System Approach to Prevent Lost Studies and Improve Radiology Report Turnaround Time

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Introduction

- Delays in Radiology report turnaround time are associated with delays in management and adverse effects on patient care [1-3]
- MR Pelvis studies may represent exams for Body Imaging (BI) or MSK
- Since both exams use the same CPT code, there is no way to differentiate them in our PACS or RIS
- By default, MSK studies were queued in the BI workflow
- Quality and Patient Safety Implications:
  - Delayed report times
  - Changes from prelim report to final read after 'lost studies' were identified by MSK attendings

Methods:

- **Identify and Define the Problem:**
  - 2 sentinel cases resulted from delay in final reads for MSK studies
- **Objectives:**
  - Create a solution which sorts MR Pelvis study into the correct workflow
  - Improve report turnaround time (RTAT)
- **Collect data:**
  - A pre-intervention list of 3 months of MR Pelvis studies was obtained from RIS
  - Audit logs were reviewed to determine the following data points: time to first view by BI and MSK, time to report completion, time of preliminary report, and time of final signature
  - Mean times for report completion to first MSK view, and time to final report were calculated

Methods

- **Identify Major Root Causes**
  - Root Cause Analysis was performed with relevant stakeholders
- **Develop Solution Strategies:**
  - <u>Intervention 1</u>: a 'reserve flag' to sort studies into the correct workflow
  - Data was subsequently analyzed and although TAT improved, studies were still 'lost'

