



 *Market Minute*

THE COMING AI REVOLUTION IN HEALTH CARE

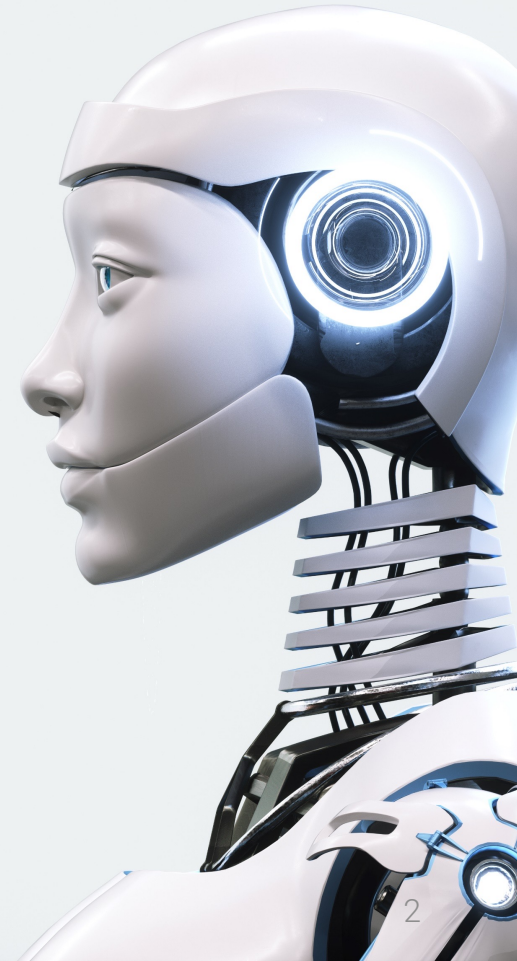


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Artificial intelligence (AI) has the potential to transform health care by improving the drug discovery process.

KEY TAKEAWAYS

- Artificial intelligence (AI) is increasingly impacting the health care sector, offering promising avenues for cost savings and enhanced patient outcomes.
- One key application for AI in health care is in the drug discovery process. The technology can help identify drug targets and treatments, as well as increase the likelihood of success of clinical trials.
- Research shows that savings from AI adoption could total as much as 10% of the \$4.7 trillion per year currently spent on health care in the U.S.¹



HOW CAN AI IMPROVE HEALTH CARE?

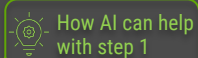
By improving the
drug discovery
process

By transforming
clinical trials

AI FOR EVERY STEP OF THE DRUG DISCOVERY PROCESS

1. Disease understanding

Researchers study the disease's biology and pathology to identify its underlying mechanisms and impacts.

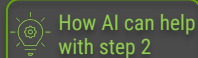


Trend recognition

AI can analyze large datasets to identify patterns and correlations in disease progression, patient demographics and response to treatments.

2. Target identification

Scientists pinpoint specific molecules or genes involved in the disease that new drugs can target.

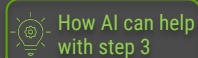


Predictive modeling

AI can analyze biological data and predict which molecules or genes are most likely to be effective targets for new drug development.

3. Target validation

The identified targets are rigorously tested to confirm their role in the disease and their potential for therapeutic intervention.

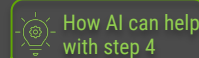


Biological simulation

AI can create models that mimic biological processes, allowing researchers to test and validate the effects of targeting specific molecules or genes.

4. Druggability determination

Researchers assess whether the validated targets can be effectively modulated by small molecules or biologics.

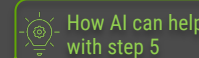


Inputs screening

AI can evaluate a vast array of chemical compounds to identify those most likely to interact effectively with validated targets.

5. Clinical trial confirmation

Potential drugs are tested in human trials to confirm their safety, efficacy and therapeutic benefit in treating the disease.



Patient categorization

AI can analyze patient data and group individuals based on specific characteristics, ensuring more accurate and efficient clinical trial design and outcomes.

AI CAN TRANSFORM CLINICAL TRIALS

Problem

- An estimated 90% of drugs fail during clinical trials.²
- Choosing a dosage that strikes the right balance between efficacy and toxicity is currently a formidable hurdle. AI can help define and model the optimal balance.

How AI Can Help

- Research databases containing vast troves of data, a prerequisite for applied AI, hold the potential for more advanced patient profiling and modeling.
- AI could also help select the clinical trial participants most likely to benefit from a particular treatment.



BREAKING THE DRUG DISCOVERY DOOM LOOP WITH AI

For half a century, increasing amounts of time, money and technology have led to *fewer* drugs approved per dollar spent on research.

Rather than improving exponentially like computing power, drug discovery per dollar has halved every nine years since 1950, according to data cited by BofA Global Research.

AI could break that “doom loop” cycle.

AI has the potential to transform health care, delivering better patient outcomes and positive financial results for the companies harnessing its benefits.

GLOSSARY & ENDNOTES

Clinical trials: In the health care industry, a clinical trial is a research study conducted with human participants to evaluate the safety, efficacy and side effects of medical interventions such as drugs, devices or procedures. These trials are crucial for determining whether new therapies or methods are effective and safe for widespread use. Clinical trials follow a structured protocol that outlines the study's objectives, methodology, participant criteria and data collection procedures.

¹ Nikhil R. Sahni and George Stein, et al., "The Potential Impact of Artificial Intelligence on Health Care Spending," National Bureau of Economic Research, January 2023; Peter G. Peterson Foundation, "Why the American Health Care System Underperforms," July 31, 2023.

² Duxin Sun, Wei Gao, Hongxiang Hu, and Simon Zhou, "Why 90% of Clinical Drug Development Fails and How to Improve It?" *Acta Pharmaceutica Sinica B* 12, No. 7 (July 2022): 3049-3062.

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