemeka Okafor, MD, MS, Amit Mehta, MD, Jiajie Zhang, PhD, and Amy Franklin, PhD
The University of Texas Health Science Center at Houston

Abstract

Electronic Health Record Systems (EHRs) have the potential to change the way we receive and deliver care. Once implemented, EHR systems are not always available. Through planned outages or system failures, system unavailability is part of HIT use. Here, we consider the impact of the absence of EHR data on physician decision making by exploring the choices doctors make in selecting their next task. We find that during a planned outage there are shifts in decision-making behavior. These results suggest the impact of downtime should be explored for clinical as well as financial implications.

Introduction

Although the implementation of electronic health record systems has received significant research attention, including the benefits and unintended consequences of such systems, little is known regarding the impact of EHR downtimes. When EHR systems are unavailable, either due to routine maintenance or as part of an unplanned event, clinical sites are left trying to accomplish their work outside the typical workflow. Descriptive studies charting the factors contributing to downtime[1] or the cost to physicians and practices highlight only some of the impact of system unavailability. Here, we consider the impact of the absence of EHR data on physician decision making by exploring the choices doctors make in selecting their next task.

Task Transition Decisions

In our study, we focus on decision making in the Emergency Department (ED). EDs are time and information intensive environments where circumstance rarely allows a physician to see a task such as caring for a single patient through from beginning to end without intervening activities. We explore the selection process between task actions as a type of decision making, called here task transition decisions. In our previous work[2], we found that less than half of all task transition decisions are guided by protocol. For roughly 50% of their decisions, physicians respond dynamically to the interruptions and opportunities provided to them by their environment. In this, we compare previously observed behaviors with the decision-making generated during a significant environmental shift, a 12-hour scheduled EHR downtime.

Results

A total of eight Attending ED physicians were observed and audio recorded for two shifts each. Each shift consisted of four hours for a total of 64 observation hours. Six of the Attendings were observed during a "typical" workday, or days where the EHR systems were available, while two Attendings were observed during downtime. We coded the transcribed observation and audio recording data for planned, interruption, and opportunistic decision types using Franklin et al.'s task transition decision coding method[2]. The proportions of decision types made were calculated for each Attending during both the "typical" workday and during downtime (Figure 1).

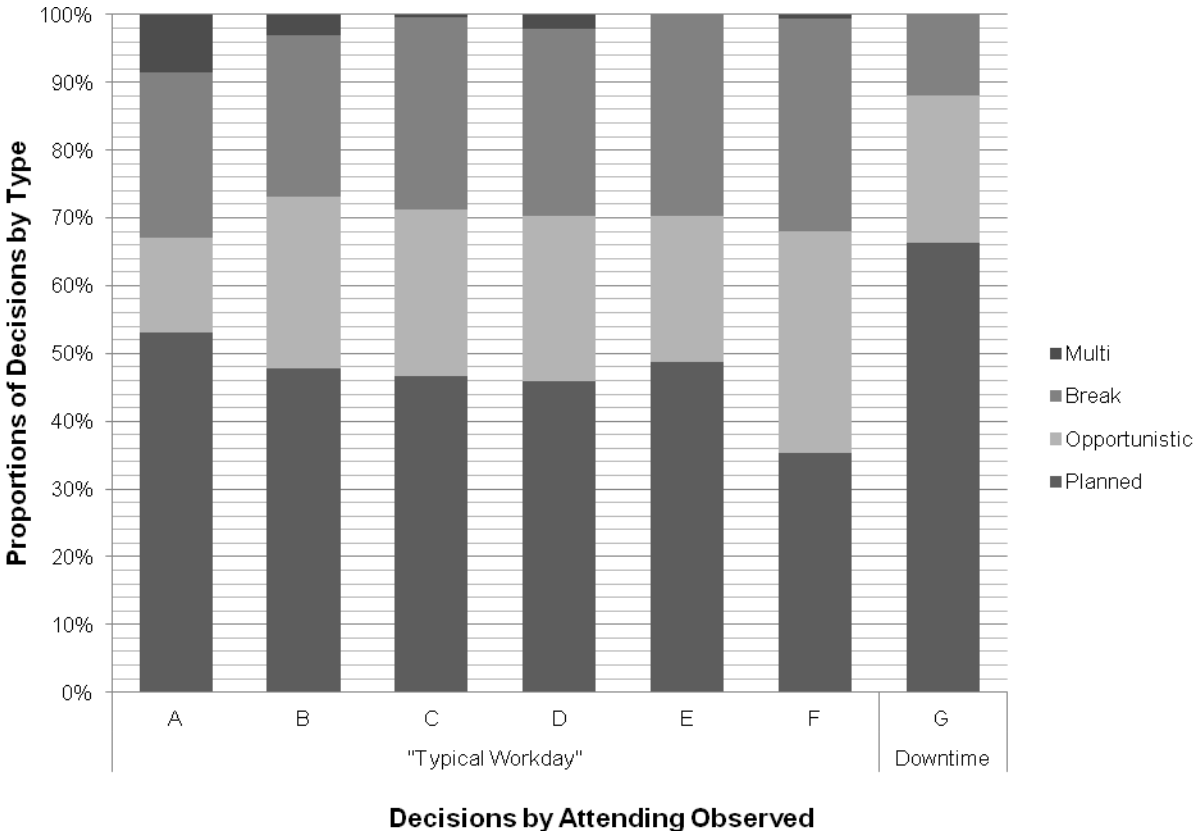

Figure 1. Task transition decision making for 8 Attending ED physicians during "typical" workdays and decision making during downtime.

The EHR downtime had a significant impact ($t(7) = -11.99$, $p < .01$) on task transition decision-making. During this period, we saw shift towards protocol based behaviors. This may be due to several factors: (1) downtime planning and implementation of new protocols may have increased adherence, (2) reduced patient volume may have decreased system complexity impacting the need for more dynamic responses, (3) absence of tools such as track boards and selected computers providing access to pre-downtime records resulted in physical grouping of the clinical team which altered communication patterns.

Conclusion

EHR systems and their absence have a significant impact on clinical environments. Here, we find a shift in decision-making behavior towards planned behavior during a planned outage. Further work is needed to explore the impact of unplanned downtime on decision making as these results suggest downtime should be explored for clinical as well as financial implications.

References

1. Hoot N, Wright JC, Aronsky D. Factors contributing to computer system downtime in the emergency department. AMIA Annu Symp Proc. 2003:866.
2. Franklin A, Liu Y, Li Z, Nguyen V, Johnson T, Robinson D, Okafor N, King B, Patel V, Zhang J. Opportunistic decision making and complexity in emergency care. J Biomed Inform. 2011;44(*3*):469-76.