

Artificial Intelligence and Patient Safety: A New Opportunity for Safer Healthcare

Farahzad Jabbari-Azad^{1*}

1. Allergy Research Center, Mashhad University of Medical Sciences, Mashhad, Iran

ARTICLE INFO	ABSTRACT
Article type: Editorial Article History: Received: 09 Sep 2026 Accepted: 09 Sep 2026 Keywords: Artificial Intelligence, Patient Safety, Medical Errors, Healthcare Quality	Patient safety remains a major challenge for healthcare systems worldwide despite continuous advances in medical science and technology. Artificial intelligence (AI) has recently emerged as a promising tool for improving the quality and safety of healthcare delivery. By analyzing large volumes of clinical data and identifying patterns beyond human capability, AI may help healthcare professionals detect risks earlier, reduce medication errors, and improve diagnostic accuracy. However, concerns regarding data quality, transparency, ethical responsibility, and patient privacy must be addressed before widespread implementation. This editorial discusses the opportunities and challenges associated with the use of AI in patient safety and highlights the importance of maintaining human oversight in AI-assisted healthcare.
► Please cite this paper as: Jabbari-Azad F. Artificial Intelligence and Patient Safety: A New Opportunity for Safer Healthcare. <i>Journal of Patient Safety and Quality Improvement</i>. 2026; 14(4): 189-191. Doi: 10.22038/psj.2026.98770.1554	

Introduction

Improving patient safety has been a priority for healthcare systems since the publication of the landmark report To Err Is Human, which highlighted the significant burden of preventable medical errors on patients and healthcare organizations (1). Although substantial progress has been achieved over the past two decades, avoidable harm remains a persistent problem worldwide (2). The rapid expansion of digital health technologies has created new opportunities to address this challenge. Among these innovations, artificial intelligence has attracted considerable attention because of

its ability to process complex clinical information and support decision-making. Unlike conventional software systems, AI algorithms can learn from large datasets, identify hidden relationships, and generate predictions that may assist healthcare professionals in delivering safer care (3,4).

One of the most promising applications of AI is the early detection of patient deterioration. Machine learning models can analyze clinical data in real time and identify patients at increased risk of complications such as sepsis or respiratory failure before

*Corresponding Author:

Allergy Research Center, Mashhad University of Medical Sciences, Mashhad, Iran. Email: Jabbarif@mums.ac.ir

obvious clinical signs become apparent. Earlier recognition may allow more timely intervention and reduce the likelihood of serious adverse outcomes (5).

AI also has the potential to improve medication safety. Medication errors remain among the most common causes of preventable patient harm. Clinical decision-support systems equipped with AI can help identify drug interactions, inappropriate prescriptions, and dosing errors, thereby supporting safer prescribing practices (6).

Another area of growing interest is diagnostic support. Diagnostic errors can result in delayed treatment and poor outcomes. AI-assisted systems have demonstrated impressive performance in medical image interpretation and pattern recognition, particularly in fields such as radiology, pathology, and dermatology (7). While these technologies are unlikely to replace clinicians, they may serve as valuable tools that enhance diagnostic accuracy and reduce human error.

Despite these opportunities, important concerns remain. AI systems depend heavily on the quality of the data used for training and validation. Biased or incomplete datasets may generate inaccurate recommendations and potentially widen healthcare disparities (8). Furthermore, the lack of transparency in some machine-learning models may limit clinician trust and acceptance.

Ethical considerations must also remain central to discussions about AI in healthcare. Protecting patient privacy, ensuring data security, and maintaining accountability for clinical decisions are essential requirements for responsible implementation (9). Importantly, AI should be viewed as a support tool rather than a substitute for professional judgment. Clinical care involves empathy, communication, ethical reasoning, and contextual understanding—elements that cannot be fully replicated by algorithms.

As healthcare continues its digital transformation, AI is likely to become an increasingly important component of patient safety strategies. However, the ultimate success of these technologies will depend not only on technical performance but also on thoughtful integration into clinical practice. The future of patient safety will be shaped by effective collaboration between healthcare professionals and intelligent technologies, combining the strengths of both to achieve safer and higher-quality care.

Discussion

The growing integration of artificial intelligence into healthcare presents both opportunities and challenges for patient safety. Current evidence suggests that AI can support clinicians in identifying high-risk patients, improving medication management, and enhancing diagnostic accuracy. These capabilities are particularly important in modern healthcare environments where increasing volumes of clinical data may exceed the capacity of traditional decision-making approaches.

Nevertheless, technological advances alone cannot guarantee safer care. The effectiveness of AI systems depends largely on the quality of available data, the transparency of algorithms, and the ability of healthcare professionals to appropriately interpret and apply AI-generated recommendations. Concerns regarding algorithmic bias, data privacy, and accountability continue to be important barriers to widespread adoption.

For AI to contribute meaningfully to patient safety, healthcare organizations should focus not only on technological innovation but also on governance, education, and ethical oversight. Clinicians must remain actively involved in decision-making processes, ensuring that AI functions as a supportive tool rather than an independent authority.

Conclusion

Artificial intelligence has the potential to become an important component of future patient safety initiatives. By supporting earlier detection of clinical deterioration, reducing medication-related errors, and assisting diagnostic processes, AI may help healthcare systems deliver safer and more effective care. However, realizing these benefits requires careful attention to ethical considerations, data quality, transparency, and human oversight. The most promising future lies in a collaborative model in which artificial intelligence enhances, rather than replaces, clinical expertise.

References

1. Kohn LT, Corrigan JM, Donaldson MS. *To Err Is Human: Building a Safer Health System*. Washington DC: National Academies Press; 2000.
2. World Health Organization. *Global Patient Safety Action Plan 2021–2030*. Geneva: WHO; 2021.
3. Topol EJ. *Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again*. New York: Basic Books; 2019.
4. Jiang F, Jiang Y, Zhi H, Dong Y, Li H, Ma S, et al. Artificial intelligence in healthcare: past, present and future. *Stroke Vasc Neurol*. 2017;2(4):230-243.
5. Rajkomar A, Dean J, Kohane I. Machine learning in medicine. *N Engl J Med*. 2019;380(14):1347-1358.
6. Bates DW, Levine D, Syrowatka A, et al. The potential of artificial intelligence to improve patient safety. *NPJ Digit Med*. 2021;4:54.
7. Esteva A, Kuprel B, Novoa RA, et al. Dermatologist-level classification of skin cancer with deep neural networks. *Nature*. 2017;542:115-118.
8. Char DS, Shah NH, Magnus D. Implementing machine learning in healthcare: addressing ethical challenges. *N Engl J Med*. 2018;378:981-983.
9. Kelly CJ, Karthikesalingam A, Suleyman M, Corrado G, King D. Key challenges for delivering clinical impact with artificial intelligence. *BMC Med*. 2019;17:195.