A Novel Method For Building an Active Health IT Surveillance BlackBox

MedStar Health National Center for Human Factors in Healthcare

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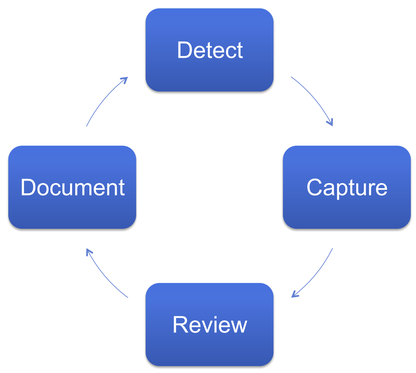
Introduction

- Many electronic health records (EHRs) have not been optimized for patient safety.
- "Black Box's" utilized in high-risk industries for contextual understanding.
- In healthcare it is **not** sufficient to know that an error occurred in the EHR, rather we must know the "context".
- Healthcare event reviews focus on discrete data and anecdotal evidence
- There is no safety system in place to understand the "context" surrounding an IT error (i.e. events that led up to and after an error)

Objectives

We aimed to develop a framework to:

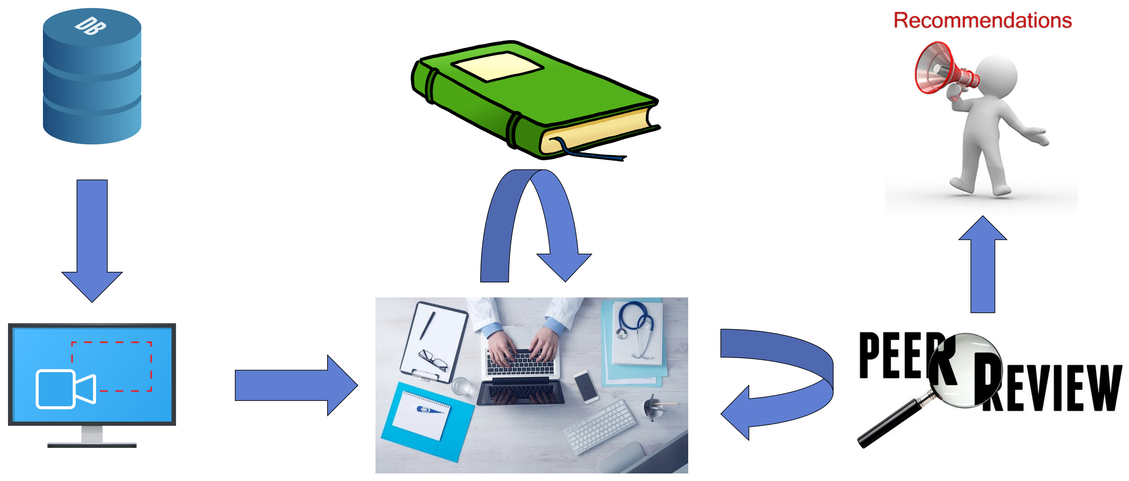
- Understand the context of errors by combining EHR safety event data queries, system wide video capture of EHR interactions, and human factors heuristics analysis.



Methods

Health IT errors gained from subject matter experts, patient safety event reports and quality improvement initiatives. A researcher (DJH) then developed Oracle based queries to locate discrete events based on clinical event patterns recorded in the EHR during the course of patient care. Video recordings were retrospectively abstracted from the informatics quality assurance tool which records all user sessions for seven days. Clinical videos were then systematically reviewed using heuristic methods by the research team containing human factors and clinical subject matter experts to develop a code book.

- Cerner Millennium EHR searched for safety error patterns over 270 days
  - Wrong Route Acetaminophen (per rectal -> per oral)
  - Wrong Laterality Imaging (left wrist x-ray -> right wrist x-ray)
  - Wrong Oxycodone Release (Immediate Release -> Extended Release)
- Filter for potential error cases subsequently abstracted



Results

Our search resulted in 65 Laterality, 12 Acetaminophen, and 30 Oxycodone confirmed cases over a 270 day period.

Query	Days Searched	Query Results	Potential Cases	Cases Abstracted
Laterality (Right to Left)	74	201 (2.7/day)	138 (1.9/day)	35
Laterality (Left to Right)	81	174 (2.1/day)	103 (1.3/day)	30
Acetaminophen	58	57 (1.0/day)	25 (0.4/day)	12
Oxycodone	57	56 (1.0/day)	55 (1.0/day)	30
Total	**270**	**488**	**321**	**107**

The mismatch between number of potential cases and the number of videos abstracted is a result of technical limitations retrieving the screen recording session.

Conclusion

Through this pilot study, we have been able to successfully demonstrate:

- Detection of potential Health IT safety errors are possible through development of Oracle based queries
- Capture of system screen recording of the user before, during, and after the error occurred is possible
- Abstraction and documentation of Health IT errors is subsequently possible upon successful recording of videos

The cases abstracted surrounding Health IT errors has been successfully utilized internally to provide evidence of how certain errors are occurring and provide contextual clues on how to mitigate the errors from happening in the future.

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