Use of a Novel Web-based Tool to Improve Communication Between the Emergency Department and Radiology

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Streamlining communication between radiology and other departments is critical for ensuring timely and appropriate care.

With increasing radiologic subspecialization, radiology physicians may work in geographically disparate parts of the department.

At our hospital, we anecdotally observed that a significant portion of incoming phone calls were misdirected to incorrect destinations.

- This resulted in wasted time, increased interruptions, and delays in care because the referring clinicians could not efficiently navigate the radiology department staffing structure.

Drs Voutsinas, Sun, Chaiting, Jacobi, Genes, Nassisi, and Halton have nothing to disclose.

Dr Delman discloses being a consultant for Bayer AG.
The purpose of our quality improvement project was to create a web-based tool that:

- Would allow the emergency department (ED) to more efficiently contact the appropriate radiology workstation in a timely manner.
- Reduce the number of misdirected phone calls.
- Surveys were sent to both the radiology residents and ED clinicians (attendings, residents, physician assistants) to assess how frequently phone calls were misdirected.
  - Radiology attendings and fellows were not included as they do not answer the phone as often and only sit at a limited number of workstations, so they would have little reference to compare if their station is being more frequently called than others.
- Radiology residents were asked a series of multiple choice questions concerning misdirected phone calls and which stations were most often affected.
- ED clinicians were also asked a series of multiple choice questions concerning misdirected phone calls and which stations they were most often trying to get in contact with.
  - They were also given a series of questions to assess their knowledge of commonly called radiology stations (Plain Film, CT Body, Ultrasound, Neuroradiology, Pediatrics, and Overnight).
Methods

After collection of the survey results, ED and radiology physicians worked together to design an easy-to-use, intranet-based tool informing ED clinicians about the appropriate destination based on radiology subspecialty and hour of the day.

After the tool was implemented for six months, surveys were again sent to radiology residents and ED clinicians asking the same questions as before in order to assess for any significant change in response.

Additional questions were added to the ED survey to assess awareness of the new tool.

Methods

Initial radiology questionnaire:
- Please Indicate your level of training
- How often do you receive phone calls that require you to give the caller a different phone number because they called the wrong radiology desk?
- What time of day do you normally receive phone calls asking for other radiology desks?
- What rotations do you normally get calls asking for other radiology desks?
- Which rotation do you receive the most calls asking for a different radiology desk?
- What are the most commonly asked for numbers when someone calls the wrong radiology desk?

Questions included in the follow up survey only:
- Since October 2017, you feel the number of times the ED calls the wrong radiology desk has...
Methods

- Initial emergency department questionnaire:
  - Please indicate your level of training:
    - How often do you call radiology and are told you called the wrong number and given a different number to call?
    - When you are told that you called the wrong number, what type of study are you trying to get a read for?
    - Please add any comments, issues, or concerns you have in contacting the radiology department you may have had.

- Questions included in the follow-up survey only:
  - Are you aware of the Radiology contact list available on the ED intranet, which was updated in October of 2017?
  - Do you use the Radiology contact list available on the ED intranet to contact radiology?
  - Regarding the Radiology contact list, please select the statement that most reflects your feeling about it.

- Quiz questions for the emergency department:
  - When you need a plain film read, what number do you call?
  - During normal radiology work hours (8 am to 5 pm), what number do you call to get a Body CT read?
  - During normal radiology work hours (8 am to 5 pm), what number do you call to get a Neuro study read?
  - During normal radiology work hours (8 am to 5 pm), what number do you call to get an Ultrasound read?
  - Over night (8pm to 8am), what number do you call to get a radiology study read?
• An interactive, editable schedule with phone extensions (and pagers when appropriate) was made available through the ED intranet, allowing for flexibility with changes in reading room numbers.

– Previously, there was a static image of radiology numbers in this space, which was unable to be changed and included multiple incorrect and defunct numbers.

– Additionally, the list defaulted to a “radiology pager,” which is ordinarily carried by a resident responsible for plain films, for when those numbers were unavailable.

• The default radiology pager was not included in the new call sheet.

