

# The Role of AI in Enhancing Patient Care Coordination

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## ABSTRACT

Effective patient care coordination involves managing the complex journey of patients across multiple healthcare providers. However, traditional care coordination systems face challenges such as communication breakdowns, conflicting medical advice, and poor continuity of care. This paper examines the role of artificial intelligence (AI) in addressing these issues by enhancing decision-making, optimizing scheduling, and improving the coordination of care processes. AI-driven technologies offer significant opportunities to streamline care coordination, reduce human error, and improve patient outcomes. Despite these advancements, the implementation of AI also presents challenges, including biases, data privacy concerns, and ethical dilemmas. Future directions focus on AI's continued integration into healthcare systems to enhance patient care coordination while maintaining a balance between technology and human oversight.

**Keywords:** Artificial intelligence, patient care coordination, healthcare technology, decision support systems, scheduling optimization.

## INTRODUCTION

The delivery of effective health care is complicated. When patients receive medical care, they often visit various healthcare professionals—physicians, hospitals, nursing facilities, home care agencies, rehabilitation clinics, and many others. These services must be coordinated, which frequently is not the case. Patients often receive conflicting medical advice, medications that interact poorly with each other, duplicative medical tests, or other adverse outcomes. This is hardly surprising since patients move through the healthcare system in unexpected ways. In addition, there are an overwhelming number of healthcare professionals, and patients typically see more than one professional for a particular problem. These diverse physicians and healthcare providers often assume that other providers will take care of certain tasks. Faced with conflicting advice and the inability to follow through effectively on recommendations, it is no wonder that patients become frustrated and angry when seeking expert assistance for their medical problems [1, 2]. The goal of academic researchers in artificial intelligence and cardiology is to develop a computer program that helps patients switch healthcare providers, convinces providers to take action on behalf of patients, and tracks care over time. The focus is on the potential of computer programs to assist with care coordination and address problems stemming from system complexity and role ambiguity. This paper provides an overview of the current healthcare system, discusses people's attempts to use information for care coordination, explores the feasibility and challenges of computer programs in this context, and offers thoughts on the roles of programs and human agents in achieving effective care coordination [3].

### Understanding Patient Care Coordination

Patient care coordination encompasses the various actions taken by health care providers to facilitate the proper delivery of health care services. These actions center on the journey of a patient across the wider healthcare system, involving the shuffling through multiple healthcare providers and their respective needs. Care coordination is about being proactive, controlling that journey, keeping it on the right track, and providing the patient with a seamless experience across different providers, regardless of their background and context. It involves active communication and action-oriented toward controlling that journey. Each study is explicitly about caring for a specific group of patients while receiving specific services from multiple healthcare providers. The group of patients defines the context in which they are

cared for and is referred to as the patient cohort. Different patient cohorts often use different travel paths through the healthcare system and experience different issues when it comes to care coordination. Analyzing the patient cohort also helps understand the broader healthcare system used to care for them [4, 5]. Different types of care coordination issues can arise over time. Pre-emptive issues happen before the first service, while ongoing issues happen after. Understanding these issues helps improve care coordination. Patient care coordination evolves and becomes more complex as time goes on. If providers don't navigate patient cohorts across providers, coordination problems may occur. External events like mutations or economic downturns can change treatment pathways. Monitoring post-operation is crucial to avoid problems. Current research focuses on patient experience, not providers [6].

### **AI Technologies in Healthcare**

The application of artificial intelligence (AI) technologies has steadily grown in healthcare systems over the past decade. New advanced AI technologies that potentially improve patient outcomes are being implemented by hospitals. Hospitals increasingly adopt and experiment with AI technologies, making them an inevitable part of care delivery. Growing attention has been paid to AI technologies' influence on healthcare personnel's work and expectations. Research shows mixed results regarding AI technologies' perceived impact, ranging from task enhancement and facilitation with positive features to a perceived feeling of threat and deskilling. To investigate the role of AI technologies in enhancing patient care coordination in healthcare systems, an exploratory and explanatory qualitative case study is conducted involving AI technology enhancing patient care coordination. The healthcare system consists of hospitals, clinics, and specialized clinics, with the largest healthcare provider in the Nordic countries providing care to over a million patients each year and conducting almost a million five hundred thousand hospital visits annually. Staff within patient care coordination at several hospitals participate. AI technology views patient care coordination as a combined action of allocating the suitable care process and scheduling the needed care actions within the process while simultaneously considering multiple demanding requirements. AI technologies are perceived as benefitting scheduling decisions by enhancing the correctness and efficiency of care process allocation decisions, reducing the number of scheduling decisions needed, and enhancing the speed of the scheduling decisions. AI technologies are by no means perceived to substitute human actions within care process allocation. However, as AI technologies take over decision-making burdens from care process allocation and scheduling actions, there is a visible need to adapt the organization of work to ensure better cooperation and communication between care process allocation, scheduling, and patient care personnel [7, 8].

