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The Problem: “broken telephone”

- Suboptimal technical performance may be identified by radiologists, but is not consistently communicated to the technologist who performed the exam
- Patterns of weakness are not identified or addressed
- Errors repeat and problems linger
- Patient safety: these problems can lead to missed diagnoses, repeat imaging (CT/XR incurs additional radiation dose) and patient harm
Why?

• Within our large, multi-site academic radiology department, the process to report a suboptimal exam differed by location and by exam modality
  - Fill out a paper form? Call tech directly? Send email to tech manager?
• Paper forms difficult to distribute, and did not allow for data accumulation
• Radiologists did not engage in these processes consistently
• Perhaps some radiologists didn’t believe their feedback efforts would prevent a future occurrence or affect any change
Aim

To increase physician input into the technical performance of exams across all Montefiore Radiology sites, in order to identify patterns of error and suboptimal performance for targeted improvement
What we did

- Designed and created web-based program for technical feedback
- Allows for quick, automated case submission by radiologist
  - 1-click access to submission page, auto-populates from either Nuance PowerScribe 360™ or Epic Radiant™
- Automated case routing to correct tech manager
- Radiologist can indicate "patient callback needed" as required
Integration to dictation system & EHR

Nuance PowerScribe 360

Epic Radiant

Click here

Click here

Montefiore
### Case Submission Screen Appears

1. **Step 1:** Select issue from modality-specific dropdown menu
2. **Step 2:** Type comment
3. **Step 3:** Submit!

Remaining fields auto-populate
What we did

• **Closed-loop communication: case resolution comments sent to submitting radiologist by automated email**

  The issue you reported has been updated.
  MRN: 0000000
  Accession Number: 0000000
  Issue: Poor Image Quality
  Your Comment: c spine image has poor technique - can you take a look at the ma/kv settings?
  Updated by: sunshine
  Technologist: berry, straw
  Manager Comments: Checked machine settings were incorrect- was corrected.

• **Fully searchable database**

• **Custom reports easily generated to allow us to target main issues, and demonstrate that they are being resolved over time**
Technologist Positive Feedback and Award Opportunity

- Reward program to incentivize technologists
- Quarterly lottery drawing
- Automated lottery can randomly "select" technologists having praise submissions for prizes (e.g. concert tickets)
- To date 64 praise entries
Study Methods

• To determine program impact on physician engagement in tech feedback, we analyzed reported suboptimal cases
  – Analyzed 6 months before and 6 months after program introduction
  – Month of program introduction (Aug 2016) was excluded
• Fisher’s Exact test was applied to evaluate for clinical significance (p<0.001)
• Odd’s ratios were calculated
• Note: Statistical analysis was limited to the main hospital site, because of lack of recorded reliable baseline data at other sites
Results (at main hospital site)

Suboptimal Imaging Reported Before and After Implementation of Technical Feedback Program

# Suboptimal exams/Exam volume (per 1000 exams)

Results (at main hospital site)

CR  CT  US  MRI

Before

Feb-16  Mar-16  Apr-16  May-16  Jun-16  Jul-16

Aug-16  Sep-16  Oct-16  Nov-16  Dec-16  Jan-17  Feb-17

Go-Live

After
## Results (at main hospital site)

<table>
<thead>
<tr>
<th></th>
<th>6 months before program</th>
<th>6 months after program</th>
<th>Odds Ratio (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR</td>
<td>10 of 71,020 exams</td>
<td>75 of 80,742 exams</td>
<td>7.66 (3.962 -14.831)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>CT</td>
<td>6 of 20,335 exams</td>
<td>83 of 22,401 exams</td>
<td>14.759 (6.443 - 33.807)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>US</td>
<td>34 of 15,011 exams</td>
<td>78 of 16,400 exams</td>
<td>2.491 (1.664 - 3.729)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>MRI</td>
<td>0 of 6,701 exams</td>
<td>24 of 7,627 exams</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Commonest US Issues Across Montefiore Sites

- Missing Images: 35%
- Poor Image Quality: 14%
- No Issue Selected: 12%
- Protocol Error: 12%
- Missing or Incorrect Doppler: 9%
- Missing or Incorrect Measurements: 9%
- Praise to Tech: 9%
Final thoughts

• We achieved significantly increased physician input into the technical performance of imaging exams with the introduction of a simple, easy-to-use, and integrated web-based program.

• This program can be applied in a Just Culture environment and allow for a safe, productive learning environment with open communication.

• Technologist feedback program is a Value-Add activity and accords with Imaging 3.0 principles.

• Mammography EQUIP requirement can be fulfilled by the implementation of this program.
References

• Brink, JA. Is Achieving “Just Culture” Just Culture, or Something More? J Am Coll Radiol 2017; 14:2