CHAPTER 9

Ethical and Privacy Challenges of Artificial Intelligence in Healthcare

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ABSTRACT

The rapid integration of Artificial Intelligence into healthcare, ethical and privacy concerns are identified and addressed. The issues identified are patient trust, data security, health equity, and algorithmic bias. A systematic review method was applied, in which a comprehensive database and research search was performed. This approach provided a structured way to explore the defined issues. Studies suggest that an absence of standard governance may be a barrier to physicians delivering quality healthcare and regulation may exacerbate the healthcare disparities and could undermine the patients' autonomy. Additionally, significant gaps in several domains such as data privacy protection, informed consent, and bias management of Artificial Intelligence systems have been addressed by the analysis. Moreover, there is a critical need to formulate coherent, cross-disciplinary, and human-centric policies that steer the development and implementation of Artificial Intelligence in healthcare. To ensure transparency and sustainability, this project will suggest a comprehensive set of regulations.

Introduction

A democratic government would be based on sustainable practices to make the healthcare system universal and accessible to all citizens by providing individuals with equitable treatment and good quality of care, regardless of their socioeconomic position. Through the international support and possibilities that it offers, Artificial Intelligence (AI) has been "home-born" as the "fourth industrial revolution", something with a tremendous and worldwide impact. It is a multidisciplinary field that pulls together the theories and the innovations of computer science, engineering and other scientific disciplines in order to construct machines that respond like human beings. These machines are able to identify visual images, transcribe vocal language to writing, translate materials and learn new skills by expanding their knowledge base. Machine learning, one of the main directions for machine operation, involves algorithms that scan the data for patterns, then make predictions or recommendations based on new data using these patterns without consideration of contextual guidance. At present we are looking at a considerable spike in the uptake of AI within healthcare. Application of AI techniques could lead to the improvement of the national medical system, consequently leading to some aspects of population health, as well as, individual patient health to be optimized, while it could have some particular ethical impacts with respect to the access of people to healthcare and its cost efficiency[1].

The selection of broad literature on medical AI spans applications in diagnostics, infection prevention, therapeutics, and other novel use cases. However, much of this work has been led from high income countries and has not taken into account the specificities of healthcare access in systems in resource-limited contexts. The unequal access to the COVID-19 vaccine reminds us that organizations do not have the luxury of corporate good will to realize health equity and social justice. In recent years, AI regulatory policy pathways in healthcare are being devised and services and Policies should be a part of global health trajectories to facilitate an inclusive healthcare industry and universal access to health in the hopes that AI in healthcare will neither contribute to further commodification, but equally generate access[2]. With the rise of AI

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[1] Pham, Tuan. 2025. "Ethical and Legal Considerations in Healthcare AI: Innovation and Policy for Safe and Fair Use." *Royal Society Open Science*, 12(5): 241873. https://doi.org/10.1098/rsos.241873.

[2] Liebrenz, Michael, Dinesh, Bhugra, Rowalt, Alibudbud, Antonio, Ventriglio, and Alexander, Smith. 2024. "AI in Health Care and the Fragile Pursuit of Equity and Social Justice." *The Lancet*, 404(10455). https://doi.org/10.1016/S0140-6736(24)01604-0.

applications in healthcare the responsibility to stay attuned to its ethical use will become paramount. The most critical ethical principles must be addressed, foremost among those being the principle of autonomy which states that the patient has a right to autonomy and autonomy requires that the patient be free to make his or her own health care decisions. A patient's autonomy is susceptible to invasion with the increasing use of AI as decision-maker or decision support, particularly when the decision is influential[3].

Artificial Intelligence, more specifically deep learning, is often characterized as a 'black box' due to its opacity. Researchers in all fields have suggested involving explainability and interpretability in the development of these systems to add transparency; still, no common grouping between fields has been identified. In sensitive fields such as healthcare, opacity can be perilous, as healthcare decisions directly impact human lives[4]. The demand for transparency has led to a number of technical solutions which focus on safeguarding data and ensure accountability. Responsible AI use encompasses transparency, adheres to social and ethical principles and guarantees equal and unbiased healthcare values for all patient groups[5]. The demand for transparent systems has produced multiple technical solutions which directly address this requirement. The AI industry defines accountability from an organizational viewpoint as the capacity to sustain quality standards while protecting all data and algorithms and AI outputs which require protection. The available solutions provide assistance to specific data protection and accountability challenges while advancing toward that particular problem[6].

The effective implementation of AI in healthcare also depends on overcoming significant technical and regulatory barriers. Developers must create algorithms that represent all possible scenarios across diverse population groups, and performance

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[3] Pham, Tuan. 2025. "Ethical and Legal Considerations in Healthcare AI: Innovation and Policy for Safe and Fair Use." *Royal Society Open Science*, 12(5): 241873. https://doi.org/10.1098/rsos.241873.

[4] Kiseleva, Anastasiya, Kotzinos, Dimitris, and Hert, Paul De. 2022. "Transparency of AI in Healthcare as a Multilayered System of Accountabilities: Between Legal Requirements and Technical Limitations." *Frontiers in Artificial Intelligence*, 5:879603. https://doi.org/10.3389/frai.2022.879603.

[5] Quazi, Fardin. 2024. "Ethics & Responsible AI in Healthcare." *International Journal of Global Innovations and Solutions (IJGIS)*. https://doi.org/10.21428/e90189c8.a16c4bb9.

[6] Bagave, Prach, Marcus, Westberg, Marijn, Janssen, and Ding, Aaron Yi. 2025. "Accountability Framework for Healthcare AI Systems: Towards Joint Accountability in Decision Making." arXiv. https://arxiv.org/abs/2509.03286.