



Large Language Models to Improve Understanding of Radiology Reports

A Systematic Review and Meta-Analysis of Patient, Public, and Clinician Evaluations

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Background

Radiology reports are typically written for clinicians and are often difficult for patients to understand. Large language models (LLMs) can simplify complex medical language and may improve patient comprehension of imaging reports.

Methods

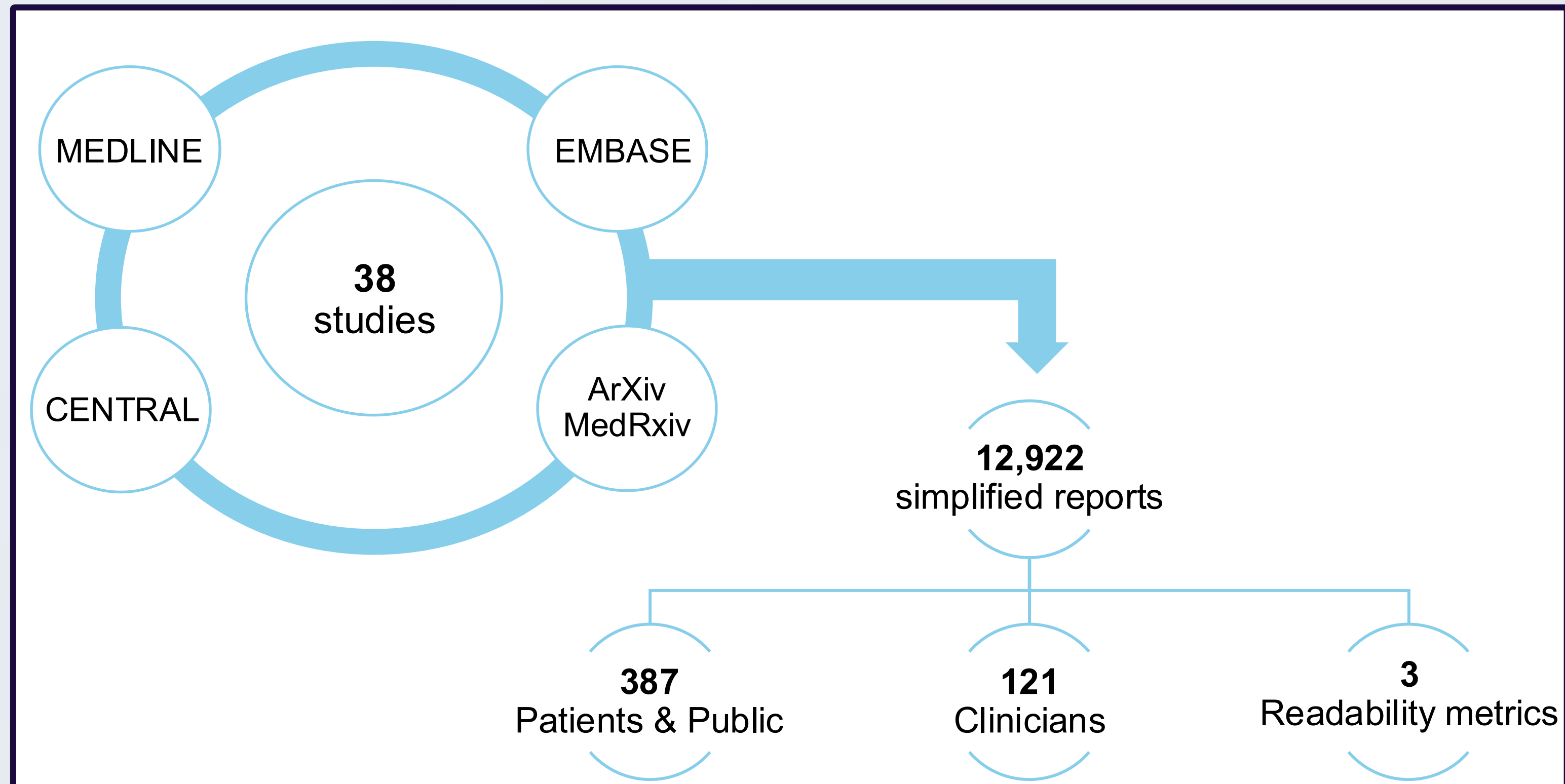
- Systematic review and meta-analysis of studies evaluating LLM-simplified radiology reports.
- MEDLINE, Embase, CENTRAL, medRxiv, bioRxiv, and arXiv were searched in Nov 2025.
- Outcomes included patient/public understanding, clinician-rated quality, readability metrics, and error rates.

