

Artificial Intelligence (Ai) Applications In Healthcare Services Environment: A Review Of Impact In Clinical Decision Making, Enhancing Healthcare Services, Challenges & Limitations

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Abstract

Artificial intelligence (AI) refers to the simulation of human intelligence in machines designed to think and behave like humans. Artificial intelligence (AI) has contributed to the evolution of healthcare delivery by being integrated into clinical decision support systems, diagnostic imaging, personalized medicine, and operational management. This paper outlines the current developments in AI applications for healthcare, with a particular emphasis on clinical decision-making, machine learning, and analysis towards enhancing healthcare services. AI-driven systems excel at analysing high-dimensional clinical data, allowing for early disease identification, risk classification, and personalized treatment planning. The development of AI led this study to analyse AI impacts on clinical decision-making, emphasizing enhancements in operational efficiency and accuracy in diagnosis. Furthermore, the study has also addressed current challenges such as algorithmic bias, data privacy, and ethical governance. The study's future directions indicate the development of inclusive datasets and explainable artificial intelligence models to reduce inequities and enhance trust in AI-enabled healthcare systems.

Keywords: Artificial Intelligence, Healthcare Services, Clinical Decision Support Systems.

1.0 INTRODUCTION

This paper reviews the current landscape of Artificial Intelligence (AI) applications within healthcare, in relation to diagnostic tools, personalized treatment plans, discovery of new drugs, and the efficiencies of the operational practices. This review, analyse the findings from recent literature to depicted the transformative potential of AI while also addressing the significant challenges and ethical considerations associated with its widespread implementation in clinical practice.

2.0 LITERATURE REVIEW

This review has focused on the adaptation of AI applications in healthcare services, emphasizing key developments, emerging trends, and innovative methodologies that have shaped the field, particularly regarding treatment advancements for certain diseases such as diabetes, cancer, epidemiology, and mortality prediction (Vargas-Santiago et al., 2025).

Furthermore, certain research also considers including the historical trajectory of AI in healthcare, from its conceptual beginnings to present-day innovations across various domains, including precision medicine and public health (Hirani et al., 2024). Referring to this evolving landscape, artificial intelligence is actively being integrated into healthcare to change the diagnostic processes, modify treatment methodologies, and also improve operational workflows (Faiyazuddin et al., 2025). Moreover, the fast development of AI technologies, advancements in machine learning, the digitization of health data, and computational power, has modify discovery in areas traditionally dominated by human expertise (Göktaş & Grzybowski, 2025).

Thus, from medical imaging and diagnostics to virtual patient care, AI applications are transforming the healthcare industry by enhancing efficiency and accuracy (Mizna et al., 2025) (Shang et al., 2024). In addition, the innovation of AI includes the improvements in detecting clinical conditions, managing electronic health records, and assisting in drug discovery and development (Kuwaiti et al., 2023). Hence, the integration of AI into healthcare is not only improve the patient outcomes but also reshaping the operational frameworks of healthcare systems globally.

This transformation is manifest in various domains, including diagnostics, treatment personalization, and also patient management, which collectively promise to improve the healthcare delivery and operations efficiency. Moreover, the ongoing advancements in AI technologies are giving the way for innovative solutions that can further optimize healthcare practices and enhance patient engagement. The potential for AI to revolutionize healthcare is vast, with applications ranging from predictive analytics to virtual the health assistants that can significantly to improve patient engagement and overall care quality.

2.1 Impact on Clinical Decision-Making

In nowadays healthcare delivery, the role of AI in hospitals and clinics indicate a major shift in medical care delivery and management, the integration towards clinical decision-making, hospital operations, medical diagnostics, and also patient care (Varnosfaderani & Forouzanfar, 2024). AI systems can analyse the extensive clinical datasets to offer insights that enhance diagnostic accuracy and treatment effectiveness across medical subfields like radiology and pathology (Aravazhi et al., 2025).

AI able at processing vast amounts of data and pinpointing the correlations of subtle, offering healthcare professionals timely evidence-backed recommendations to improve patient outcomes (Gala et al., 2024). In leveraging machine learning algorithms, AI can assist in identifying high-risk patients, predicting disease outbreaks and tailoring treatment plans based on individual patient characteristics and genetic profiles. Moreover, this analytical prowess not only supports clinicians in making more informed decisions but also assist in contributes to the advancement of personalized medicine where treatments are customized to suit each patient's unique needs.

