

How Does AI Support Value-Based Care Models?

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Abstract

Value-based care (VBC) is a healthcare delivery model where providers are paid based on patient health outcomes. This approach is a significant shift from th...

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Value-based care (VBC) is a healthcare delivery model where providers are paid based on patient health outcomes. This approach is a significant shift from the traditional fee-for-service model, which incentivizes quantity over quality. The goal of VBC is to improve the quality of care while reducing costs. In recent years, artificial intelligence (AI) has emerged as a powerful tool to support and enhance VBC models. AI can process vast amounts of data and identify patterns that can help providers make better decisions, leading to improved patient outcomes and lower costs. This article will explore how AI supports VBC models through three key mechanisms: agency, automation, and augmentation.

Agency: Empowering Patients and Providers

AI empowers both patients and providers by providing them with the tools and information they need to make better decisions. For patients, AI can improve health literacy by simplifying complex medical information and providing personalized educational materials. For example, AI-powered chatbots can answer patient questions and provide them with information about their condition in an easy-to-understand format [1]. This can help patients take a more active role in their own care, leading to better health outcomes. Furthermore, AI enables personalized care through remote monitoring and wearable technologies. Machine learning algorithms linked to wearable devices can track specific metrics such as home exercise compliance, daily step counts, and knee range of motion, providing objective data to guide individualized postoperative care [2].

For providers, AI can help them make more informed decisions by providing

them with real-time insights into patient health. For example, AI-powered remote monitoring tools can track patient vital signs and other health data, and alert providers to any potential problems. This can help providers intervene early and prevent more serious health problems from developing. By empowering both patients and providers, AI can help to improve the quality of care and reduce costs.

Automation: Streamlining Administrative and Clinical Processes

AI can also support VBC models by automating a wide range of administrative and clinical processes. This can free up providers to spend more time with patients and focus on providing high-quality care. For example, AI can automate tasks such as scheduling appointments, processing insurance claims, and managing medical records. This can save providers a significant amount of time and money, and it can also help to reduce errors. One study found that AI-driven scheduling systems reduced overtime rates by 21% while maintaining surgical volume, resulting in estimated cost savings of \$469,000 over three years [2].

In addition to automating administrative tasks, AI can also automate clinical processes such as analyzing medical images and identifying potential drug interactions. For example, AI-powered algorithms can analyze medical images such as X-rays and MRIs and identify abnormalities that may be missed by the human eye. A systematic review found that AI achieved near-perfect prediction for fracture detection across multiple anatomic sites, often outperforming both radiologists and orthopedic surgeons [2]. By automating both administrative and clinical processes, AI can help to improve the efficiency of care and reduce costs.

Augmentation: Enhancing Clinical Decision-Making

Finally, AI can support VBC models by augmenting the clinical decision-making process. AI-powered tools can provide providers with real-time insights and recommendations that can help them make better decisions. For example, AI-powered clinical decision support tools can analyze a patient's medical history and other data and provide providers with recommendations for the most effective treatment plan. Jayakumar et al. conducted a randomized trial evaluating an AI-enabled patient decision aid that incorporated digital patient education, preference assessment, and person-specific predictions of relevant health outcomes. The AI system significantly improved decision quality scores, level of shared decision making, improved patient-reported outcome measurements, and patient satisfaction compared to digital educational materials alone [2].

AI can also help providers to identify patients who are at high risk for developing certain conditions. For example, AI-powered predictive analytics tools can analyze a patient's electronic health record and other data and identify patients who are at high risk for developing conditions such as diabetes or heart disease. This can help providers to intervene early and prevent these conditions from developing. By augmenting the clinical decision-making process, AI can help to improve the quality of care and

reduce costs.

Challenges and the Future of AI in Value-Based Care

Despite the many benefits of AI in VBC, there are also a number of challenges that need to be addressed. These include the need for high-quality data, the risk of bias in AI algorithms, and the need for a clear regulatory framework [3]. Healthcare organizations face significant resistance to implementing AI technologies in orthopedic clinical settings. Studies have shown that healthcare professionals often lack a comprehensive understanding of AI principles and express concerns about the potential consequences of widespread clinical AI use [2]. However, as AI technology continues to develop, it is likely that these challenges will be overcome. In the future, AI is likely to play an even more important role in VBC, helping to improve the quality of care and reduce costs.

In conclusion, AI has the potential to revolutionize VBC by empowering patients and providers, automating administrative and clinical processes, and augmenting the clinical decision-making process. While there are still challenges to be addressed, the future of AI in VBC is bright. As AI technology continues to develop, it is likely to become an essential tool for providers who are committed to providing high-quality, value-based care.

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