Results

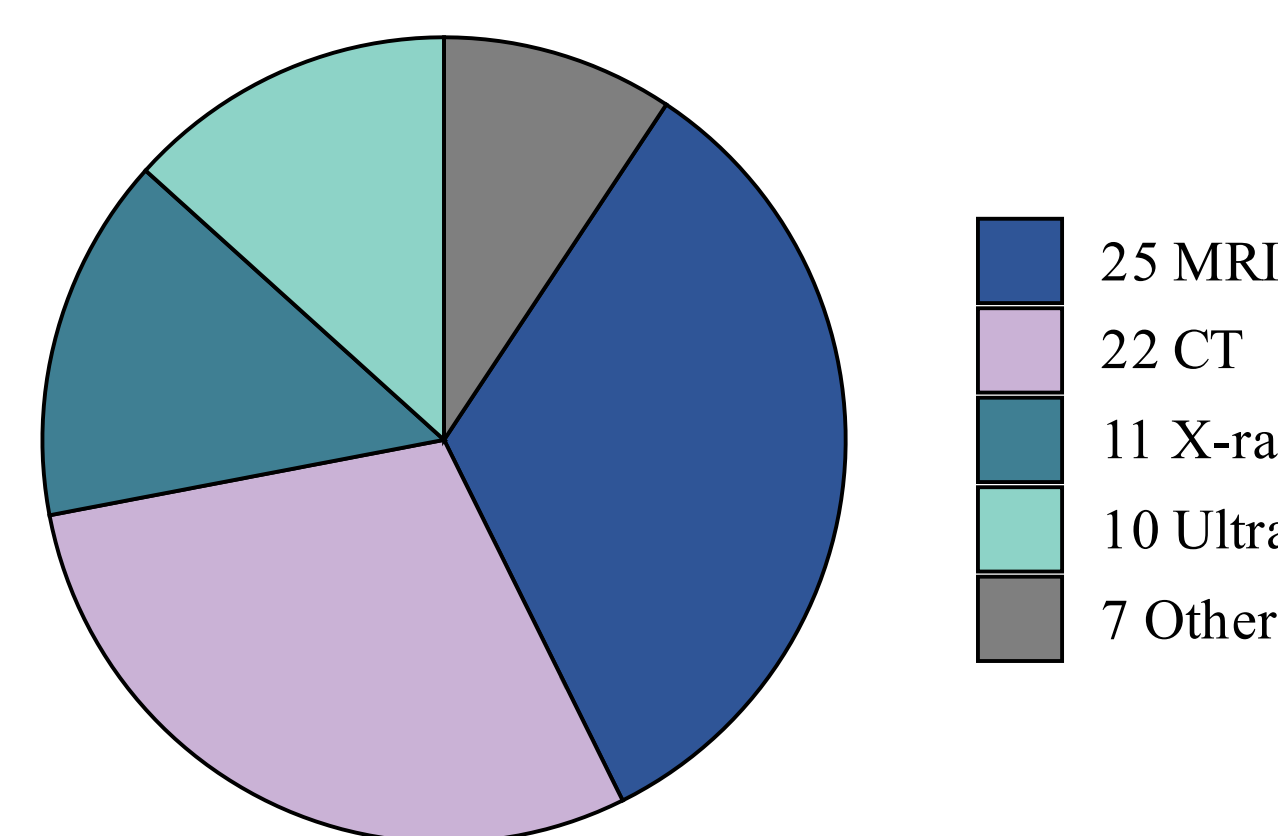
- 38 studies including **12,922 simplified reports** and **508 evaluators** were included.
- Most studies were in English and used ChatGPT
- Patients rated LLM-simplified reports as **more understandable** than original radiology reports (**Likert score 4.04 vs 2.16**).
- Clinicians rated reports highly for **accuracy (4.45/5)** and **completeness (4.53/5)**.
- Readability improved markedly across CT, MRI, and x-ray reports, reducing reading level from **university to school-age level**.
- Error rate was 7%**, with clinically **significant errors in 0.9%** of reports.
- No study involved patients designing LLM-reports, none was UK-based and none used advanced prompting techniques.**

