

AI and Radiology: Bridging the Gap Between Peer Review, Education, and Value-Based Care

M. Amir Hussain, MD; Matthew Wrenn, BS

In radiology, peer review is a cornerstone of maintaining diagnostic accuracy and ensuring high standards of patient care. By identifying discrepancies in image interpretations and offering valuable learning opportunities, peer review helps radiologists continuously improve their practice. However, traditional methods of peer review face significant challenges, including time constraints, limited access to specialized expertise, and the potential for bias. According to a survey conducted by the American College of Radiology, 43% of radiologists identified time constraints as a major barrier to effective peer review, underscoring the need for more efficient and effective solutions.¹

As health care shifts toward value-based care, the importance of timely and accurate peer review becomes even more critical. Value-based care links patient outcomes to reimbursement, placing diagnostic quality at the forefront of radiology practices. Artificial intelligence (AI) and machine learning offer promising solutions to transform peer review processes,

enabling better outcomes through enhanced diagnostic accuracy and workflow efficiency.^{2,3}

The Role of AI in Enhancing Peer Review

Traditional peer review methods, while essential, often struggle with inefficiencies. Radiologists, already burdened with heavy workloads, may not have the time to conduct thorough reviews. The process itself can be subjective, with variations in expertise and interpretation contributing to inconsistencies. AI-driven peer review addresses these challenges by providing objective and standardized assessments.³

AI has the potential to significantly enhance peer review by providing more objective assessments of diagnostic images, highlighting discrepancies, and improving consistency in evaluations. For example, AI algorithms can be trained to detect specific types of anomalies in reporting behavior, such as repetitive patterns of typos at certain times of the day.⁴ This not only reduces the likelihood of missed diagnoses but also allows for a more focused and efficient review process.

AI also facilitates case selection for peer review, prioritizing high-risk or educationally significant cases. This targeted approach

ensures that radiologists can focus their efforts on the most impactful reviews, addressing time constraints and improving diagnostic consistency.¹

AI-Powered Education and Training in Radiology

Continuous education is crucial in radiology, given the rapid advancements in imaging technology and the growing complexity of diagnostic procedures. Traditional educational methods, however, often struggle to keep pace with these developments, and radiologists may find it challenging to stay current with the latest best practices. AI can fill this gap by analyzing individual radiologists' diagnostic patterns and identifying knowledge gaps, providing tailored educational content.⁵

AI-driven educational platforms can simulate rare cases, offering radiologists the opportunity to diagnose conditions they may not encounter in their routine work. These platforms can also provide instant feedback on diagnostic decisions, helping radiologists identify and correct mistakes in real time.⁶

Furthermore, AI integrated into the picture archiving and communication system (PACS) environment can analyze a radiologist's diagnostic history to identify knowledge gaps and

Affiliations: Dr Hussain is a radiologist at OSF Saint Anthony Medical Center, Rockford, Illinois; Mr Wrenn is a senior director at Xen.AI, New York, New York.

Disclosures: The authors have no conflicts of interest to disclose. None of the authors received outside funding for the production of this original manuscript and no part of this article has been previously published elsewhere.



recommend targeted learning resources by using advanced machine algorithms, ensuring that education is relevant and effective.

By integrating AI into radiology education, health care systems can ensure that radiologists are not only proficient in using the latest imaging technologies, but also are adept at applying best practices in their diagnostic work. This, in turn, can lead to more accurate diagnoses, fewer errors, and, ultimately, better patient outcomes.

AI in Value-Based Care and Patient Outcomes

A shift toward value-based care in health care emphasizes the importance of patient outcomes and cost-effectiveness. In that environment, accuracy and efficiency of radiology services are paramount. AI-driven peer review and education offer significant advantages in aligning radiology

practices with the goals of value-based care.²

The transition to value-based care emphasizes diagnostic accuracy and efficiency as these directly influence patient outcomes and costs. Poor-quality radiology reports can lead to delayed or incorrect treatments, driving up health care costs and compromising patient safety. By reducing errors and improving diagnostic precision, AI can align radiology practices with the goals of value-based care.²

AI not only supports diagnostic accuracy but also fosters continuous learning and improvement. Radiologists using AI-driven peer review systems report increased confidence in their diagnostic abilities, as well as enhanced clarity and quality in their reports.¹

As health care systems increasingly adopt value-based care frameworks, integrating AI into radiology practices will become essential. AI not only supports the clinical goals of improving patient outcomes but also

helps health care providers meet the financial and operational demands of value-based care, making it a valuable tool in the future of radiology.¹

In Closing

The integration of AI into peer review and education in radiology holds tremendous potential to transform the field, particularly in the context of value-based care. By enhancing diagnostic accuracy, streamlining workflows, and fostering continuous learning, AI can help radiologists meet the increasing demands of their profession while improving patient outcomes. As the health care industry continues to evolve, the adoption of AI-driven solutions will be crucial in ensuring that radiology remains at the forefront of medical innovation, delivering the highest standards of care in a value-based environment.

New innovations coming to market are at the forefront of this

transformation, showcasing how AI can be specifically tailored to meet the needs of radiology departments and help improve patient care through enhanced diagnostic accuracy and education.

REFERENCES

- 1) Sharpe RE Jr, Tarrant MJ, Brook OR, et al. Current state of peer learning in radiology: a survey of ACR members. *J Am Coll Radiol*. 2023;20(7):699-711. 10.1016/j.jacr.2023.03.018
- 2) Brady AP, Visser J, Frija G. Value-based radiology: what is the ESR doing, and what should we do in the future? *Insights Imaging*. 2021;12(1):108. 10.1186/s13244-021-01056-9
- 3) Codari M. Impact of artificial intelligence on radiology: a euroaim survey among members of the european society of radiology. *Insights Imaging*. 2019;10(1):105. 10.1186/s13244-019-0798-3
- 4) Chilamkurthy S, Ghosh R, Tanamala S, et al. Deep learning algorithms for detection of critical findings in head CT scans: a retrospective study. *Lancet*. 2018;392(10162):2388-2396. 10.1016/S0140-6736(18)31645-3
- 5) Tejani AS, Elhalawani H, Moy L, Kohli M, Kahn CE Jr. Artificial intelligence and radiology education. *Radiol Artif Intell*. 2023;5(1):e220084. 10.1148/ryai.220084
- 6) Flory MN, Napel S, Tsai EB. Artificial intelligence in radiology: opportunities and challenges. *Semin Ultrasound CT MR*. 2024;45(2):152-160. 10.1053/j.sult.2024.02.004