Figure 1: Fishbone Diagram to identify causes
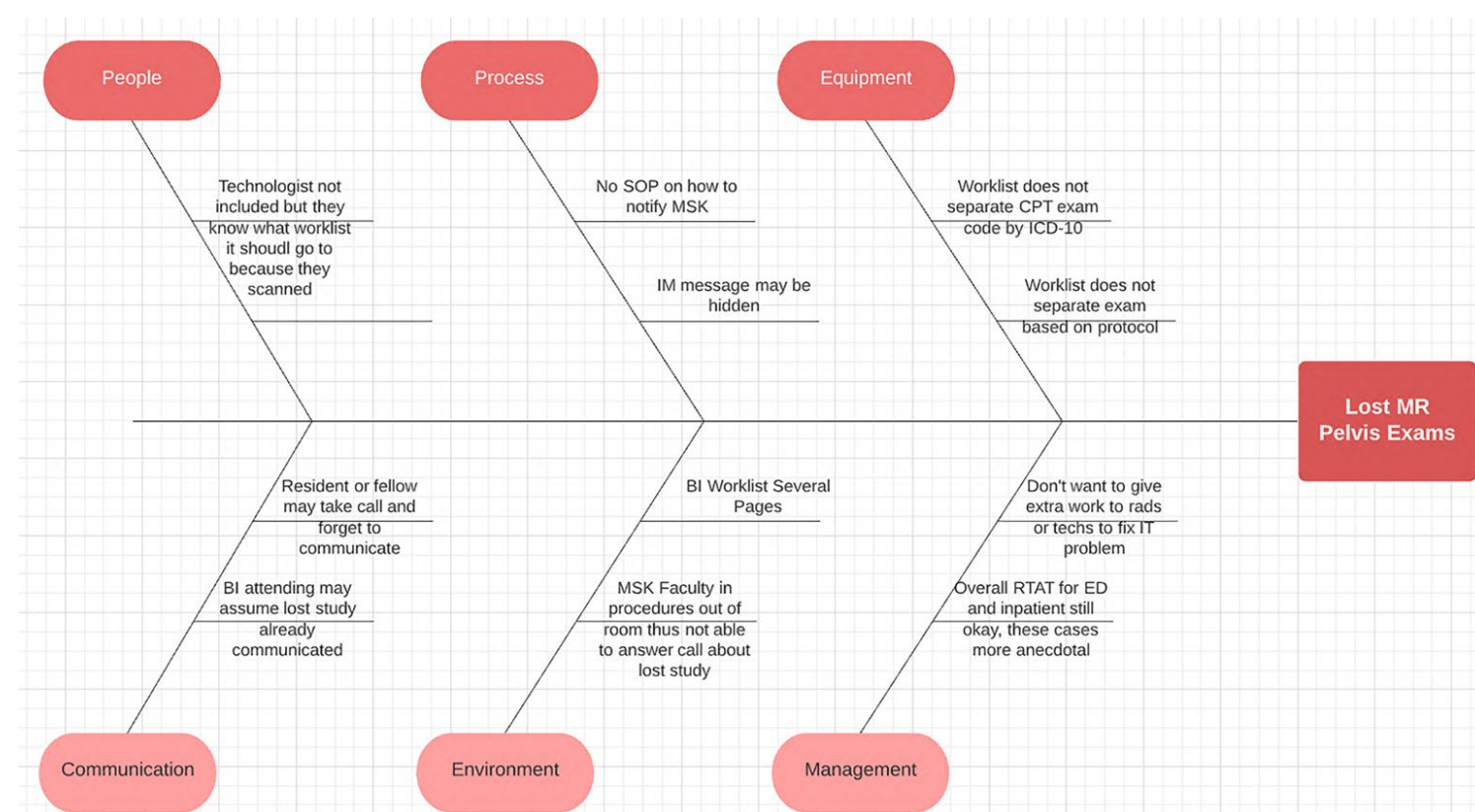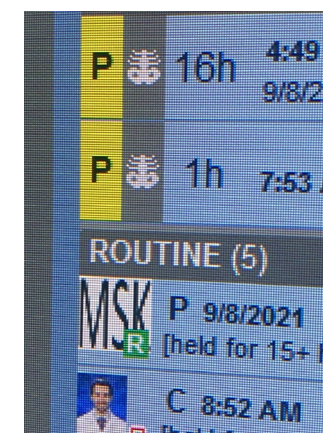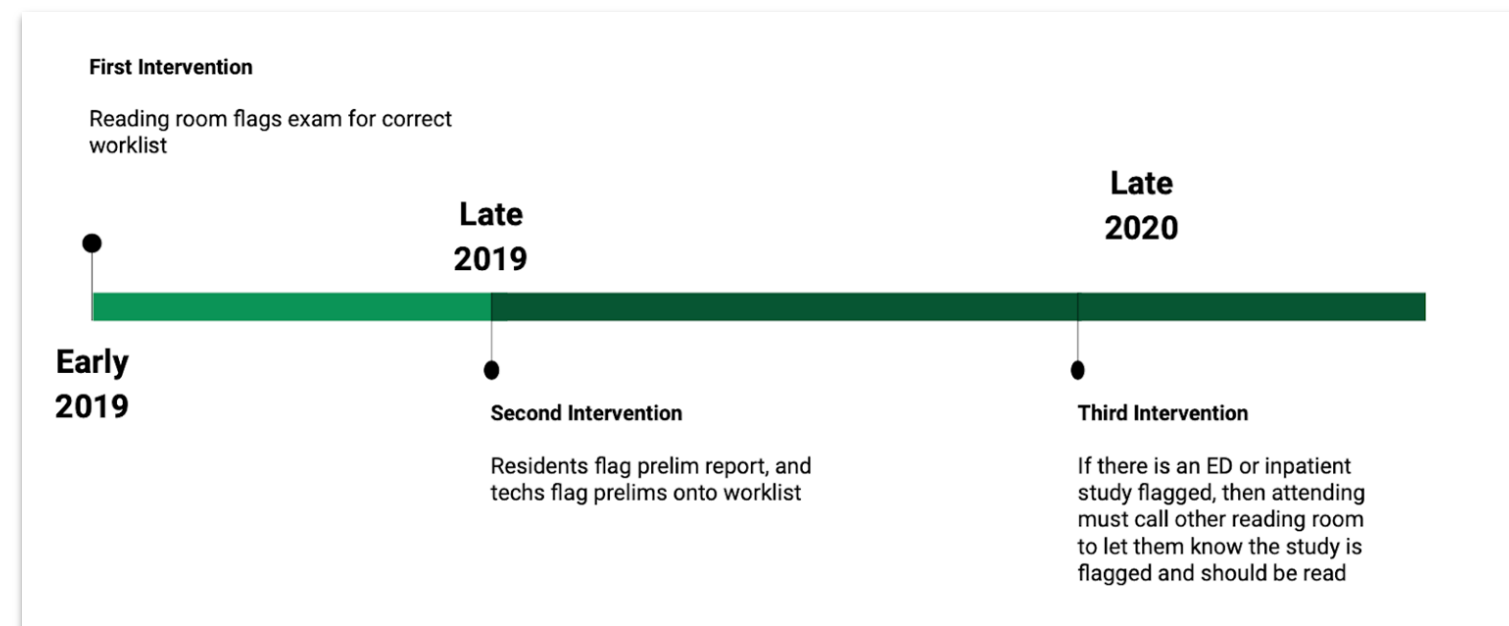

Figure 2: 'Reserve Flag'

Methods

- **Additional Solutions:**
  a. Technologists and residents flag prelim report onto worklist
  b. For ED and inpatient studies, attendings call MSK reading room
- **Reanalyze:**
  a. After 3 months, data was analyzed to assess success of subsequent interventions

