

Purpose

Imaging examinations initially performed at outside institutions often receive secondary interpretations. Reviews by in-house subspecialist radiologists allow for case discussions in real-time, standardization of reports, reduced reimaging, and may provide higher-quality specialized reads. The increase in Medicare reimbursements for rereads also suggests increased recognition of their value¹. Despite its benefits, the practice of secondary interpretation also raises unique ethicolegal concerns involving risk and harm reduction that often lack protocol or legal precedence to account for clinically significant discrepancies, highlighted in **Figure 1**.

Further examination is required for this practice to become the standard of care and to be reimbursed as such. In this exhibit, we review pertinent medicolegal, financial, and ethical concepts and provide directions for future investigations.

Figure 1. Reported Proportion of Discrepant Studies, and Proportion of Management Changing Studies

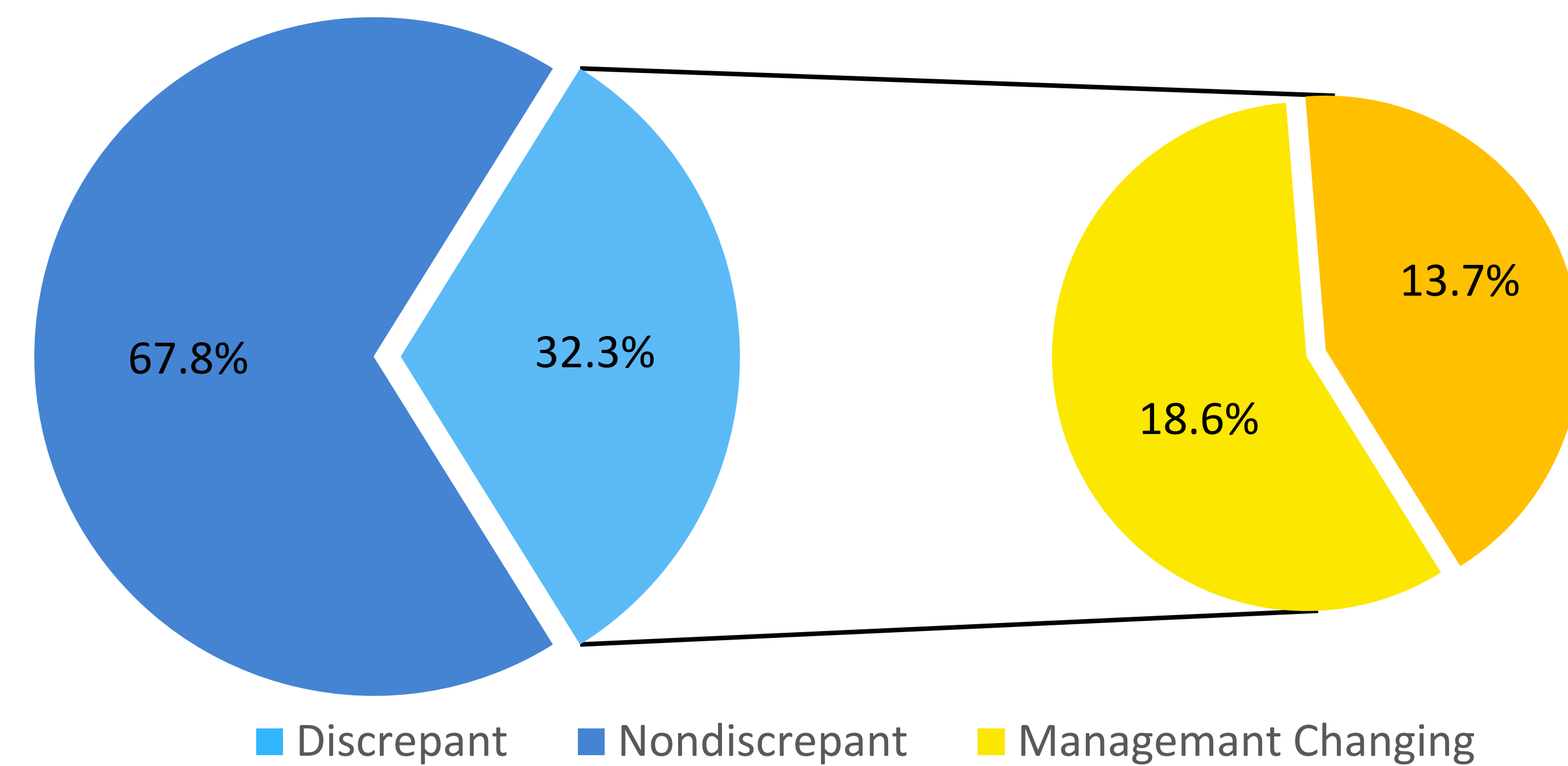


Figure 1. In a meta-analysis of twenty-nine studies representing 12,676 secondary image interpretations, discrepancies were found in 32.3% of studies. Of these discrepant studies, 58% would have changed patient management (18.6% of total interpretations). Adapted from Rosencrantz, et al.²

Considerations

1. Medicolegal

Reporting

- How and to whom do we report missed findings? What is the ethical and proper approach?

Retrospective lawsuits

- What is the precedent of litigation based on second opinions in radiology?

Undocumented consultations

- Potential to avoid "curb-side" consults which may save time and reduce risk of errors

Considerations

2. Financial

Fair reimbursement

- May increase workload and contribute to uncompensated time
- Potential for radiologist reimbursement

Payment collection issues

- Which insurers will pay? What are the documentation requirements?
- What is the patient's role in providing beneficiary notices?

Unmeasured Impact

- May disrupt existing workflows and overextend staff
- Delay in interpreting primary studies, variable educational value for trainees

Value-added service

- May reduce repeat imaging studies
- Potential for increased facetime with referring physicians, facilitating inter-departmental discussions
- Greater visibility through interactions and marketing toward patients

3. Ethical

Beneficence

- Facilitates more accurate, timely, and safe patient care with reduced contrast and radiation exposure
- Concierge radiology services which reinterpret images to provide patient-friendly reports can improve patient understanding and satisfaction³

Non-maleficence

- Interpretation without pertinent or complete clinical history may lead to errors
- Variable quality of data and reformats, interpretation with limited "pertinent images"
- Non-search protocols for second-opinion consultations have higher false positive rates⁴

Autonomy

- More informed medical decision by patients prior to surgical or medical therapy