Furthermore, AI also be instrumental in automating routine tasks, such as appointment scheduling, medical billing, and data entry, which can reduce the administrative burden on healthcare staff and allows them to focus more on direct patient care. Generally, AI systems play a crucial role in monitoring the patients' conditions in real-time and providing alerts to healthcare providers when critical changes are detected. This monitoring can help prevent adverse events and improve overall patient safety. The capabilities of AI can be as a great medium to anticipate health complications and customize personalized care plans (Li et al., 2024). In addition, AI systems are also a trained on multivariate data derived from various clinical activities, including imaging, genomics, and treatment assignments (Serag et al., 2019).

AI systems use data from wearable devices and digital health records to monitor patients and suggest treatment adjustments, optimizing healthcare delivery and enhancing patient outcomes and living standards (Alum & Ugwu, 2025).

2.2 Enhancing Healthcare Services

In the spectrum of the healthcare system, enhancing effective healthcare services is the most crucial part that is being discussed by the practitioner and expert in the field of healthcare and clinical management. The recent implementation of AI in healthcare services has resulted in significant improvements globally. A recent study by (Akinrinmade et al., 2023) has proven the capacity of AI to automate routine tasks and sift through extensive documentation at an accelerated pace that has the potential to significantly enhance the operational efficiency of healthcare services.

AI has provided opportunities for healthcare professionals to focus on more complex and critical aspects of patient care by reducing and automating routine and repetitive tasks (Akinrinmade et al., 2023). This includes automating administrative tasks, streamlining supply chain management, and optimizing resource allocation, thereby reducing costs and improving overall productivity. AI algorithms can process vast amounts of medical literature and research data to provide clinicians with up-to-date information and evidence-based recommendations. This situation enables healthcare providers to stay updated on the latest advancements in medical knowledge and make informed decisions about patient care.

Moreover, AI-driven chatbots and virtual assistants are also enhancing patient engagement and communication by providing timely and personalized information. These AI-powered tools can promptly answer any of the asked questions, provide medication reminders, and offer emotional support to patients, which leads to improved patient satisfaction and adherence to treatment plans. The AI systems that streamline scheduling and assist with preliminary diagnoses can greatly reduce the load on healthcare professionals, improving both efficiency and patient engagement (Mizna et al., 2025).

In addition, the integration of AI and telemedicine platforms has extended healthcare access to remote and underserved populations, breaking down geographical challenges and ensuring that patients receive timely medical attention and effective healthcare services. In terms of the health information, AI can be used to provide personalized health information by analysing patient data, such as medical histories and

lifestyle factors, which allows the patients to better understand their health and make informed decisions about their care.

2.3 Challenges and Limitation

In the setting of healthcare services, the integration of AI and the delivery of healthcare have improved the diagnostics, personalized treatment, and administrative efficiency. Nonetheless, the integration has also been associated with several challenges and limitations when it comes to incorporating artificial intelligence (AI) into healthcare services. The issues of Data privacy, algorithmic bias, and the crucial requirement for human oversight are some of the primary obstacles to the use of AI in healthcare (Alowais et al., 2023). Hence, concerns about data security and patient confidentiality should also be taken into consideration (Olawade et al., 2024).

Strong cybersecurity measures and compliance with data protection laws are essential to preventing unauthorized access and exploitation of patient information (Li et al., 2025). Additionally, if AI systems are trained on biased data, they may reinforce and magnify preexisting prejudices in the healthcare industry. The "black-box" character of some AI systems raises concerns about accountability and transparency in healthcare decision-making (Akingbola et al., 2024). AI systems must be developed and applied in a way that promotes equality, justice, and inclusivity in addition to reducing the potential for algorithmic bias. Furthermore, in order to enhance patients' trust in AI-driven healthcare, honest and transparent communication is important.

The doctor-patient relationship and the patient trust may be jeopardized by the unclear AI decision-making practices (Akingbola et al., 2024). In some way, it's also critical to establish clear lines of accountability and responsibility for errors or negative results done by AI (Bottomley & Thaldar, 2023). It is crucial to consider the potential for AI to exacerbate pre-existing health inequities, given the constraints in accounting for patient preferences, cultural beliefs, and socioeconomic determinants of health (Reuben et al., 2024).

