Eliminating lost and non-reported radiology exams in US Air Force radiology practice

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Disclosure

• The author neither currently has (nor previously had) a financial interest or other relationship with any commercial organization in the past 12 months that may have an interest in the content of this presentation
• The views herein are those of the authors and not of the Department of Defense or US Air Force
• This material has not been presented or submitted for presentation or publication elsewhere, no outside funding was provided, and the information is unclassified
Background

• All diagnostic imaging exams must be interpreted by a radiologist and reported to the referring physician
  – In practice, exams may fail to transmit and/or be lost during transmission to PACS
  – Exams may go un-reviewed and un-reported on PACS
  – Reports may fail to transmit to the electronic health record for review by the ordering physician

• Lost exams and reports pose a tremendous patient safety and quality problem in radiology
  – Radiology departments must have reliable processes in place to find these exams, which are often lost due to computer network failures as well as unavoidable human error
  – Lack of robust processes to identify these exams in a timely fashion pose an ethical and legal risk to the radiologist
Background

- **USAF Teleradiology Workflow**
  - Exams ordered in CHCS (Composite Health Care System) = RIS (radiology information system)
  - Stand-alone imaging equipment (eg. CR, CT, MRI) receive CHCS input and transmit images to PACS via secure local and teleradiology networks
  - Images on PACS (AGFA Impax 6.3) are reviewed and dictated/finalized with AGFA Talkstation
  - Reports are electronically routed to local/national CHCS’ and subsequently to the worldwide military electronic medical record (EMR - AHLTA/Essentris)
How bad is the problem?

- On a daily basis, an average of **1 out of 300 exams are “lost”** in our radiology system (images not on PACS from local & national sites)
- Depending on network integrity, few or many radiology reports may also not be transmitted back to the CHCS RIS and subsequently to the EMR
- Our process was not reliable in identifying lost and non-reported exams between January 2015 and August 2015, resulting in a “build-up” of 61 “problems”

### Table 1: Number of exams in various CHCS status at Travis AFB radiology in Sept 2015

<table>
<thead>
<tr>
<th>CHCS Status</th>
<th>Not on PACS</th>
<th>New</th>
<th>Dictation Started</th>
<th>Dictated</th>
<th>Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARRIVED</td>
<td>11</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>EXAMINED</td>
<td>3</td>
<td>2</td>
<td>15</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>COMPLETED</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>75,623</td>
</tr>
</tbody>
</table>

PACS (AGFA IMPAX) Status (September 2015)
**Why the problem matters**

- A referring physician orders imaging and expects exam completion and reporting back to the EMR for review.
- Patient’s images are acquired but fail to transmit to the PACS.
- The images find their way to PACS but are so old no one sees them.
- The images are finally reviewed but the dictated report fails to transmit to the EMR due to a network failure.
- The referring physician does not see the delayed report and was not alerted by the radiology department.
- Delay in Diagnosis

*Why the problem matters*
How do we look for lost exams?

- USAF Radiology RIS (CHCS) has search tools to find “incomplete” exams; daily searches are made imaging technologists, PACS team members, and key radiologists
  - Any radiologist can use RIS/PACS search tools to assure daily work completion
- At our 15 teleradiology sites, the lead technologist assures that all exams are sent/seen on PACS, and they expect final reports on all exams daily (usually a 1-2 hour report turnaround time)
How do we look for lost exams?

- AGFA Impax has search capabilities to identify exams on PACS without final reports; routine searches for these types of exams is a quick and simple additional method to identify non-reported exams.
- Exams that remain in “Dictated” status may have reports that are finalized in Talkstation but not posted into CHCS or the EMR due to a network failure.
Unexpected Process Issues

• Not all radiologists, technologists, and referring physicians understand high reliability concepts and the scope of the problem of lost exams
• People unknowingly make error in contributing to lost exams or in trying to find lost exams and reports in spite of honest efforts
• Network errors are surprisingly common, leading to reports not being posted in the EMR
  – Should a report posting to the EMR a month late get an addendum? The interpreting radiologist may never know of the delay… should they?
• Referring physicians and patients say “I never heard back, so I assumed everything was ok…”
Results

• By 31 December 2015, there were no lost/unreported exams for 2015; however, ....

• Exams in 2016 continue to be “lost” on a daily basis due to networks being “down” during image transmission to PACS, human error in getting exams onto PACS, error in identifying unreported exams, and network errors during report transmission/posting back into the EMR.

• Daily effort by multiple team members maintain the ZERO lost/unreported exam standard.
Take home thoughts...

• Error is inevitable, so having a reliable process to identify lost exams is important
  – As computer network stability is unreliable, it is not reasonable to assume error-free data exchange

• Departmental leaders should be engaged on oversight of their process to get to “zero” lost and unreported exams
  – Patient safety offices in medical centers should be briefed on this as an ongoing issue

• For the radiologist, direct communication with the referring physician is needed when encountering a “lost” exam or delayed report to prevent a delay in diagnosis
Abbreviated References