Justice

- Concierge radiology services are limited to those who can afford the service⁵

Figure 2. Discrepancies by Modality, Body Region, and Clinical Context

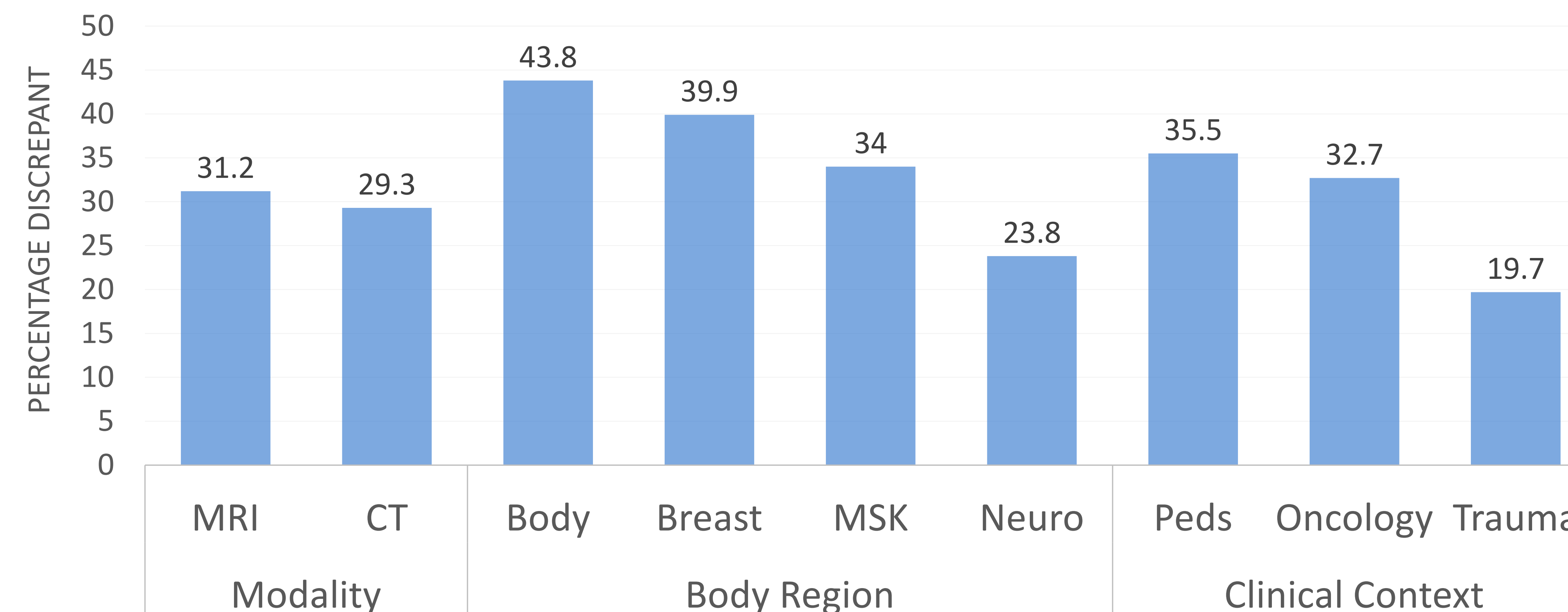


Figure 2. Discrepancy rates of secondary interpretations varied significantly among imaging modality, body region, and clinical context. This suggests a potential set of criteria for selecting which studies to reinterpret. Adapted from Rosencrantz, et al.²

Future Directions

Given the significant heterogeneity in discrepancy among imaging modality, body region, and clinical context (**Figure 2**), a potential direction for future research includes developing a selection criteria for reinterpreting studies. Researchers can utilize mixed qualitative-quantitative methods to gauge provider attitudes across subspecialties and to characterize practice preferences. Minimum standards can be established for image and patient data submitted for reinterpretation, and protocols can be created for reporting missed findings. Further characterization can quantify how rereads affect workflow. Prospective studies and cost-benefit analyses can help establish secondary interpretations as a value-added service.

Potential quality improvements for future studies are included in **Table 1**.

Table 1. Adapted Quality Assessment of Diagnostic Accuracy Studies-2 (QUADAS-2)

Patient Selection

1. Use consecutive initial study samples
2. Include nondiagnostic studies
3. Include studies not following specific acquisition protocols
4. Include studies representative of daily practice

Index Test

5. Collect initial interpretations and other clinical information
6. Ensure interpretations by subspecialty trained radiologists
7. Interpret in a consensus or conference setting

Reference Standard

8. Interpret prior to reference standard diagnoses

Flow and Timing

9. Use acceptable reference standards for accurate diagnoses

Table 1. The QUADAS-2 is a tool for systematic reviews and meta-analyses for diagnostic accuracy studies⁶. Each of the four domains are assessed in terms of risk of bias and applicability.

Conclusion

Routine secondary interpretation of outside imaging has clinical value, but further research is needed to guide policy decisions and establish this practice as an optimized, patient-centric, and cost-effective standard of care.

References

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2. Rosencrantz AB, Duszak R, Babb JS, Glover M, Kang SK. Discrepancy Rates and Clinical Impact of Imaging Secondary Interpretations: A Systematic Review and Meta-Analysis. *J Am Coll Radiol.* 2018; 15: 1222-1231.
3. Shaikh S, Bafana R, Halabi, SS. Concierge and Second-Opinion Radiology: Review of Current Practices. *Curr Probl Diagn Radiol.* 2016; 45:111-114.
4. Swenson RG, Theodore GH. Search and Nonsearch Protocols for Radiographic Consultation. *Radiology.* 1990; 177(3):851-6.
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6. Whiting PF, Rutjes AWS, Westwood ME, et al. QUADAS-2: a Revised Tool for the Quality Assessment of Diagnostic Accuracy Studies. *Ann Intern Med.* 2011; 155(8):529-36.