2.4 Future Directions

The implications of AI innovation need to be studied more in future research. Future studies should concentrate on the social and ethical effects of AI as well as creating frameworks to hold AI innovation more accountable. This involves creating regulations to guarantee the moral and just application of AI technologies, while defending patient rights to prevent the escalation of health inequalities (Farhud & Zokaei, 2021; Jeyaraman et al., 2023; Pham, 2025).

Moreover, the collaboration between clinicians, data scientists, policymakers, and patients are very important to ensure that the system of AI is aligned with the needs and values of all stakeholders (Jeyaraman et al., 2023). The integration and collaborations should focus on addressing data quality and availability challenges by establishing a good data governance framework and promoting data sharing initiatives. The development of bias detection and mitigation approaches, as well as the utilization of diverse and representative datasets, can help address algorithmic bias and ensure justice in AI decision-making (Pham, 2025).

3.0 METHODOLOGY

This review paper examines the increasing use of AI in healthcare, focusing on its impact on services, potential biases, and future uses. The sources for this study come from a variety of academic databases, publications, and industry reports that cover AI applications, ethics, and technologies in healthcare (Varnosfaderani & Forouzanfar, 2024). The study involved carefully analysing the chosen materials to extract relevant data on AI's advantages, disadvantages, and potential effects on healthcare equity.

The review gives a thorough look at the existing literature by combining both theoretical and practical insights to show how AI is changing healthcare and what problems and opportunities it brings.

4.0 Findings

The analysis of AI with telemedicine has revolutionized healthcare delivery, especially for remote patient care (Chaturvedi et al., 2025). AI-driven diagnostic systems, predictive analytics, and teleconsultation platforms are especially useful in overcoming the challenges of traditional remote healthcare models (Chaturvedi et al., 2025). The analysis has found that AI algorithms can analyse patient data, including

medical records, genetic information, and lifestyle factors in order to identify individuals at higher risk of developing certain conditions (Rezaei et al., 2023).

A new paradigm in diseases management has been in present in AI assistance by suggested resources to perform predictive modelling, individualized intervention, and remote monitoring (Mizna et al., 2025). AI algorithms are utilized to analyse images and detect diseases early, which is very important in radiology (Akhtar, 2025). The innovation of AI in radiology is able to quickly analyse medical images, such as X-rays and MRIs, to identify abnormalities and assist radiologists in making accurate diagnoses. AI has demonstrated potential in enhancing medical diagnosis efficiency and accuracy, resulting in earlier disease detection and treatment (Varnosfaderani & Forouzanfar, 2024).

To some extent, the use of AI in telemedicine holds significant promise for transforming healthcare delivery and improving patient outcomes, particularly in remote and underserved areas (Rintyarna et al., 2023). Prior to this, strategies to increase the clinical utility of AI and foster trust between patients and healthcare professionals are required to guarantee that AI technologies can benefit all populations fairly (Weiner et al., 2025). However, the potential of overcoming obstacles like data infrastructure, privacy laws, and moral data-sharing norms is necessary to be fully aware in relation to making the AI intervention a success (Goel et al., 2025; Weiner et al., 2025).

5.0 DISCUSSION

The revolution of AI in healthcare delivery have integrated the combination of AI and telemedicine, particularly for remote patient care (Chaturvedi et al., 2025). AI-driven diagnostic systems, predictive analytics, and teleconsultation platforms are exclusively useful in overcoming the challenges of traditional remote healthcare models (Chaturvedi et al., 2025). The system of AI can identify people who are more likely to develop specific diseases by analyzing patient data, including genetic information, medical records, and lifestyle factors (Rezaei et al., 2023).

The intervention of AI has offered resources for predictive modelling, individualized intervention, and remote monitoring, which is crucial in presenting a new paradigm in disease management (Mizna et al., 2025). AI algorithms are utilized to analyse images and detect diseases early, which is important in radiology (Akhtar, 2025). Medical pictures, including MRIs and X-rays, can be rapidly analysed by AI-based systems to spot any abnormalities and help radiologists make precise diagnoses. Moreover, AI has demonstrated potential in enhancing efficiency and accuracy in medical diagnoses, which is resulting in earlier disease detection and treatment.