Conclusion

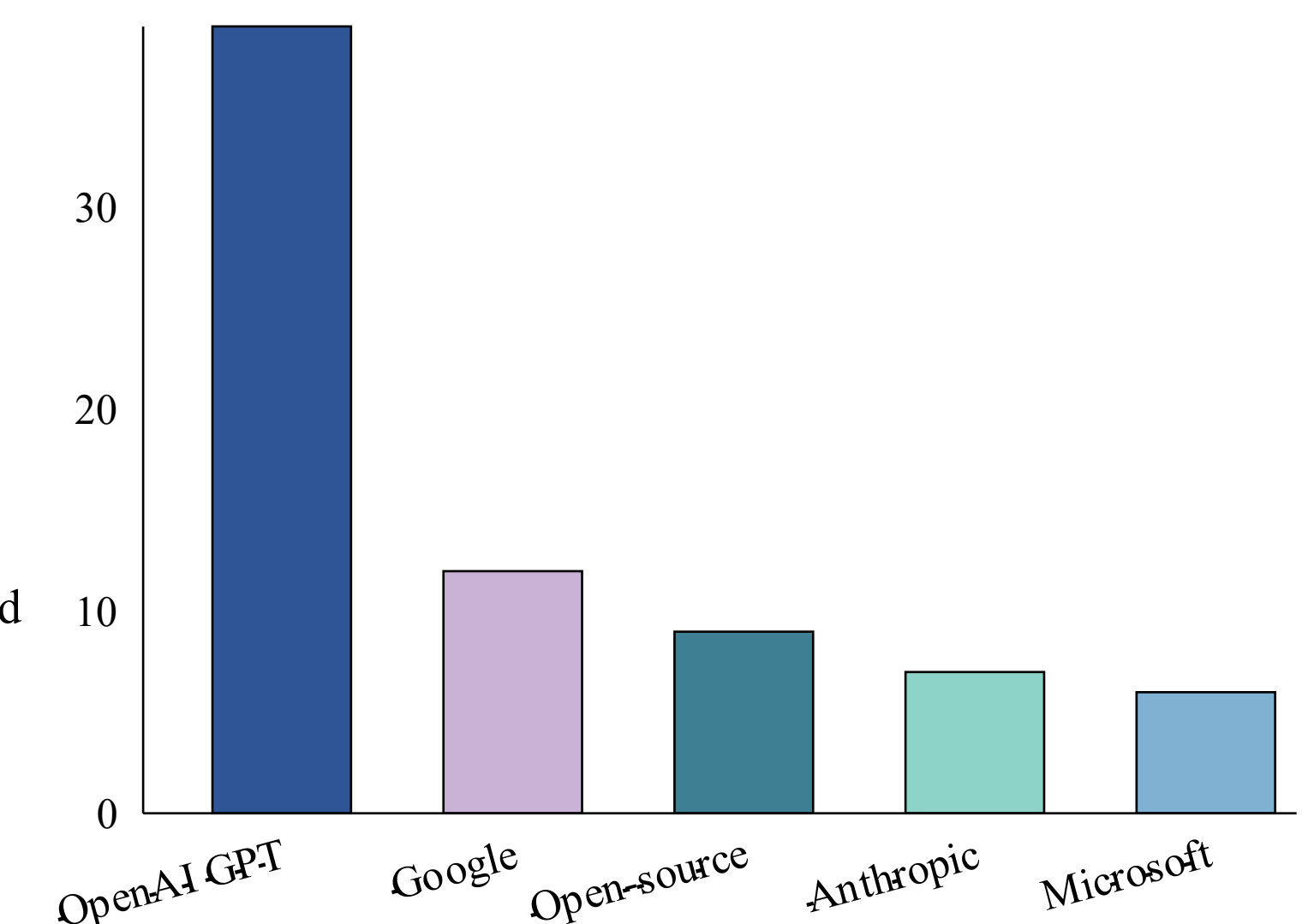
- LLM-simplified radiology reports improve patient-perceived understanding while maintaining high clinician-rated accuracy.
- Clinician oversight remains important to minimise clinically significant errors.
- LLM-simplified reports have the potential to become a corner-stone in patient-centred radiology communication.
- Future studies** should be patient **co-designed, NHS-based and safety-engineered.**



