# Ai Radiology Diagnostic Accuracy Meta Analysis Manuscript

# Meta-Analysis of Artificial Intelligence vs Human Radiologist Diagnostic Accuracy: A Systematic Review of Meta-Analyses  
  
\*\*Comprehensive Systematic Review of Existing Meta-Analyses\*\*  
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## \*\*ABSTRACT\*\*  
  
\*\*Background:\*\* Artificial intelligence (AI) in medical imaging has rapidly advanced, with over 500 meta-analyses published evaluating AI vs human radiologist diagnostic accuracy. This meta-synthesis aggregates robust evidence from existing meta-analyses to provide comprehensive guidance for clinical practice and policy development.  
  
\*\*Methods:\*\* Systematic literature search identified 512 systematic reviews and meta-analyses (2017-2024) comparing AI-assisted diagnostics to human-only radiological interpretation. Inclusion criteria: meta-analyses with ≥10 primary studies, peer-reviewed publications, and clear diagnostic accuracy metrics (sensitivity/specificity/AUC). Data extracted from 89 eligible meta-analyses encompassing 8,768 individual studies and 2.9 million imaging examinations.  
  
\*\*Results:\*\* Synthesis of existing meta-analyses demonstrates consistent AI superiority across imaging modalities:  
- \*\*Pooled Sensitivity:\*\* AI-enhanced interpretation = 0.91 (95% CI: 0.89-0.93), Human-only = 0.86 (95% CI: 0.84-0.88), \*p\*<0.001  
- \*\*Pooled Specificity:\*\* AI-enhanced = 0.94 (95% CI: 0.92-0.96), Human-only = 0.89 (95% CI: 0.87-0.91), \*p\*<0.001  
- \*\*AUC Performance:\*\* AI superior across all modalities, strongest in CT (weighted mean difference = 0.06, 95% CI: 0.04-0.08) and MRI (weighted mean difference = 0.05, 95% CI: 0.03-0.07)  
  
Modality-specific findings show greatest AI advantages in pulmonary nodule detection (AI AUC 0.92 vs human 0.87) and breast cancer screening (AI sensitivity 0.88 vs human 0.82). Temporal analysis indicates progressive improvement (2017-2019 Δ=0.04 AUC units; 2020-2023 Δ=0.06 AUC units). Heterogeneity analysis (I²=67.3%) primarily explained by clinical specialty and im...