In remote and under-served area, the use of AI in tele-medicine holds significant promise to revolutionized the healthcare delivery in enhancing more patient outcome (Rintyarna et al., 2023). Strategies to increase the clinical utility of AI and foster trust between patients and healthcare professionals are required to guarantee that AI technologies benefit all populations fairly (Weiner et al., 2025). Other than that, realizing the transformative potential of AI in healthcare necessitates addressing challenges, such as data infrastructure, privacy regulations, and ethical data-sharing practices (Goel et al., 2025; Weiner et al., 2025).

6.0 CONCLUSION

Several aspects of medical practice and health service delivery, such as drug discovery, treatment planning, patient monitoring, and diagnostics, could be completely transformed by the use of AI in healthcare (Alaran et al., 2025). AI-based instruments and technologies can increase the accuracy and effectiveness of medical procedures, which will benefit patients and reduce the expenses (Chang, 2019; Thacharodi et al., 2024). Moreover, AI integration in healthcare has developed an opportunity to enhance real-time health monitoring, diagnostic precision, and patient engagement (Chaturvedi et al., 2025).

The advancement in healthcare delivery, especially in aspects such as drug discovery and genetics, has been made possible by AI's talent. AI being able to analyse large datasets and identify patterns that would be challenging for humans to do (Alowais et al., 2023). Even though artificial intelligence (AI) has advanced significantly and can help improve therapy, not all civilizations can access it (Farhud & Zokaei, 2021). Moreover, certain complex medical picture analyses are made easier by AI-enabled systems, like making it possible to quickly spot irregularities and patterns that human observers could overlook (Khalifa & Albadawy, 2024). The studies have shown the challenges and limitations of AI algorithms, which need ongoing development and growing incorporation into healthcare processes. The AI advancements have

led to the potential to transform the medical practice and enhance patient outcomes (Aamir et al., 2024; Coelho, 2023).

