

Radiology Information System (RIS) Integrated Faculty Scoring and Feedback System for After Office Hours (AOH) On-Call Resident Provisional Radiology Reports

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ABSTRACT

PURPOSE

Radiology residents in our hospital provisionally report acute imaging scans across different subspecialty on after office hours (AOH) duties. These provisional reports are verified by different faculty radiologists the next working day according to scan subspecialty. As resident appraisal is subspecialty based, there is no unifying method to assess their reporting accuracy during AOH duties. We designed a faculty report scoring and feedback module integrated into our electronic Radiology Information System (RIS) software to overcome this challenge.

METHODS

All attending faculty radiologist are encouraged to voluntarily grade AOH CT and MRI reports transcribed by the on-call resident before verifying. There are 4 options on the scoring scale: "4" represents an excellent report; "3" represents a typical report with minor clinically insignificant amendments; "2" represents reports with minor non-life threatening discrepancies; "1" represents reports with major life threatening discrepancies. The module also includes a free text box for the scorer to provide written feedback.

RESULTS

Our pilot project ran for 9 months from July 2018 to March 2019. A total of 2972 CT and MRI scans were scored - mean of 330.2 scans per month, range from 232 to 393. There were total of 146 reports scored as minor discrepancy (mean 16.2 per month) and 1 report scored as major discrepancy (mean 0.1 per month). Total of 361 reports were given free text comments (mean 40.1 per month). Mean of 19.7 residents were graded per month (range 14 to 23) and the individual mean scores per month range from 2.9 to 4.

CONCLUSION

Scoring system for AOH provisional radiology reports is now an integral part of formative workplace assessment and identified significant number of report discrepancies. It enables residents to objectively review reporting accuracy and obtain individualized feedback from faculty.

INTRODUCTION

Radiology residents in our acute care hospital are rostered on subspecialty-based rotations during office hours such as chest, neurology and musculoskeletal imaging as per ACGME model. However as part of training in line with progressive entrustment, they are required to issue full preliminary reports for any acute diagnostic imaging across different subspecialty in first line after office hours (AOH) on-call duties. These provisional reports are subsequently approved by various attending faculty radiologists independently the next working day according to subspecialty, without face-to-face readout with resident (Fig 1). This is concordant with practices in USA, where a nationwide survey in 2018 revealed only 18% of responding residents reported morning face-to-face read out for most / all on-call reports [1].

As our resident appraisal model is subspecialty based, there is currently no objective method to assess their reporting competency during AOH on-call duties. Furthermore, it is logistically challenging for the various attending faculty radiologist to provide feedback on the provisional reports given the different physical locations of subspecialty teams within campus and residency working hour limits (Fig 1). Feedback can change clinical performance when it is systematically delivered from credible sources [2]. Our pilot study is a novel approach to generate the feedback on resident reported preliminary reports using a scoring form build into our electronic Radiology Information System (RIS) software.



Fig 1: Comparison of office & on-call hours workflow & education impact.

METHODS

We designed a faculty report scoring and feedback form module integrated into our electronic RIS software, Carestream Vue RIS version 11 (Carestream Health, Rochester, New York, USA) (Fig 2). Rationale and instructions for this scoring system are conveyed to all attending radiologists and residents via department meeting brief followed by email. Attending faculty radiologist are instructed to voluntarily grade all preliminary AOH CT and MRI scan reports transcribed by the on-call resident before verifying the reports, according to a scoring scale (Table 1) derived from the radiology error classification model proposed by Melvin C et al [3]. A free text box is also designed for scorer to provide explanation for score.

At the end of each month, a residency program administrator processes the RIS application generated log of all the reports graded. Individualized report card are sent to each resident via an Microsoft excel spreadsheet through email, comprising of:

- Mean monthly score
- Number of discrepancies graded (grade C and D)
- List of scored reports from the resident including free text comments from verifying attending.

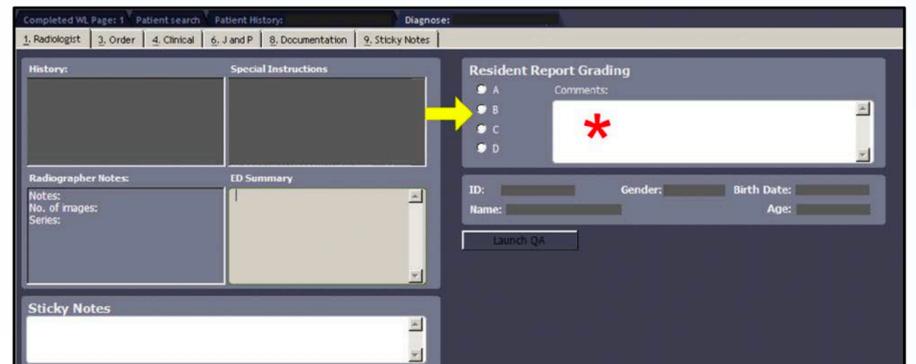


Fig 2: Grading form built into RIS reporting platform. Signing radiologist will choose score A – D (arrow) based on standard of report and provide free text explanation in comments (*).

Grade	A	B	C	D
Score	4	3	2	1
Type	Excellent Report	Normal Report	Minor Discrepancy	Major Discrepancy
	Accurate report w/o need for modification; identified difficult finding	Default for most scans; minor non-significant misses	Clinically significant misdiagnosis but not life threatening	Life threatening misdiagnosis
Example	NA	- Calcified granuloma - Simple renal cyst - Tendinosis - Facet arthrosis	- Pulmonary Nodule - Liver Metastasis - Lacunar Infarct - Spinal Stenosis	- PE - Appendicitis - Intestinal obstruction - ICH - Spine fracture

Table 1: Scoring Scale Guide

RESULTS

Our pilot project ran for 9 months from July 2018 to March 2019. A total of 2972 CT and MRI scans were scored - mean of 330.2 scans per month, range from 232 to 393 (Table 2). Most of the scans scored were from neuroradiology subspecialty (2491, 83.8%), followed by body (thorax and abdominal) subspecialty (331, 11.1%) and musculoskeletal subspecialty (150, 5%). There were total of 146 reports scored as minor discrepancy (mean 16.2 per month) and 1 report scored as major discrepancy (mean 0.1 per month). Total of 361 reports were given free text comments (mean 40.1 per month). Mean of 19.7 residents were graded per month (range 14 to 23) and the individual mean scores per month range from 2.9 to 4.

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar
Total:	312	248	334	383	371	367	363	379	215
Neuro Scans:	280	233	287	313	300	298	327	287	154
Body Scans:	25	4	21	56	54	45	21	67	50
MSK Scans:	7	11	26	14	17	24	15	25	11
Minor Discrepancy (C):	10	19	30	16	16	11	12	23	9
Major Discrepancy (D):	0	0	0	1	0	0	0	0	0

Table 2: Reports scored by month

CONCLUSION

Our scoring and feedback system for AOH on-call resident provisional radiology reports has gained acceptance in the department as an integral part of summative workplace assessment and identified significant number of AOH provisional report discrepancies. It enables residents to objectively review their on-call reporting accuracy, temporal development and obtain individualized feedback from faculty. Concurrently the teaching faculty can utilize data to gain better understanding of the common discrepancies on-call and modify training curriculum to address knowledge gaps.

REFERENCES

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3. Melvin C, Bodley R, Booth A, Meagher T, Record C, Savage P. Managing errors in radiology: a working model. *Clin Radiol* 2004;59:841-5.