

AI in Pharmacy: Absolutely Imperative or Actually Insignificant

Feature Article

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In the realm of healthcare innovations, Artificial Intelligence (AI) consistently emerges as the focal point of discussions, with many experts deeming it the panacea for revolutionizing patient care. But amidst the buzz, one might wonder, is the hype surrounding AI in healthcare justified?

Consider this: patients grappling with end-stage or rare diseases, having exhausted most other common treatments, often become the recipients of unreliable drugs with a narrow therapeutic index.⁽¹⁾ In such scenarios, precision dosing becomes paramount in optimizing health outcomes. This technique involves careful consideration of patient characteristics such as genetic makeup, environmental influences and lifestyle to select treatments to increase efficacy while minimizing adverse effects. Yet, in practice, the implementation of precision medicine is arduous, with many healthcare professionals (HCPs) deterred by the cost and time associated with interpreting the extensive and complex data.

However, AI's capability of analyzing vast data sets and predicting individual responses to treatments promises to navigate these complexities, ushering in a new era of precision medicine across community pharmacies, hospital settings and the pharmaceutical industry.

In both retail and hospital settings, AI-driven technologies have the potential to enhance personalized healthcare delivery in pharmacies through techniques such as deep learning and predictive analytics. Deep learning involves utilizing neural networks to analyze complex data sets such

as a patient's clinical results, medical history and genetic information to identify trends and anomalies. This capability powers AI-driven clinical decision support systems (CDSS) which can assist pharmacists and HCPs in selecting the most appropriate treatment for patients.⁽²⁾ Similarly, predictive analytics is an advanced mathematical model which integrates historical and current data to predict future events. This tool can monitor patient adherence to therapy by evaluating patterns and changes in behavior, prompting timely interventions. Furthermore, the ability to anticipate patient needs is particularly imperative within hospital settings, as it enables the identification of high-risk patients requiring urgent intensive care or readmission, allowing HCPs to proactively manage treatment plans. This approach not only improves patient outcomes but also alleviates the overall burden on the healthcare system.

Some may further express their appreciation for the role of AI in healthcare by suggesting that innovations such as Natural Language Processing (NLP) can be used to develop Chatbots to handle routine customer inquiries within pharmacies. However, it is important to acknowledge that whilst AI has advanced capabilities, HCPs' personalized patient consultations and empathetic care are irreplaceable aspects of healthcare delivery, which AI cannot currently emulate. This recognition highlights the importance of AI as a tool to support, rather than replace, human expertise in pharmacy settings.

The transformative role of AI can be best observed within the pharmaceutical industry, with many companies racing to

seize this technology to optimize supply chain management, improve clinical trial designs and most notably, accelerate the drug discovery process. In the drug development stage, AI features such as knowledge graphs and machine learning algorithms are commonly used to integrate genomic, drug, disease and clinical data, allowing for more efficient and accurate identification of potential drug target sites.⁽³⁾ AstraZeneca's collaboration with Benevolent AI exemplifies this advancement, where AI-driven knowledge graphs catalyzed the recent discovery of novel drug targets for systemic lupus erythematosus (SLE) in June 2024.⁽⁴⁾ Such developments further underscore AI's profound impact in identifying and developing targeted therapies for complex diseases.

Ultimately, Artificial Intelligence has emerged as a powerful technology poised for significant advancements in this transformative decade, providing unparalleled opportunities to improve operational efficiencies, and health outcomes and redefine standards in precision medicine across healthcare settings. However, as AI establishes itself further into the healthcare system, the essential role of human empathy remains irreplaceable in delivering holistic personalized healthcare solutions.

REFERENCES

1. Balch B. Making medicine personal: Moving away from a one-size-fits-all approach to health care (updated 2024 Feb 22; cited 2024 July 1) Website, available from: <https://www.aamc.org/news/making-medicine-personal-moving-away-one-size-fits-all-approach-health-care>
2. Brown S. Machine learning, explained (updated 2021 Apr 21; cited 2024 July 1) Website, available from: <https://mitsloan.mit.edu/ideas-made-to-matter/machine-learning-explained>
3. Data Science & Artificial Intelligence: Unlocking new science insights (updated 2022 March; cited 2024 July 1). Website, available from: <https://www.astrazeneca.com/r-d/data-science-and-ai.html>
4. BenevolentAI and AstraZeneca collaboration yields continued success as further novel target progressed into portfolio (updated 2024 Jun 25; cited 2024 July 1). Website, available from: <https://www.benevolent.com/news-and-media/press-releases-and-in-media/benevolentai-and-astrazeneca-collaboration-yields-continued-success-further-novel-target-progressed-portfolio/>

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