Overview:

- Facilities must have a system to review CT protocols
  - Specified by The Joint Commission and the ACR

- Most sites rely on:
  - Self-identification and documentation of protocol changes
  - Committee review
The issue(s)

• Even with oversight
  • Miscommunication or mistakes can cause inadvertent changes
• Changes also occur behind the scenes
  • Calibration / Software upgrades
• ‘Paper-based’ master protocols may not reflect what is actually programmed
  • Satellite CT offices can be distant from oversight and experts
  • Difficult to identify and troubleshoot issues

Our solution: Methods
Part 1 – Conversion of XML to Web-Pages

• XML protocol files were exported from 14 CT units
  • Siemens scanners
  • Files represent the programmed protocols
  • Monthly
• A web application was developed to display protocol files on a hospital intranet
Webpage display: Protocol Parameters

Acquisition (beam on) Reconstruction

CT committee members can review / audit protocols without physically being at each scanner.

Part 2 – Month to Month Review

- The application also compares CT parameters
  - Versus prior month’s XML files
  - Deviations indicated in red
  - Analysis & review requires < 3 hrs/month (all 14 scanners)
Part 2 – Monthly review screenshot – 2 changes

- This dose notification was inadvertently removed from one coronary CTA protocol at a single CT scanner
- Difficult to identify without a computer-based analysis

Part 2 – Tally of monthly changes from one scanner

<table>
<thead>
<tr>
<th>Total identified</th>
<th>With filters</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># of protocol variable changes</td>
</tr>
<tr>
<td>Jan</td>
<td>9</td>
</tr>
<tr>
<td>Feb</td>
<td>77</td>
</tr>
<tr>
<td>March</td>
<td>4</td>
</tr>
<tr>
<td>April</td>
<td>667</td>
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<td>May</td>
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<td>Oct</td>
<td>37</td>
</tr>
<tr>
<td>Nov</td>
<td>4</td>
</tr>
<tr>
<td>Dec</td>
<td>371</td>
</tr>
</tbody>
</table>

Insignificant dose change

Filters reduced reviewable items to manageable levels
Remaining high volume changes were due to added features (e.g.: CarekV)

Smarter filters focusing on changes in dose and image quality were applied

There were high amounts of changes in 4/2015, 7/2015, 12/2015, and 12/2016
Part 3 – Comparison to Master XML

- Master Protocols
  - Google docs shared spreadsheet
  - Exported to XML
- Ideal comparison
- Slow iterative process
  - ~ 1 protocol / month
- Month-month comparisons remain as a stopgap

Policy recommendations:

- CT protocol reviews should be performed monthly for new CT installations or if complex / high dose / research scans are commonly used
  - Physician, physicist and CT technologist input is necessary
  - Quarterly reviews may be sufficient when protocols have been standardized
- Use of computer analysis of protocol deviations is recommended to ensure the validity of programmed protocols
- Documentation of protocol changes is needed for committee review
- Vendors must notify the facility when software upgrades can affect the CT calibration or protocol files
- Maintain backup protocol files in case of inadvertent deletion

Thanks for watching!