

Artificial Intelligence (AI) in Clinical Medicine: Potential and Progress

*Das DC

Artificial intelligence (A.I.) is intelligence demonstrated by machines mimicking cognitive functions, such as learning and problem solving.¹ It significantly influences the practice of medicine and the delivery of healthcare in the near future. It has shown remarkable improvement in tasks such as diagnostics, data analysis and is already being applied in areas ranging from patient triage to cancer detection.² A.I. is an interdisciplinary field spanning computer science, psychology, linguistics, and philosophy, among others.

The recent availability of AI to the public, including language models like ChatGPT, DeepSeek etc. has increased awareness and its potential capabilities in medicine. The continued growth of AI has inspired interest and debate concerning its use in patient care. ChatGPT successfully passed the USMLE and can solve internal medicine case files, indicating its versatility and potential for future clinical applications. In fact, Google and DeepMind developed the Med-PaLM language model trained on several existing medical Q&A datasets to offer "safe and helpful answers" to questions posed by health care professionals and patients.³

Medical-grade AI language models for consultations, receiving valuable insights and assistance in various aspects of patient care are as follows -

- Provide advice on the diagnosis and treatment for symptoms.
- Create a personalized treatment plan based on the patient's age and lifestyle.
- Analyze X-ray to detect abnormalities.
- Identify risk factors from patient's electronic health record.
- Write a letter explaining the medical necessity of treatment.

Physicians can improve the quality of care by leveraging these powerful tools, while saving time on tasks that can be automated with AI. With further development and refinement, AI technology could play an important role in enhancing the standard of healthcare.^{4,5}

Physician-Machine Collaboration in Medicine

There is utterance about AI eventually replacing physicians, particularly in fields like radiology, pathology, and dermatology, where AI's diagnostic ability can match or even exceed that of clinicians. However, research suggests that physician-machine collaborations will outperform either one alone. It's unlikely that AI will completely replace physicians anytime soon. The human aspects of care, including empathy, compassion, critical thinking, and complex decision-making, are invaluable in providing holistic patient care beyond diagnosis and treatment decisions. So, rather than fully replacing physicians, AI will likely empower the practice of medicine, with physicians exploiting the technology to enhance clinical care. To this point, the American Medical Association recommends that technology be used to augment, rather than replace, human intelligence.¹

AI also has the potential to address physician burnout by automating repetitive and monotonous administrative tasks, allowing physicians to focus on patient care. Moreover, AI could play a valuable role in improving access to care and addressing clinician workforce shortages. As AI advances, physicians may be relied upon for higher-level decision-making, patient interaction, and interdisciplinary collaboration while working alongside AI systems.^{1,4}

Consideration of AI in Health Care

Despite the potential advantages of AI in health care, there are significant safety, privacy, reliability, and ethical considerations. Furthermore, without appropriate precautions, AI may perpetuate instinctive biases in diagnosis and treatment. Doctors will likely continue to play a critical role in ensuring that the ethical and moral implications of medical decisions are carefully considered and that patients receive the highest quality of care. To achieve this, physicians must be prepared to take on new roles and responsibilities in the era of AI, including expanded opportunities in medical informatics. Physicians can also guide patients on how to use AI to obtain reliable health information and receive appropriate care.⁵

Enhancing Medicine with AI

AI has the potential to transform health care for the better. When complemented with physician's expertise, it will be a powerful tool that can lead to better patient outcomes. AI can also facilitate scientific discovery and breakthroughs in disease prevention and treatment through vast data analytics. Integrating AI into routine clinical practice will require careful validation, training, and ongoing monitoring to ensure its accuracy, safety, and effectiveness in supporting physicians to deliver care for patients.

While AI can be an important and valuable asset in the medical field, it cannot replace the human element. However, AI can and should be used to enhance the practice of medicine, empowering doctors with the latest technological tools to serve our patients better. AI and machine learning will not put health professionals out of business; rather, they will help health professionals to do their jobs better as well as leave time for the

human–human interactions that make medicine the rewarding profession we all value.

References

1. Ted A James. How Artificial Intelligence is Disrupting Medicine and What it Means for Physicians. Trends in Medicine. Harvard Medical School. April 13, 2023. Available at <<https://postgraduateeducation.hms.harvard.edu/trends-medicine/how-artificial-intelligence-disrupting-medicine-what-means-physicians>> [Accessed 15 Nov 2024].
2. Meskó B, Görög M. A short guide for medical professionals in the era of artificial intelligence. NPJ Digit Med. 2020 Sep 24;3:126. doi: 10.1038/s41746-020-00333-z. PMID: 33043150; PMCID: PMC7518439.
3. Kung TH, Cheatham M, Medenilla A, Sillos C, De Leon L, Elepaño C, Madriaga M, Aggabao R, Diaz-Candido G, Maningo J, Tseng V. Performance of ChatGPT on USMLE: Potential for AI-assisted medical education using large language models. PLOS Digit Health. 2023 Feb 9;2(2):e0000198. doi: 10.1371/journal.pdig.0000198. PMID: 36812645; PMCID: PMC9931230.
4. Lee P, Bubeck S, Petro J. Benefits, Limits, and Risks of GPT-4 as an AI Chatbot for Medicine. N Engl J Med. 2023 Mar 30;388(13):1233-1239. doi: 10.1056/NEJMSr2214184. PMID: 36988602.
5. Haug CJ, Drazen JM. Artificial Intelligence and Machine Learning in Clinical Medicine, 2023. N Engl J Med. 2023 Mar 30;388(13):1201-1208. doi: 10.1056/NEJMra2302038. PMID: 36988595.

*Dr. Dulal Chandra Das, MBBS, FCPS (Medicine), Assistant Professor, Department of Medicine, Shaheed Syed Nazrul Islam Medical College, Kishoreganj. Email: dr.dulaldas@yahoo.com.

[Shaheed Syed Nazrul Islam Med Col J 2025, Jan; 10 (1):1-2] DOI: <https://www.doi.org/10.69699/ssnimej2025v10i1s1>