Figure 3: Timeline of interventions

First Intervention

Reading room flags exam for correct worklist

Early 2019

Late 2019

Late 2020

Second Intervention

Residents flag prelim report, and techs flag prelims onto worklist

Third Intervention

If there is an ED or inpatient study flagged, then attending must call other reading room to let them know the study is flagged and should be read
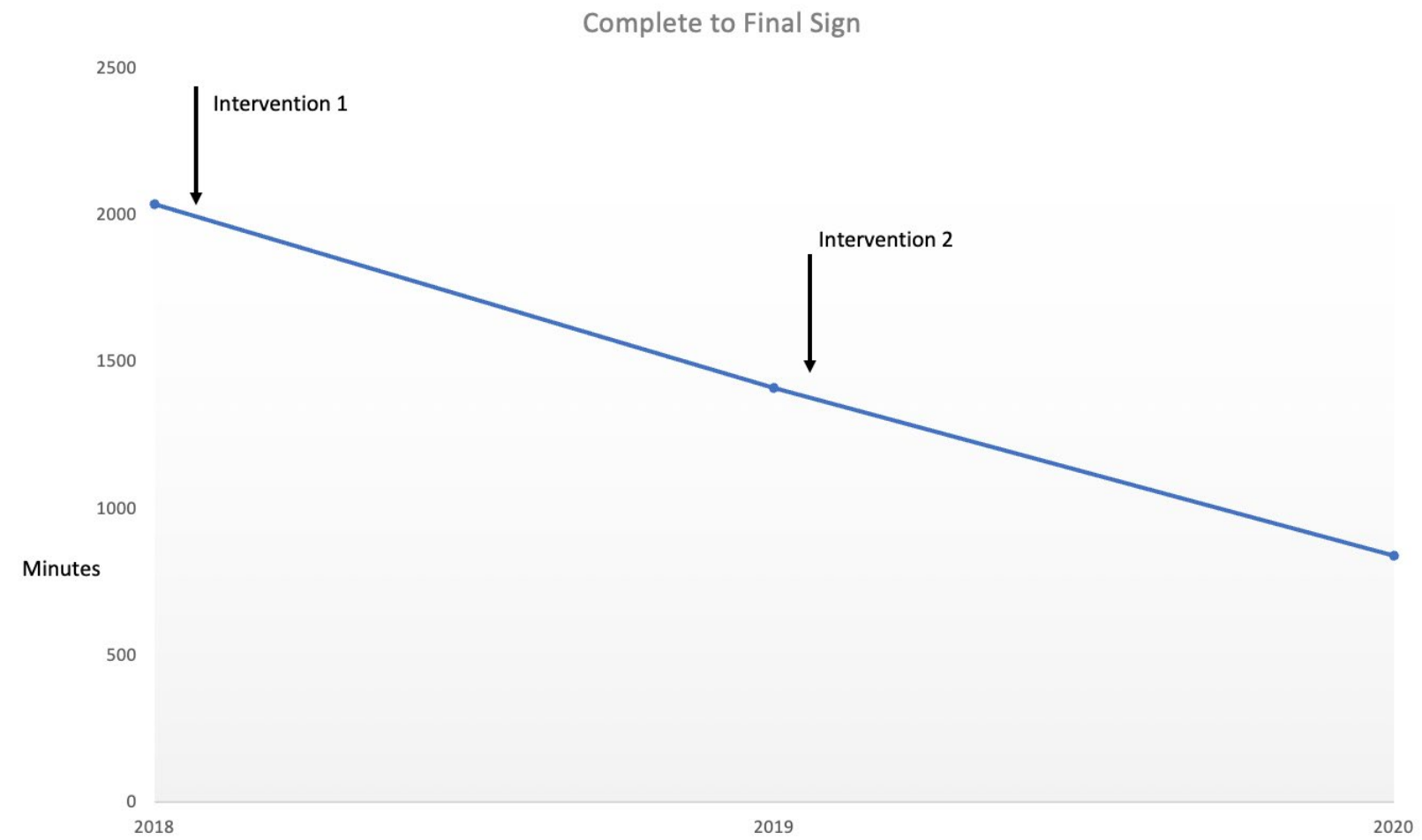
Results

- There was significant (p=.0018) improvement in time to view by MSK pre-intervention mean of 1015 minutes (n=107) to post-intervention mean of 500 minutes (n=127)

- There was significant improvement (p=.0033) in time to view inpatient and ED cases from 927 minutes to 357 minutes

- Time from study completion to final signature improved from mean of 1764 minutes to 838 minutes but was not statistical significance (p=.08)

- 5 cases demonstrated a delay in reporting resident misinterpretation pre-intervention to none post intervention

- Time to view overnight preliminary reports improved by 198 minutes after intervention

Results

Figure 4: Run Chart of Complete to Final Sign

Complete to Final Sign

Discussion

- Our study demonstrates the use of different systems tools across different levels of patient care to solve a patient safety problem.
- The reserve flag, a simple 2 click mechanism, and engagement of resident and technologist addresses pertinent information technology and human factors
- Involving a resident and technologist enabled buy-in from relevant stakeholders
- Involving a technologist flagging outpatient studies, which are not usually read by residents, ensured such studies are populated in MSK worklist
- Continuous identification of waste and monitoring for defects is critical to facilitate cycles of continuous improvement

Conclusion and Future Directions:

- Our project illustrates information technology tools and modified human factors to improve TAT and eliminate delayed communication of resident misinterpretation from overnight exams
- Future directions include expansion to CT Pelvis, CT sacrum, and MR Sacrum

References

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2. DeFlorio R, Coughlin B, Coughlin R, et al. Process modification and emergency department radiology service. *Emerg Radiol*. 2008;15(6):405-412.
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