Is AI Healthcare More Affordable Than Traditional Care? An Academic Analysis of Cost-Effectiveness

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Published: April 16, 2023 | AI Diagnostics

DOI: 10.5281/zenodo.17997542

Abstract

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The global healthcare system faces immense pressure to deliver high-quality care while controlling escalating costs. **Artificial Intelligence (AI)** has emerged as a transformative technology, promising to revolutionize clinical practice and improve financial sustainability. The central question for policymakers, professionals, and the public remains: Is AI healthcare truly more affordable than traditional care? Academic evidence suggests the answer is a nuanced, but increasingly clear, yes, particularly when evaluating long-term cost-effectiveness and system-wide savings.

The Economic Promise of AI in Healthcare

The economic argument for AI in medicine rests on its ability to enhance efficiency, reduce diagnostic errors, and optimize resource allocation. Unlike traditional, human-centric processes prone to variability, AI systems offer scalable, consistent, and rapid analysis.

A systematic review of clinical AI interventions across diverse healthcare settings—including oncology, cardiology, and ophthalmology—found that these interventions are frequently **cost-effective or even cost-saving** [1]. The review highlighted that AI-driven tools not only achieve comparable clinical outcomes but also generate measurable improvements in **Quality-Adjusted Life Years (QALYs)**, a standard metric for health economics.

Case Studies in Cost-Effectiveness

The financial benefits of AI are not merely theoretical; they are quantifiable across specific medical domains:

Cardiology and Screening: *In atrial fibrillation (AF) screening, a machine learning-based risk prediction algorithm demonstrated incremental cost-effectiveness ratios (ICERs) significantly below accepted thresholds, achieving figures as low as* ***£4,847 per QALY gained*** *[1]. This is a powerful indicator of*

AI's ability to reduce unnecessary screenings while maintaining or improving patient outcomes. **Ophthalmology:** For diabetic retinopathy screening, AI-driven models have been shown to reduce per-patient screening costs by **14–19.5%** and achieve ICERs as low as **$1,107.63 per QALY** [1]. These improvements are observed in both resource-rich and resource-limited environments, underscoring AI's robust economic impact. ***Oncology:*** *AI-assisted colonoscopy strategies have been projected to yield substantial annual national savings, with estimates reaching* ***$149.2 million in Japan*** *and* ***$85.2 million in the United States*** *[1].*

System-Wide Savings: A Macroeconomic View

Beyond individual clinical applications, the wider adoption of AI is projected to have a massive impact on national healthcare expenditures. The National Bureau of Economic Research (NBER) estimates that broader AI integration could lead to savings of ***5 to 10 percent in US healthcare spending*** *[2]. This translates to an annual reduction of approximately* ***$200 billion to $360 billion*** *(in 2019 dollars), based on use cases attainable within the next five years without sacrificing quality or access [2].*

These savings stem from AI's potential to streamline administrative tasks, predict patient deterioration for earlier, less costly interventions, and optimize supply chain and resource management. The economic advantage is so pronounced that some studies hypothesize that AI treatment offers ***stronger economics compared to AI diagnosis****, suggesting the greatest financial returns may come from AI's role in personalizing and optimizing therapeutic pathways [3].*

The Initial Investment and the Path to Affordability

While the long-term cost-effectiveness is clear, it is crucial to acknowledge the initial investment required for AI adoption. Implementing AI in healthcare involves significant costs related to infrastructure, data integration, regulatory compliance, and the training of clinical staff. The challenge lies in transitioning from the high upfront costs of development and implementation to the sustained, long-term savings.

However, as AI technology matures and becomes more standardized, these initial barriers are expected to diminish. The rapid evolution of machine learning models and the increasing availability of cloud-based AI services are democratizing access, making AI solutions more accessible to smaller clinics and hospitals. This trend is accelerating the point at which the return on investment (ROI) is realized, moving AI from a luxury technology to a fundamental component of affordable care.

Conclusion: The Future of Affordable Healthcare

The evidence strongly supports the conclusion that AI healthcare is, in the long run, more affordable than traditional care. By improving diagnostic accuracy, preventing costly late-stage interventions, and optimizing system-wide efficiency, AI acts as a powerful deflationary force in a sector historically plagued by inflation. The shift from reactive, expensive care to proactive, AI-

informed management is the key to a more financially sustainable future for global health.

For more in-depth analysis on this topic, the resources at [www.rasitdinc.com] (https://www.rasitdinc.com) provide expert commentary and cutting-edge research on the intersection of digital health, AI, and healthcare economics.

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