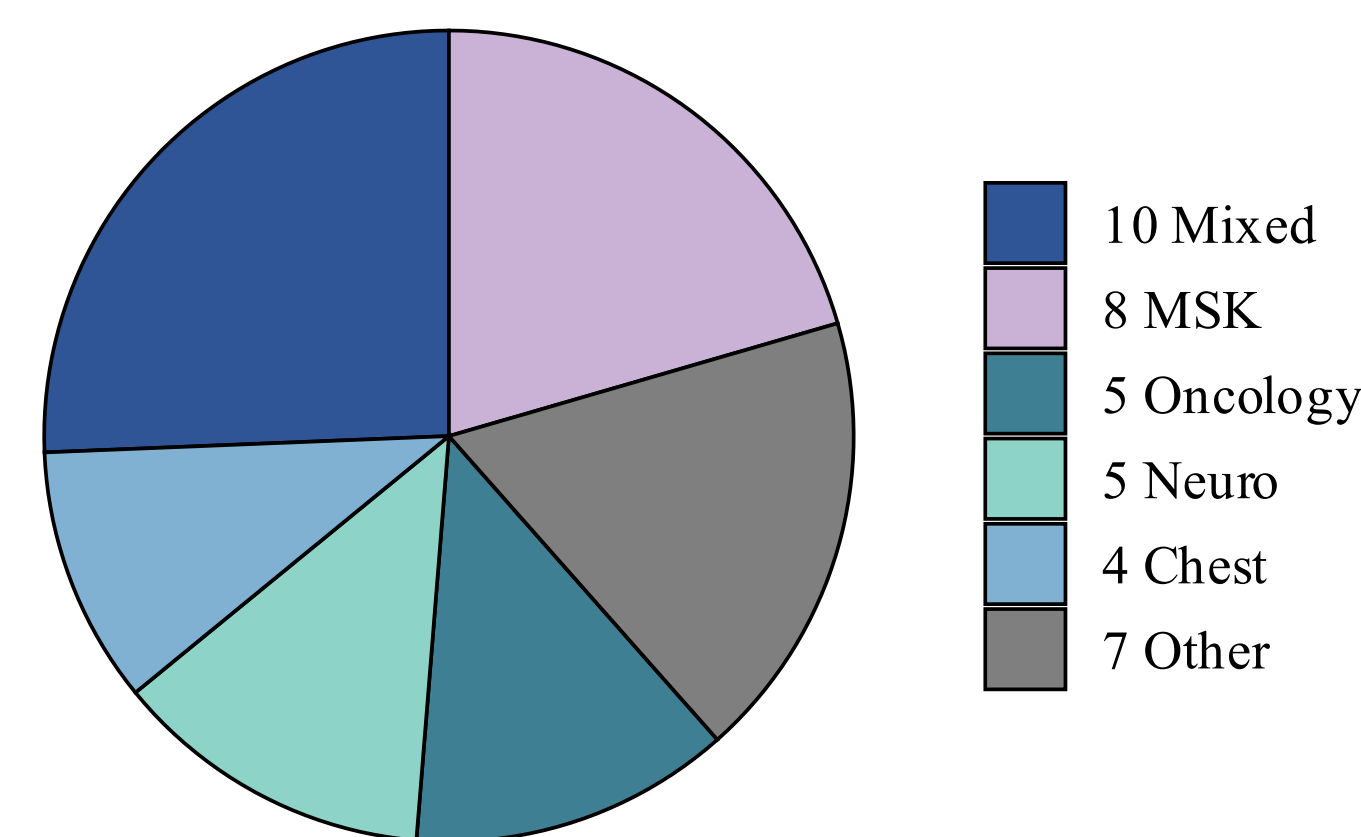
A. Modalities of simplified reports