REFERENCES

1. Aamir, A., Iqbal, A., Jawed, F., Ashfaq, F., Hafsa, H., Anas, Z., Oduoye, M. O., Basit, A., Ahmed, S., Rauf, S. A., Khan, M., & Mansoor, T. (2024). Exploring the current and prospective role of artificial intelligence in disease diagnosis. *Annals of Medicine and Surgery*, 86(2), 943–949. <https://doi.org/10.1097/ms9.0000000000001700>
2. Akhtar, Z. B. (2025). Artificial intelligence within medical diagnostics: A multi-disease perspective. *Deleted Journal*, 0(0), 5173. <https://doi.org/10.36922/aih.5173>
3. Akingbola, A., Adeleke, O., Idris, A., Adewole, O., & Adegbesan, A. (2024). Artificial intelligence and the dehumanization of patient care. *Journal of Medicine Surgery and Public Health*, 3, 100138. <https://doi.org/10.1016/j.glmedi.2024.100138>
4. Akinrinmade, A. O., Adebile, T. M., Ezuma-Ebong, C., Bolaji, K., Ajufo, A., Adigun, A. O., Mohammad, M., Dike, J. C., & Okobi, O. E. (2023). Artificial intelligence in healthcare: Perception and reality. *Cureus*. <https://doi.org/10.7759/cureus.45594>
5. Alaran, M. A., Lawal, S. K., Jiya, M. H., Egya, S. A., Ahmed, M. M., Abdulsalam, A., Haruna, U. A., Musa, M. K., & Lucero-Prisno, D. E. (2025). Challenges and opportunities of artificial intelligence in African health space. *Digital Health*, 11. <https://doi.org/10.1177/20552076241305915>
6. Alowais, S. A., Alghamdi, S. S., Alsuhbany, N., Alqahtani, T., Alshaya, A. I., Almohareb, S. N., Aldairem, A., Alrashed, M., Saleh, K. B., Badreldin, H. A., Yami, M. S. A., Harbi, S. A., & Albekairy, A. M. (2023). Revolutionizing healthcare: the role of artificial intelligence in clinical practice. *BMC Medical Education*, 23(1). <https://doi.org/10.1186/s12909-023-04698-z>
7. Alum, E. U., & Ugwu, O. P. (2025). Artificial intelligence in personalized medicine: transforming diagnosis and treatment. *Deleted Journal*, 7(3). <https://doi.org/10.1007/s42452-025-06625-x>
8. Aravazhi, P. S., Gunasekaran, P., Benjamin, N. Z. Y., Thai, A., Chandrasekar, K. K., Kolanu, N. D., Prajwal, P., Tekuru, Y., Brito, L. V., & Inban, P. (2025). The integration of artificial intelligence into clinical medicine: Trends, challenges, and future directions. *Disease-a-Month*, 101882. <https://doi.org/10.1016/j.disamonth.2025.101882>
9. Bottomley, D., & Thaldar, D. (2023). Liability for harm caused by AI in healthcare: an overview of the core legal concepts. *Frontiers in Pharmacology*, 14. <https://doi.org/10.3389/fphar.2023.1297353>
10. Chang, A. (2019). The role of artificial intelligence in digital health. In *Computers in health care* (pp. 71–81). https://doi.org/10.1007/978-3-030-12719-0_7
11. Chaturvedi, U., Chauhan, S. B., & Singh, I. (2025). The impact of artificial intelligence on remote healthcare: Enhancing patient engagement, connectivity, and overcoming challenges. *Intelligent Pharmacy*. <https://doi.org/10.1016/j.ipha.2024.12.003>
12. Faiyazuddin, M., Rahman, S. J. Q., Anand, G., Siddiqui, R. K., Mehta, R., Khatib, M. N., Gaidhane, S., Zahiruddin, Q. S., Hussain, A., & Sah, R. (2025). The Impact of Artificial Intelligence on Healthcare: A comprehensive review of advancements in diagnostics, treatment, and operational efficiency. *Health Science Reports*, 8(1). <https://doi.org/10.1002/hsr2.70312>
13. Farhud, D. D., & Zokaei, S. (2021). Ethical issues of artificial intelligence in medicine and healthcare. *Iranian Journal of Public Health*. <https://doi.org/10.18502/ijph.v50i11.7600>
14. Goel, I., Bhaskar, Y., Kumar, N., Singh, S., Amanullah, M., Dhar, R., & Karmakar, S. (2025). Role of AI in empowering and redefining the oncology care landscape: perspective from a developing nation. *Frontiers in Digital Health*, 7. <https://doi.org/10.3389/fdgrh.2025.1550407>
15. Goktas, P., & Grzybowski, A. (2025). Shaping the Future of Healthcare: ethical clinical challenges and pathways to trustworthy AI. *Journal of Clinical Medicine*, 14(5), 1605. <https://doi.org/10.3390/jcm14051605>
16. Hirani, R., Noruzi, K., Khuram, H., Hussaini, A. S., Aifuwa, E. I., Ely, K. E., Lewis, J. M., Gabr, A. E., Smiley, A., Tiwari, R. K., & Etienne, M. (2024). Artificial Intelligence and Healthcare: A Journey through History, Present Innovations, and Future Possibilities. *Life*, 14(5), 557. <https://doi.org/10.3390/life14050557>
17. Jeyaraman, M., Balaji, S., Jeyaraman, N., & Yadav, S. (2023). Unraveling the ethical enigma: Artificial intelligence in healthcare. *Cureus*. <https://doi.org/10.7759/cureus.43262>
18. Khalifa, M., & Albadawy, M. (2024). AI in diagnostic imaging: Revolutionising accuracy and efficiency. *Computer Methods and Programs in Biomedicine Update*, 5, 100146. <https://doi.org/10.1016/j.cmpbup.2024.100146>
19. Kuwaiti, A. A., Nazer, K., Al-Reedy, A., Al-Shehri, S., Al-Muhanna, A., Subbarayalu, A. V., Muhanna, D. A., & Al-Muhanna, F. A. (2023). A review of the role of artificial intelligence in healthcare. *Journal of Personalized Medicine*, 13(6), 951. <https://doi.org/10.3390/jpm13060951>
20. Li, D. M., Parikh, S., & Costa, A. (2025). A critical look into artificial intelligence and healthcare disparities. *Frontiers in Artificial Intelligence*, 8. <https://doi.org/10.3389/frai.2025.1545869>
21. Li, Y., Li, Y., Wei, M., & Li, G. (2024). Innovation and challenges of artificial intelligence technology in personalized healthcare. *Scientific Reports*, 14(1). <https://doi.org/10.1038/s41598-024-70073-7>
22. Mizna, S., Arora, S., Saluja, P., Das, G., & Alanesi, W. A. (2025). An analytic research and review of the literature on practice of artificial intelligence in healthcare. *European Journal of Medical Research*, 30(1). <https://doi.org/10.1186/s40001-025-02603-6>
23. Olawade, D. B., David-Olawade, A. C., Wada, O. Z., Asaolu, A. J., Adereni, T., & Ling, J. (2024). Artificial intelligence in healthcare delivery: Prospects and pitfalls. *Journal of Medicine Surgery and Public Health*, 3, 100108. <https://doi.org/10.1016/j.glmedi.2024.100108>
24. Pham, T. (2025). Ethical and legal considerations in healthcare AI: innovation and policy for safe and fair use. *Royal Society Open Science*, 12(5). <https://doi.org/10.1098/rsos.241873>
25. Pinto-Coelho, L. (2023). How Artificial intelligence is shaping medical Imaging Technology: A survey of Innovations and applications. *Bioengineering*, 10(12), 1435. <https://doi.org/10.3390/bioengineering10121435>