– Different schedules were provided for weekdays and weekends.
How often do you receive misdirected phone calls? | Radiology Resident Responses | How often are you told you called the incorrect radiology desk? | Emergency Department Responses
---|---|---|---
Less than once a week | 0% | 8.3% | 7.9% | 53.6%  
Once a week | 3.7% | 8.3% | 34.2% | 28.6%  
Once a day | 22.3% | 25% | 39.5% | 14.3%  
Two to five times a day | 40.7% | 41.7% | 18.4% | 3.6%  
More than five times a day | 33.3% | 16.7% | 0% | 0%  
Two or more times a day (aggregate) | 74% | 58.4% (p=0.37) | One or more times a day (aggregate) | 57.9% | 17.9% (p<0.01)
Results: Post-Intervention

- After the establishing the new tool, 82.1% of ED respondents were aware of the new intranet contact tool and used it to contact Radiology.
- The same 17.9% of the ED clinicians who were not aware of and did not use the tool also responded that they dealt with misdirected phone calls one or more times a day.
- On follow-up quiz, this same 17.9% believed the radiology pager was the appropriate way to contact the radiology resident overnight for a read.
- On the series of questions that assessed the ED respondents' knowledge of radiology numbers, after the intervention, over 50% of respondents knew the correct answer over answered using the call sheet. This resulted in statistically significant increases in accuracy for Body, Neuroradiology, and Pediatric radiology stations.

<table>
<thead>
<tr>
<th>Workstation</th>
<th>Pre-Intervention</th>
<th>Post-Intervention</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plain Film</td>
<td>60.5%</td>
<td>64.3%</td>
<td>0.76</td>
</tr>
<tr>
<td>Body CT</td>
<td>36.9%</td>
<td>64.3%</td>
<td>0.03</td>
</tr>
<tr>
<td>Neuro-radiology</td>
<td>36.9%</td>
<td>64.3%</td>
<td>0.03</td>
</tr>
<tr>
<td>Ultrasound</td>
<td>39.5%</td>
<td>53.5%</td>
<td>0.26</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>37.6%</td>
<td>74%</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Overnight</td>
<td>52.6%</td>
<td>71.4%</td>
<td>0.12</td>
</tr>
</tbody>
</table>

Since October 2017, you feel the number of times the ED calls the wrong radiology desk has...
Our tool was successful in accomplishing multiple goals:

- We were able to gain acceptance of the new tool by over 80% of ED respondents.
- We were able to reduce the number of misdirected phone calls based on the subjective perception of ED respondents and radiology residents.
- We objectively improved the ED respondents’ behavior pattern in contacting the radiology department by either calling the correct number or using the call tool based on the quiz results.

Discussion

Unfortunately, our project is affected by certain limitations within the tool itself, and in assessing response to the tool:

- Within the tool, certain workstations were not included due to discussions between the radiologists and ED physicians who helped put the tool together in order to avoid confusion.
  - Our department has a specific workstation for ENT radiology that is separate from Neuroradiology. The decision was made not to include this station as it was thought it may be confusing to ED referrers to determine which study would qualify as ENT and may cause frustration with the tool.
  - The ED has many rotators from other departments who were not assessed in either survey pool, but may contribute to misdirected phone calls and wasted time.
  - It is unclear if these rotators were informed of the tool and they may be contributing to a better response from the ED staff, but may mitigate the perception of the radiology residents.

- Statistical analysis of response was limited because the number of respondents differed before and after intervention, for both the ED and radiology resident groups.
  - Additionally, we do not know if the same individuals who responded to the initial survey also answered the follow-up one.
• Each of the surveys had an open-ended box to get comments concerning radiology and ED communication, which raised additional concerns that can be addressed in the future.

• Radiology attendings and fellows were not included in our cohort because of the limited number of workstations that they rotate through; however, their opinions may be valuable in assessing if there are any particular stations that are still being overburdened with misdirected phone calls.

• Going forward, we hope to be able to expand use of this tool throughout the hospital in order to provide more timely and efficient care by reducing wasted time on the phone.
  – This will have its own challenges as there are a multitude of departments with thousands of attendings, residents, physician assistants, nurse practitioners, and medical students who would need to be educated on the use of the tool.
  – Furthermore, our referral pattern for inpatients and outpatients is slightly more complex than for the ED, and may not be as easy to simplify.

• We are considering repeating the surveys to ensure the tool’s continued effectiveness.