Examining Systemic Factors and Operational Variables Through Peer Review Data for Rural Medicine Radiology Quality Improvement

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Introduction

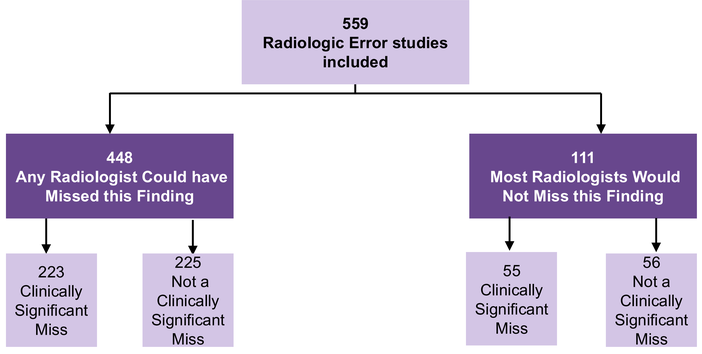
- Diagnostic errors affect ~5% of adult patients in outpatient settings and are linked to 17% of adverse hospital events and 10% of patient deaths (1).
- Medical errors cost $17-$29 billion annually (1).
- Estimated 40 million worldwide radiological errors per year (1).

Study Objective:

Identify differences in radiologic report error rates between the shift (morning, afternoon, evening, or overnight), the modality of the study, and study urgency (STAT, Inpatient, Inpatient STAT, or Outpatient).

Methods

- Utilized peer review error report data from the Central Illinois Radiologic Associates (CIRA).
- Peer review system categorized as:



- 2022-2024 559 studies were evaluated as having errors.
- Data was categorized on the shift (morning, afternoon, evening, or overnight), modality (CT, MRI, US, or Radiograph), if it was a radiology resident study, and study urgency (STAT, Inpatient, Inpatient STAT, or Outpatient).
- Logistic regression was utilized to assess the outcomes of 1) "error most radiologists would not miss" and 2) "clinically significant error." Odds ratios and 95% confidence intervals are presented. P-values < 0.05 were considered statistically significant.

Results

Variable		Frequency	Percent
Shift	Morning (08:00 to 11:59)	128	22.9
	Afternoon (12:00 to 16:59)	190	34.0
	Evening (17:00: to 21:59)	119	21.3
	Night (22:00 to 07:59)	122	21.8
Modality	CT	197	35.2
	US	14	2.5
	MRI	62	11.1
	Radiograph	285	51.0
Addended	No	536	95.9
	Yes	23	4.1
Study Urgency	STAT	241	43.1
	Inpatient	69	12.3
	Outpatient	190	34.0
	Inpatient STAT	59	10.6
Radiology Resident Study	No	545	97.5
	Yes	14	2.5
Finding	Most Radiologists Would Not Miss	111	19.9
	Any Radiologist Could Miss	448	80.1
Clinically Significant Error	No	280	50.2
	Yes	278	49.8

Figure 1: Distribution of Operational Variables and Study Characteristics

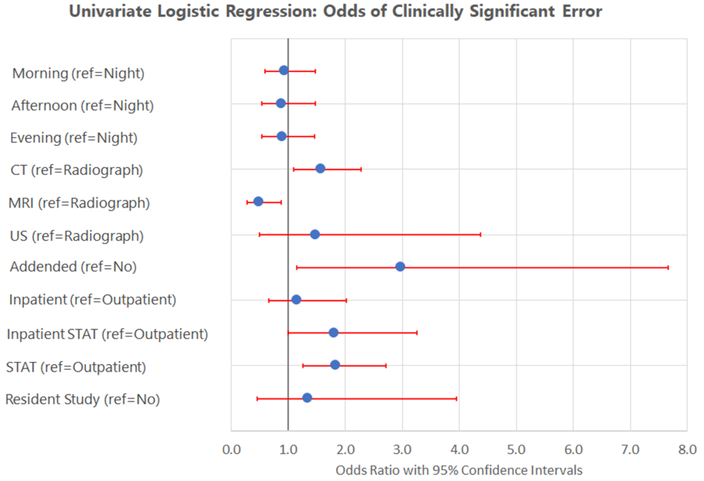


Figure 2: Odds of a Clinically Significant Radiologic Error

Results (cont.)

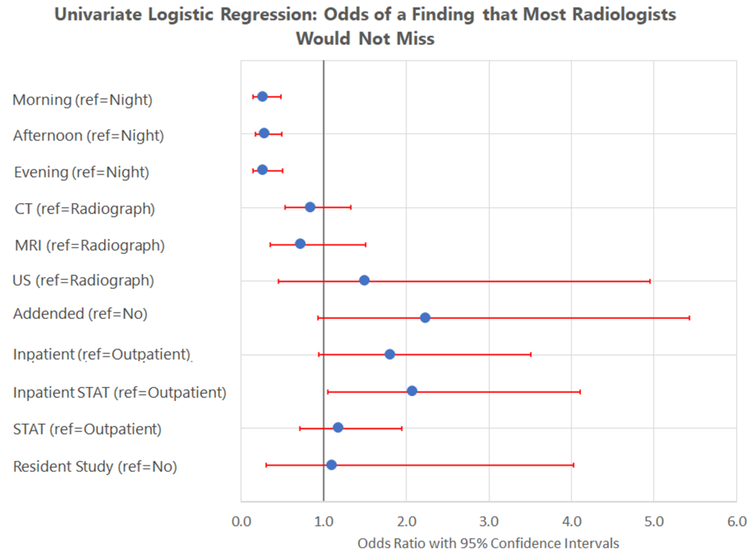


Figure 3: Odds of a Finding That Most Radiologists Would Not Miss

Conclusion

- Operational variables in radiology workflow can influence the quality of radiology reports.
- Time of day, modality, and study urgency are all factors that can increase the likelihood of errors.
- Special attention could be paid to inpatient STAT and general STAT studies.
- Consider possibility of clinically significant errors on CT and plain film studies.
- **By utilizing peer review data to focus on systemic factors that lead to errors, rather than focusing on individual underperformers, we have the potential to mitigate future radiological errors and increase patient safety.**

REFERENCES

Itri, Jason N., et al. "Fundamentals of Diagnostic Error in Imaging." *RadioGraphics*, vol. 38, no. 6, Oct. 2018, pp. 1845–1865, https://doi.org/10.1148/rg.2018180021.