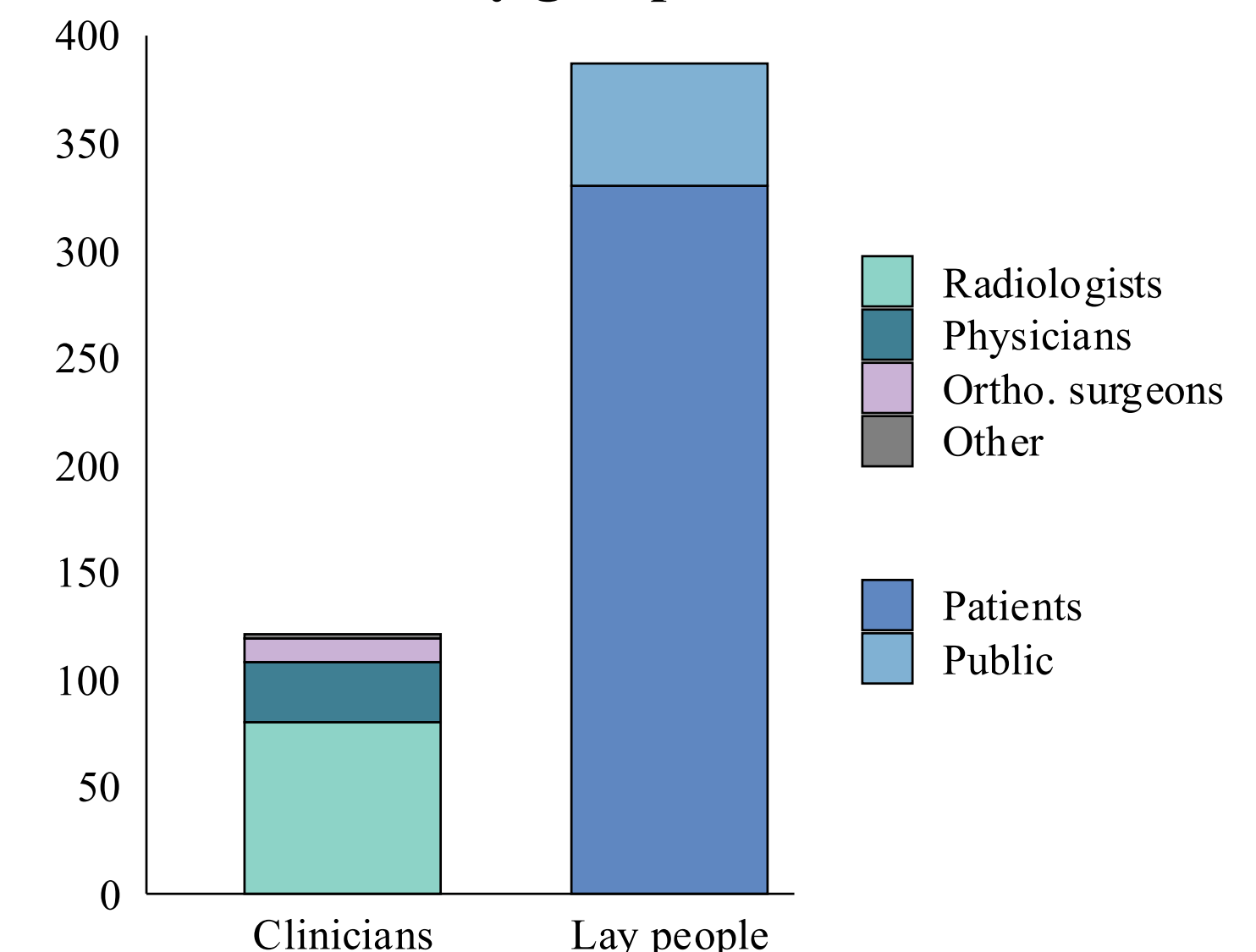
C. Models evaluated (by vendors)



