Targeting the Top 5 On-Call Resident Misses with Focused Lecture Series: A Pilot Study

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Background

Pennsylvania Hospital (PAH) is the oldest hospital in the United States (est 1751) and part of the University of Pennsylvania Health System.

PAH is a 500+ bed hospital that services approximately 25,000 patients annually.

The PAH radiology residency program consists of 20 residents and 24 faculty members.

The Radiology Department generated over 750,000 reports over the last 12 months.
Background

- Radiographic studies are initially dictated by either an attending or resident.
- During weekday business hours residents dictate drafts which are then quickly read out with and finalized by attendings.
- Night and weekend (on-call) residents dictate preliminary reports which are available for clinicians to view.
- Preliminary reports overread by attendings. Discrete degrees of discrepancy are tracked by CAPRICORN.

Resident discrepancies tracked with CAPRICORN, an open source analytic tool:
- Attending radiologist uses macros in dictation to indicate level of agreement with resident’s report
- Automatically logs cases
- Tracks attending changes between preliminary and final reports
- Analyzes attending changes to provide qualitative and quantitative performance feedback to residents
CAPRICORN

CAPRICORN categories of agreement/discrepancy:
Attending places macro in report with text indicating level of agreement
- Agree – Nothing to change or add
- Addition - no change in overall diagnosis/impression; additional findings or stylistic change
- Minor change - discrepancy in findings or impression that does not affect immediate patient care
- Major Change: discrepancy likely to affect immediate patient care

Examples

- Prelim read:
  Unremarkable examination of the lower extremity veins.
- Addition: Duplication of the popliteal vein.
- Minor Change: Chronic non-occlusive thrombus is present
- Major Change: Acute thrombus is present
Evaluate whether a focused lecture series of the most commonly missed on call diagnoses can reduce resident on call misses in those areas.

**METHOD AND MATERIALS**

CAPRICORN, a computerized natural language processing system for tracking changes to on call resident reports, allows for attending over read categorization.

Misses are categorized as major changes if the finding results in significant alteration in patient management. Utilizing this software, resident major changes were reviewed from 7/2015-2/2016.

Missed diagnoses were further categorized by topic and ranked based on frequency. A targeted lecture series was then created to review the top 5 most commonly missed diagnoses.

Following this, resident on call major changes were reassessed from 3/2017-10/2017 to determine if there were changes in the frequency of resident misses.
RESULTS

During the initial study period, there were 148 major misses out of 12,730 on call cases (1.16%). The most commonly missed diagnoses were:

- Pneumonia (20 cases)
- Upper extremity fracture (16)
- Pulmonary embolism (8)
- Colitis/abdominal abscess (6)
- Stroke (4)

These diagnoses accounted for 36% of major misses.

RESULTS

Following targeted lecture series, there were 94 major misses out of 16,712 on call cases (0.56%). Of the diagnoses covered by the lecture series, the missed cases were as follows:

- Pneumonia (6 cases)
- Upper extremity fracture (6)
- Pulmonary embolism (3)
- Colitis/abdominal abscess (7)
- Stroke (6)

These diagnoses accounted for 30% of total major miss cases.

Conclusion

There was a decrease in the number and proportion of missed diagnoses of the topics covered by the targeted lecture (54 vs. 28; 0.42% vs. 0.17%) with certain diagnoses experiencing major benefit from the lecture series.

Our results bring about an interesting question as diagnoses made by radiograph (pneumonia, upper extremity fractures) experienced greater improvement than those made by cross-sectional imaging.

We postulate that didactic lectures may not be the best way to improve accuracy of these complex imaging diagnoses and more interactive case-based education may better improve resident on-call accuracy of these complex diagnoses.

Conclusion