

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

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## 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 or the cost to physicians and practices highlight only some of the impact of system unavailability [1].

In this study, we consider the impact of EHR downtime in an Emergency Department by exploring the choices doctors make in selecting their next task.

## Task Transition Decisions

Emergency Departments 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.

## Methods

Two sets of observations were completed at a large county hospital in a major metropolitan area. 7 sessions capturing Attending ED physicians activities during normal shifts and 2 sessions of physician activities during a planned EHR downtime were recorded. Each session lasted approximately four hours.

The downtime consisted of a 12 hour window for EHR system upgrades, with planned management regarding patient record numbers, charting, bed admission protocols, and laboratory response measures.

We coded the observed behaviors into 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 session during both the "typical" workday and during downtime (Figure 1).

## Discussion

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 with an increase in **planned decisions to 66% during downtime.**

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 during a planned outage. Further work is needed to explore the impact of unplanned downtime on decision making. These results suggest downtime should be explored for clinical as well as financial implications.

## References

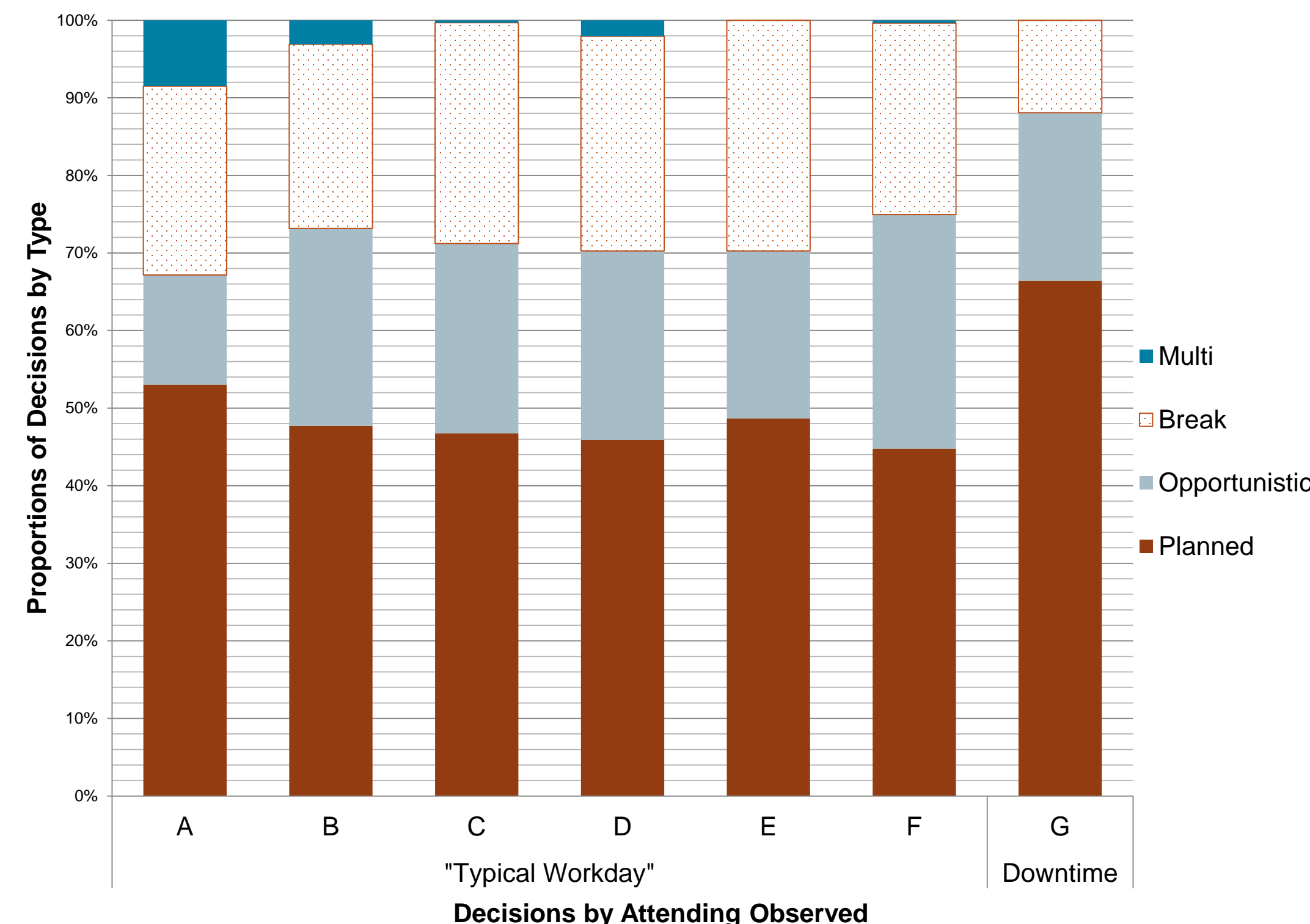
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## Results



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