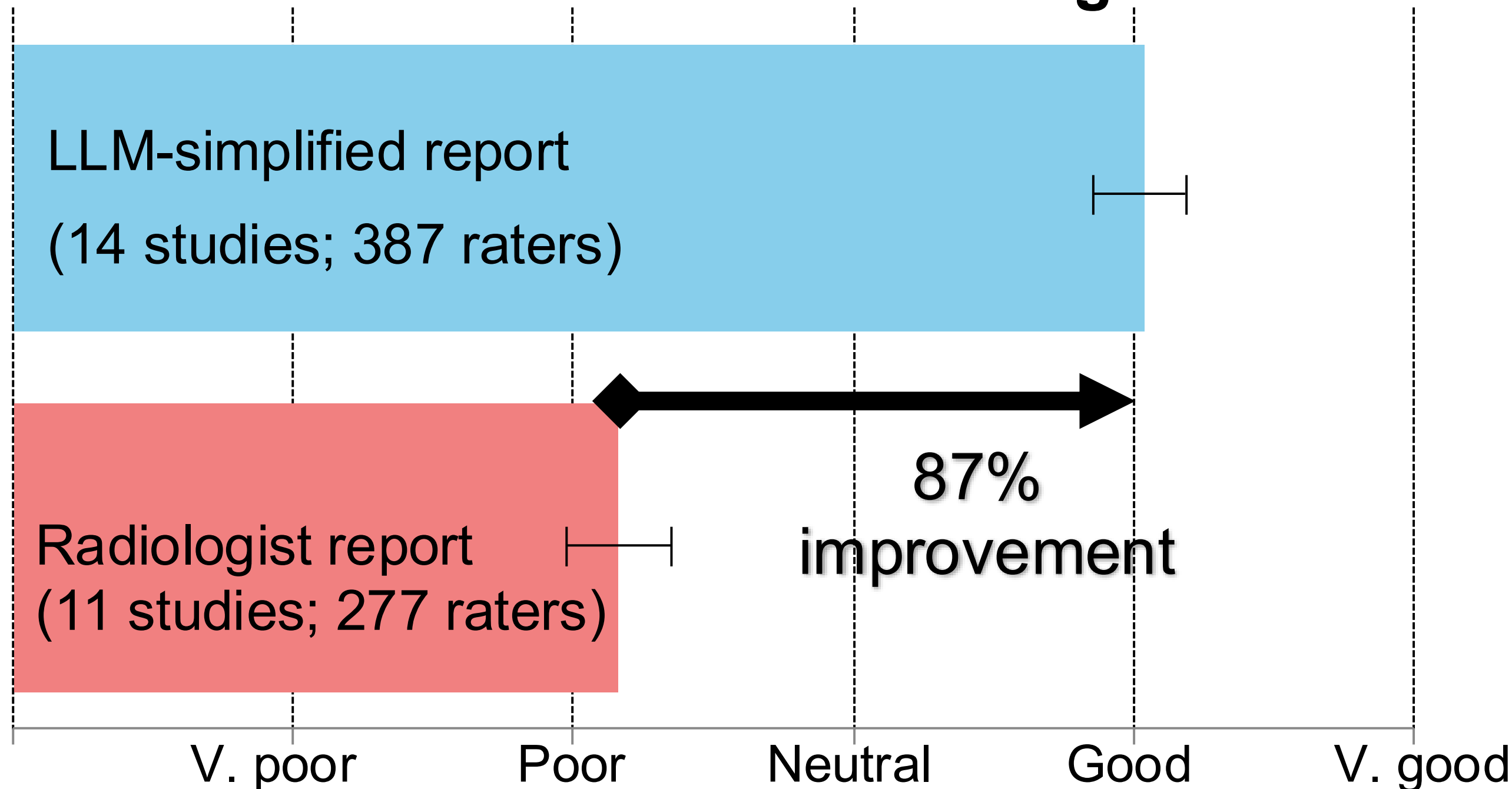
B. Specialities of simplified reports



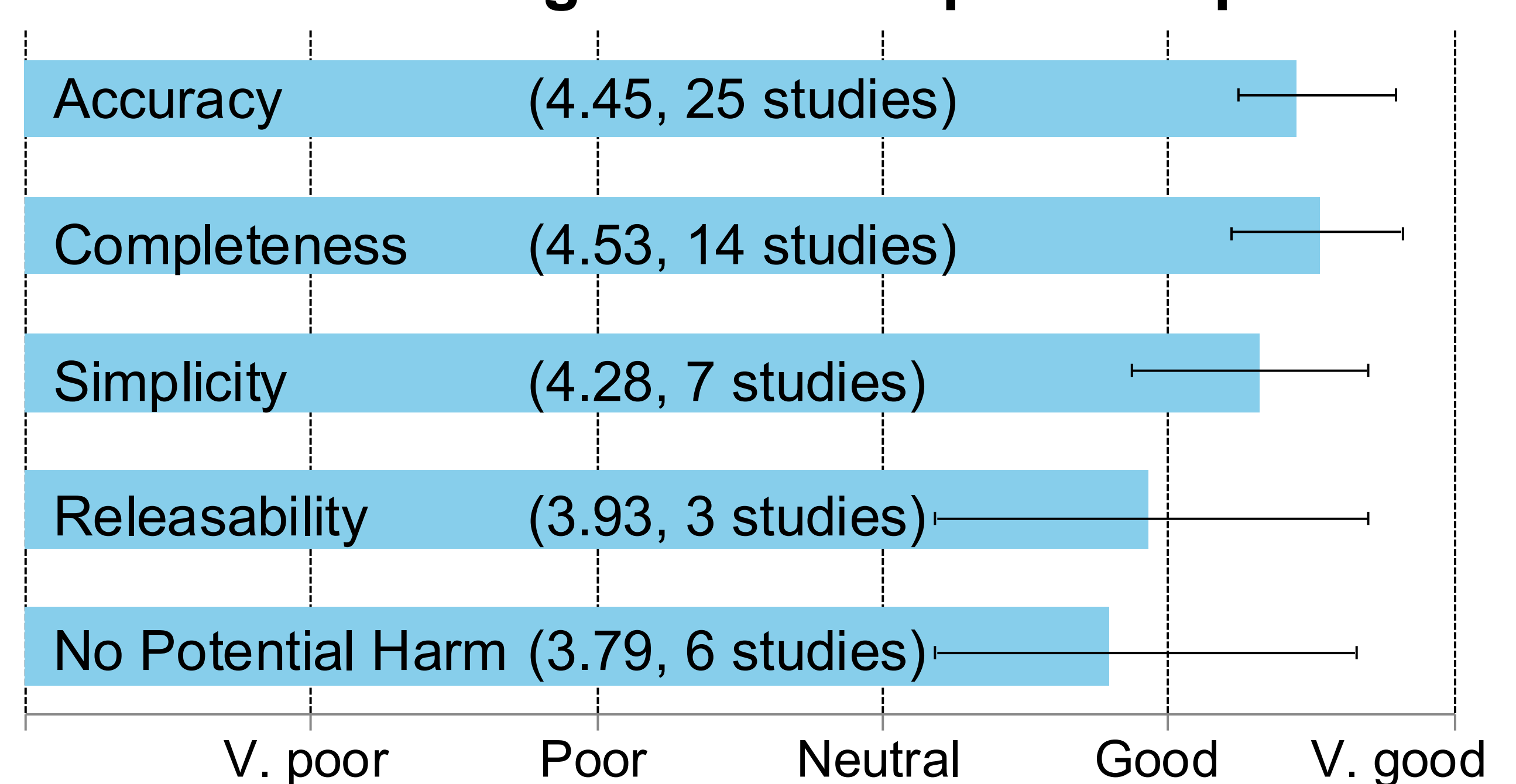
D. Assessors by group and role



Patient Perceived Understanding



Clinicians rating of LLM-simplified reports



Radiologist Report



University Level
(13.4)

Flesch-Kincaid Grade Level

Simplified Report



School Level (ages 11 to 13)
(7.3)