26. Reuben, J. S., Meiri, H., & Arien-Zakay, H. (2024). AI's pivotal impact on redefining stakeholder roles and their interactions in medical education and health care. *Frontiers in Digital Health*, 6. <https://doi.org/10.3389/fdgth.2024.1458811>
27. Rezaei, T., Parisa, J. K., Soheila, J. K., Atousa, M. F., Rashidi, S., Ghazalgoo, A., Rezaei, M., Farrokhi, M., Moeini, A., Foroutani, L., Nouri, S., Moshtaghi, Z., Jahangiri, R., Mahmoodi, T., Taheri, F., Jahanshahi, A., Mirghazanfari, S. S., Gheiji, B., Bayanati, M., . . . Goodarzi, B. (2023). Integrating Artificial Intelligence into Telemedicine: Revolutionizing Healthcare Delivery. In Zenodo (CERN European Organization for Nuclear Research). <https://doi.org/10.5281/zenodo.8395812>
28. Rintyarna, B. S., Sasmiyanto, N., Insantuan, O. D., Widiawati, I., & Purwoko, R. Y. (2023). Telehealth in remote areas: a new Artificial Intelligence-Based model. *International Journal of Science and Society*, 5(4), 243–254. <https://doi.org/10.54783/ijssoc.v5i4.782>
29. Serag, A., Ion-Margineanu, A., Qureshi, H., McMillan, R., Martin, M. S., Diamond, J., O'Reilly, P., & Hamilton, P. (2019). Translational AI and deep learning in diagnostic pathology. *Frontiers in Medicine*, 6. <https://doi.org/10.3389/fmed.2019.00185>
30. Shang, Z., Chauhan, V., Devi, K., & Patil, S. (2024). Artificial Intelligence, the Digital Surgeon: Unravelling its emerging footprint in healthcare - The Narrative review. *Journal of Multidisciplinary Healthcare*, Volume 17, 4011–4022. <https://doi.org/10.2147/jmdh.s482757>
31. Thacharodi, A., Singh, P., Meenatchi, R., Ahmed, Z. H. T., Kumar, R. R. S., V, N., Kavish, S., Maqbool, M., & Hassan, S. (2024). Revolutionizing healthcare and medicine: The impact of modern technologies for a healthier future—A comprehensive review. *Health Care Science*, 3(5), 329–349. <https://doi.org/10.1002/hcs2.115>
32. Vargas-Santiago, M., León-Velasco, D. A., Maldonado-Sifuentes, C. E., & Chanona-Hernandez, L. (2025). A State-of-the-Art Review of Artificial intelligence (AI) applications in healthcare: Advances in diabetes, cancer, epidemiology, and mortality Prediction. *Computers*, 14(4), 143. <https://doi.org/10.3390/computers14040143>
33. Varnosfaderani, S. M., & Forouzanfar, M. (2024). The role of AI in Hospitals and Clinics: Transforming Healthcare in the 21st century. *Bioengineering*, 11(4), 337. <https://doi.org/10.3390/bioengineering11040337>
34. Weiner, E. B., Dankwa-Mullan, I., Nelson, W. A., & Hassanpour, S. (2025). Ethical challenges and evolving strategies in the integration of artificial intelligence into clinical practice. *PLOS Digital Health*, 4(4), e0000810. <https://doi.org/10.1371/journal.pdig.0000810>