How Will AI Change Healthcare in Developing Countries? A Dual-Edged Transformation

Rasit Dinc

Rasit Dinc Digital Health & AI Research

Published: July 18, 2022 | Medical Imaging AI

DOI: 10.5281/zenodo.17997850

Abstract

The integration of Artificial Intelligence AI into global healthcare systems represents a paradigm shift, but its impact is perhaps most profound and complex...

The integration of Artificial Intelligence (AI) into global healthcare systems represents a paradigm shift, but its impact is perhaps most profound and complex in **developing countries** [1]. These nations face unique and persistent challenges, including vast geographical disparities, chronic shortages of skilled healthcare workers, and high patient loads in resource-limited settings [2]. AI is not merely an incremental upgrade; it is a potential catalyst for leapfrogging traditional infrastructural barriers, offering a dual-edged transformation that promises both unprecedented access and significant ethical and logistical hurdles.

The Transformative Potential: Bridging the Access Gap

AI's primary value proposition in the Global South is its ability to democratize access to high-quality diagnostics and specialist knowledge, effectively addressing the critical shortage of healthcare personnel [3].

Enhanced Diagnostics and Rural Outreach

In rural and underserved areas, AI-driven tools can function as a force multiplier for frontline health workers. For instance, in rural India, computer-based diagnostic tools have demonstrated a remarkable consistency with physician diagnoses, with one study showing a 94% consistency rate across hundreds of patients [4]. Similarly, in China, portable diagnostic machine stations in village facilities use AI to analyze results from 11 different tests, automatically uploading data to a central system for analysis [4].

These applications are particularly effective in: ***Image Analysis:*** *AI algorithms can screen for conditions like diabetic retinopathy or tuberculosis from medical images with high accuracy, often in settings where a specialist radiologist or ophthalmologist is unavailable [5].* **Disease Screening:** Machine learning models, such as those used to calculate a "rural stroke risk score," can streamline preventative care and reduce mortality rates by identifying high-risk individuals in regions with limited emergency care access [4]. ***Administrative Efficiency:*** *AI can optimize hospital management and resource allocation, making existing, strained resources more efficient in high-*

volume setups [1].

The Critical Barriers: Infrastructure, Cost, and Adoption

Despite the compelling potential, the path to widespread AI adoption in developing countries is fraught with significant challenges that threaten to widen, rather than narrow, the existing global health inequality gap [6].

The Digital Divide and Cost

The fundamental challenge lies in the digital divide. AI systems require robust infrastructure, including reliable electricity, high-speed internet connectivity, and the necessary hardware for deployment. Many rural and remote areas lack these basic prerequisites, hindering AI's full utilization [1]. Furthermore, the high initial installation and ongoing maintenance costs of sophisticated AI equipment and software pose a substantial financial burden on already underfunded public health systems [1].

Data Scarcity and Bias

*AI models are only as good as the data they are trained on. In many developing countries, health data is often fragmented, incomplete, or non-standardized. Crucially, models trained predominantly on data from high-income countries (HICs) may exhibit **algorithmic bias** when applied to diverse populations in the Global South, leading to inaccurate diagnoses and exacerbating health inequities [7].*

Ethics, Equity, and Governance: A Call for Contextual Frameworks

The successful and equitable deployment of AI hinges on establishing strong, context-specific ethical and governance frameworks. The World Health Organization (WHO) has identified key ethical challenges, emphasizing the need for transparency, accountability, and human oversight [8]. However, a "one-size-fits-all" approach is insufficient.

*The conversation must shift toward **"decolonizing" AI ethics**, ensuring that regulatory frameworks are built to address local cultural norms, data sovereignty concerns, and the unique vulnerabilities of the populations being served [9]. This requires active monitoring for bias and harm, with a "human in the loop" model to ensure that technology remains a tool for empowerment, not a source of error or overreliance [7].*

For more in-depth analysis on this topic, particularly concerning the policy and ethical dimensions of digital health transformation, the resources at www.rasitdinc.com provide expert commentary and professional insight.

Conclusion: Strategic Investment for an Equitable Future

AI holds the undeniable power to fundamentally change healthcare in developing countries, moving it from a reactive, resource-intensive model to a proactive, data-driven one. The transformation is not inevitable, however. It requires strategic, multi-sectoral investment not just in the technology itself, but in the foundational infrastructure, data standardization, and, most importantly, the ethical and regulatory governance that ensures AI serves all populations equitably. By prioritizing local context, addressing the digital

divide, and establishing robust oversight, AI can fulfill its promise as a powerful tool for achieving universal health coverage and improving global health outcomes.

*

References

[1] V. Zuhair et al., "Exploring the Impact of Artificial Intelligence on Global Health and Enhancing Healthcare in Developing Nations," Journal of Primary Care & Community Health*, 2024. [https://pmc.ncbi.nlm.nih.gov/articles/PMC11010755/] (https://pmc.ncbi.nlm.nih.gov/articles/PMC11010755/) [2] A. Owoyemi et al., "Artificial Intelligence for Healthcare in Africa - PMC,"* Frontiers in Digital Health*, 2020. [https://pmc.ncbi.nlm.nih.gov/articles/PMC8521850/] (https://pmc.ncbi.nlm.nih.gov/articles/PMC8521850/) [3] A. Mahajan, "Artificial intelligence in healthcare in developing nations,"* Current Research in Translational Medicine*, 2019. [https://journals.lww.com/crst/fulltext/2019/02020/artificial_intelligence_in_healthcare_in.9.as (https://journals.lww.com/crst/fulltext/2019/02020/artificial_intelligence_in_healthcare_in.9.as [4] V. Zuhair et al., "AI in Rural Areas of Developing Countries,"* Journal of Primary Care & Community Health*, 2024. [https://pmc.ncbi.nlm.nih.gov/articles/PMC11010755/] (https://pmc.ncbi.nlm.nih.gov/articles/PMC11010755/) [5] A. Rizvi et al., "Is artificial intelligence the cost-saving lens to diabetic retinopathy screening in low-and middle-income countries?,"* Cureus*, 2023. https://www.cureus.com/articles/183282-is-artificial-intelligence-the-cost-saving-lens-to-diabetic-retinopathy-screening-in-low--and-middle-income-countries.pdf [6] D.B. Olawade, "Artificial intelligence in healthcare delivery: Prospects and challenges,"* ScienceDirect*, 2024. [https://www.sciencedirect.com/science/article/pii/S2949916X24000616] (https://www.sciencedirect.com/science/article/pii/S2949916X24000616) [7] A. Victor, "Artificial intelligence in global health: An unfair future for Africa,"* Health Affairs Scholar*, 2025. [https://academic.oup.com/healthaffairsscholar/article/3/2/qxaf023/8002318] (https://academic.oup.com/healthaffairsscholar/article/3/2/qxaf023/8002318) [8] World Health Organization, "Ethics and governance of artificial intelligence for health," 2021. [https://www.who.int/publications/i/item/9789240029200] (https://www.who.int/publications/i/item/9789240029200) [9] M.K. Grancia, "Decolonizing AI ethics in Africa's healthcare,"* Springer*, 2024. [https://link.springer.com/article/10.1007/s43681-024-00650-z] (https://link.springer.com/article/10.1007/s43681-024-00650-z)