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Internal Medicine

THE POTENTIAL TO REVOLUTIONIZE HEALTHCARE WITH AI

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ABSTRACT In 2021, US healthcare spending surpassed $4.3 trillion, about 18.3% of GDP, and is projected to grow over 5% annually until 2028 [1, 2]. The US healthcare system, which often fails to provide the best patient outcomes at the lowest cost, is fragmented and inefficient. It is organized around silos of providers, payers, and pharmacies, not centered on patients' needs, leading to duplication, waste, and poor care coordination. Built on a fee-for-service payment model, the system prioritizes service volume over value and quality [3]. Despite efforts to link care to value, this model incentivizes overuse, underuse, and misuse of resources. The fragmented care and lack of accessible patient outcome data hinder informed decision-making. The focus remains on billable services rather than disease prevention or health promotion, resulting in higher rates of chronic conditions, complications, mortality, and acute care spending. In searching for solutions to these pervasive healthcare challenges, artificial intelligence (AI) offers promising possibilities. AI has tremendous potential to transform clinical care by optimizing resource utilization, enhancing care delivery, and improving patient outcomes. There are three major areas in which we envision AI to be valuable for improving care: (1) streamlining administrative tasks to increase physician productivity, (2) rapidly assisting physicians in diagnosis and treatment, and (3) vastly tracking quality metrics to improve the healthcare system.

KEYWORDS : Artificial Intelligence & Robotics in Healthcare, Artificial Intelligence

Administrative Burden

Administrative burdens consume a substantial portion of physicians' time. Estimates vary, but it could be over 35% [4]. This significantly limits the amount of time physicians have for actual patient care. Artificial Intelligence (AI) and AI-powered tools can automate routine tasks and thereby decrease administrative burdens. For physicians, AI-powered documentation tools could assist in writing notes and discharge summaries to optimize billing and coding, reducing the need for specialized CMS billers/coders. Communicating with insurance companies through prior authorizations could also be streamlined or perhaps even automated entirely. Similarly, in a recent JAMA Internal Medicine Paper, AI models have outperformed Reddit physicians in answering patient questions as assessed by healthcare providers (in terms of empathy and quality) [5]. After these tools are integrated into the chart, they will also greatly aid physicians in responding to patient questions with prompt responses and improved comprehension of medical information. Once these activities can be facilitated by natural language processing and voice recognition technologies, physicians will be substantially more productive in caring for patients.

Patient Care

AI can assist physicians in diagnosis and treatment decisions. By analyzing vast streams of patient data in the electronic medical record, including lab results and imaging studies, AI can provide physicians with valuable information quickly to support clinical decision-making. AIs have already been demonstrated to help with medical imaging triage, particularly in acute care settings, such as Intracranial hemorrhage detected on CT [6] and lung cancer detection aids [7]. Machine learning tools may also help physicians assess pre-test and post-test possibilities of disease, with individualized treatment depending on an individual patient's likelihood of disease. Machine learning algorithms can also learn from historical data to identify patterns, predict disease progression, and recommend appropriate treatment options. This can help reduce diagnostic errors, improve treatment accuracy, and enhance patient outcomes. Furthermore, the ability to evaluate the medical chart and identify erroneous information (such as incorrectly copy-forwarded information or conflicting data) could improve the quality of patient care.

Public Health

Another area where AI can drive improvements is in tracking quality metrics to improve the healthcare system as a whole. AI algorithms can analyze large datasets to monitor healthcare outcomes, identify care variations, and highlight improvement opportunities. By providing real-time feedback and performance metrics, AI can help healthcare providers and institutions optimize care delivery, enhance patient safety, and reduce medical errors.

Challenges

The implementation of AI in medicine does come with some challenges. To ensure patient confidentiality and trust, ethical considerations, data privacy, and security issues must be addressed. Additionally, AI algorithms must be validated and continually monitored to ensure accuracy, reliability, and fairness. Overdiagnosis and medical overuse must also be evaluated before widespread implementation. Randomized control trials with hard, meaningful endpoints are needed to ensure patients and doctors benefit from the widespread use of AI.

Another significant challenge for AI is the integration of payer models. Physicians receive compensation based on the billable minutes of their work or services rendered. However, if AI systems enhance patient outcomes and alleviate the administrative workload, the question arises: how should the creators of AI systems and physicians' utilization of these tools be appropriately remunerated? This issue becomes even more critical in the context of autonomous AIs, which have already been approved by the FDA, in evaluating diabetic

retinopathy [8]. Although some initial investigations have been conducted on this matter, further exploration is warranted to establish a fair and effective compensation framework for all stakeholders involved [9].

CONCLUSION

In conclusion, Artificial Intelligence (AI) has the potential to revolutionize healthcare by addressing the challenges of cost, inefficiency, and fragmented care. AI can optimize resource utilization, enhance patient care, and improve outcomes by streamlining administrative tasks, assisting in diagnosis and treatment, and tracking quality metrics. However, careful implementation, ongoing evaluation, and ethical considerations are crucial to harnessing the full potential of AI in medicine. Additionally, a better understanding of the right payer model for AIs is needed to ensure uptake and proper compensation. With the right approach, AI can be a powerful tool in transforming the healthcare system and delivering better patient value and outcomes.

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