

# Is AI Better at Reading Mammograms? A Data-Driven Look at Diagnostic Accuracy

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## Abstract

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## Is AI Better at Reading Mammograms? A Data-Driven Look at Diagnostic Accuracy

The fight against breast cancer relies heavily on early detection, a process primarily managed through mammography screening. For decades, the gold standard in many screening programs has been **double human reading**, where two independent radiologists review each mammogram to maximize sensitivity. However, this method is resource-intensive and prone to human variability. The advent of deep learning and Artificial Intelligence (AI) has introduced a powerful new contender, prompting a critical question in digital health: Is AI better at reading mammograms?

The answer, according to recent academic literature, is nuanced: AI is not necessarily a superior standalone replacement for two human experts, but it is a **transformative partner** that is proving to be more effective than the traditional double-reading workflow.

### The Evidence: AI-Integrated Workflows Outperform Traditional Double Reading

The true measure of AI's impact is found in large-scale, population-based studies. A significant retrospective cohort study published in *The Lancet Digital Health* in 2025 provided compelling evidence. The study compared traditional double human reading with an AI-integrated scenario where one human reader was combined with an AI system.

The results were striking:

**Increased Sensitivity:** *The combined human-AI reading scenario showed an 8.4% increase in sensitivity compared to the double human reading standard. This means the integrated approach was significantly better at*

*correctly identifying cancers.* **Detection of Clinically Relevant Cancers:** Crucially, the cancers detected by the AI system but missed by the human readers were often **larger and more invasive**. This suggests that AI has the potential to flag aggressive tumors earlier, which is vital for improving patient outcomes.

While the stand-alone AI system's performance was found to be slightly below that of two human readers, its utility as a 'smart second reader' or a triage tool is undeniable. The data strongly supports a shift from the resource-heavy double-reading model to an AI-integrated workflow.

### **The Trade-Off: Sensitivity, Specificity, and the Recall Rate**

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While AI integration boosts **diagnostic accuracy** (sensitivity), it introduces a critical trade-off: a decrease in **specificity** and an increase in the **recall rate**.

In the aforementioned study, the recall rate—the percentage of women called back for further investigation—increased from 2.9% with double human reading to 5.0% with the combined human-AI approach. Similarly, specificity, the ability to correctly identify a cancer-free mammogram, decreased from 97.7% to 95.8%.

This increase in false positives is the primary challenge for the adoption of AI in screening programs. While the benefit of detecting more true cancers is clear, the increased anxiety, cost, and unnecessary procedures associated with higher recall rates must be managed. This necessitates the development of sophisticated **arbitration processes** and clinical protocols to efficiently filter out false positives flagged by the AI.

### **The Future of Screening: From Replacement to Augmentation**

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The current consensus in the medical community is that AI's role is one of **augmentation**, not replacement. AI excels at pattern recognition and consistency, which helps mitigate the effects of human fatigue and variability. By leveraging AI to perform the initial, high-volume analysis, radiologists can focus their expertise on the most complex or suspicious cases.

This shift represents a fundamental change in the practice of radiology, moving from a purely human-centric model to a **human-in-the-loop** system. The future of breast cancer screening will likely involve a tiered approach: AI for initial triage and risk scoring, followed by a single human reader for confirmation, and finally, arbitration by a senior radiologist for discordant cases. This model promises to reduce the workload on radiologists while simultaneously improving the quality and consistency of care.

The successful integration of deep learning models into clinical practice requires not only robust technology but also a deep understanding of the clinical workflow and the ethical implications of relying on automated systems for critical diagnoses. For more in-depth analysis on this topic, including the ethical and regulatory challenges of deploying AI in digital health, the resources at [www.rasitdinc.com](http://www.rasitdinc.com) provide expert commentary. The journey to fully optimize AI in mammography is ongoing, but the evidence is clear: the

future of breast cancer screening is a powerful collaboration between human expertise and artificial intelligence.

#### *Academic References*

1. van Winkel, S. L., et al. (2025). *AI as an independent second reader in detection of clinically relevant breast cancers within a population-based screening programme in the Netherlands: a retrospective cohort study*. The Lancet Digital Health, 7(8), e524-e532. 2. Elhakim, M. T., et al. (2024). *AI-integrated screening to replace double reading of mammograms: a population-wide accuracy and feasibility study*. Radiology: Artificial Intelligence, 6(5), e230529. 3. Yoon, J. H., et al. (2023). *Standalone AI for breast cancer detection at screening digital mammography and digital breast tomosynthesis: a systematic review and meta-analysis*. Radiology\*, 308(1), e222639.

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