### **Applications of AI in Patient Care Coordination**

Artificial Intelligence (AI) is vital for coordinating patient care and improving quality. AI algorithms analyze complex data from patients, physicians, and the care delivery system. However, using these technologies brings challenges like data privacy and integration with IT systems. AI helps in population health management, care delivery, product development, and patient engagement. AI analyzes complex data, improving care delivery and engaging with patients. It designs evidence-based treatment pathways and proposes optimal treatment decisions to ensure quality and cost efficiency. This reduces the risk of adverse events and ensures patients receive appropriate treatments [9, 10]. AI algorithms analyze patient data in trials and propose eligibility criteria based on data points. They consider factors like drug interactions and co-morbidities. This reduces the risk of rejecting eligibility due to missing data. AI agents help patients make treatment choices by analyzing risks and explaining them based on patients' values. Natural language processing allows for dialogue with care coordinators. AI assists state health coordinators in assessing preventive actions and empowers care coordination personnel and patients to use advanced technologies without expertise [11].

### **Challenges and Ethical Considerations**

As with any new technology, there are challenges to overcome and concerns to be considered with the use of AI in healthcare. For one, biases may inadvertently be introduced through AI's design and learning processes. This may lead an algorithm to make assumptions about what a correct action is based on its past exposure to only a narrow set of information or experience. For example, an AI algorithm trained only on the cases it is exposed to may learn to neglect or overlook rare diseases or equally-important risk factors not included in its training data. There are ethical concerns surrounding bias and discrimination, as AI may inadvertently contribute to discriminatory practices that prioritize costs or other factors over the best-suited care for each patient. Accountability for actions becomes complex once AI systems are involved, raising questions like, "If an AI incorrectly recommends treatment A for patient B, should the AI developer or the overriding physician be held responsible?" The use of AI raises concerns about whether decisions that impact health should be automated at all [12, 13]. Privacy and security of patient data is a significant concern. Data breaches have increased, with cyberattacks in healthcare more

prevalent than other industries. Attacks on healthcare systems will only grow in sophistication and frequency, raising concerns about future security. Companies may trade patient privacy for security by sharing data with other companies or limiting access to information. AI systems require third-party access to communicate or direct access to databases. Stakeholders with access to patient data have power over it, raising concerns about data use, enforcement of agreements, and ownership. Regulatory concerns include compliance with data safeguarding regulations like HIPAA. Technical challenges include developing optimal AI models for assistive user interfaces that minimize false positives and unwanted cognitive burdens [14].

### Future Directions and Opportunities

AI's integration into healthcare systems has enhanced patient care coordination through various means. Current uses include assisting patients in finding medical records, identifying those who need care coordination services, and providing clinical decision support. AI technology has improved systems by detecting abnormalities in images and screening for future care coordination needs. There are also potential AI use cases that could further enhance patient care coordination, such as advanced natural language processing AI for phone calls and remote monitoring of all patients through risk coding. Integrating AI into all care coordination departments could improve workflows and accelerate processes [15, 16]. AI technology and software systems can revolutionize healthcare systems, particularly patient care coordination departments. They can identify patients who would benefit from care coordination services, facilitate smooth transitions, coordinate care for high-risk patients, and detect eroded patient-provider relationships. However, there are implications of using AI technology and software systems in patient care coordination and the healthcare system. The training model behind these systems requires access to sensitive health information and supervision by educated professionals to prevent exploitation. Some patients may object to AI involvement in their care, raising ethical concerns. There are also potential risks to care coordination staff jobs and reliance on AI for clinical and administrative tasks. Companies developing AI technology for patient care coordination must ensure user-friendly systems that do not burden staff with extra tasks. They should also have a clear purpose and goal for training models and risk coding studies to exceed current possibilities through careful planning and research [17].

### CONCLUSION

AI offers transformative potential for enhancing patient care coordination by optimizing decision-making, improving communication across care teams, and reducing administrative burdens. By streamlining care processes and offering data-driven insights, AI can mitigate the complexities of patient care in multi-provider environments, ensuring timely and effective interventions. However, integrating AI in healthcare also raises ethical and practical concerns, particularly regarding data privacy, potential biases, and the role of human oversight. To fully realize AI's benefits, it is essential to address these challenges through comprehensive regulatory frameworks and continuous collaboration between technology developers and healthcare professionals. As AI continues to evolve, its role in patient care coordination will become increasingly indispensable, reshaping the future of healthcare delivery.

### REFERENCES

1. Ilardo ML, Speciale A. The community pharmacist: perceived barriers and patient-centered care communication. *International journal of environmental research and public health*. 2020 Jan;17(2):536. [mdpi.com](https://doi.org/10.3390/ijerph17020536)
2. Davis CM, Musolino GM. *Patient practitioner interaction: An experiential manual for developing the art of health care*. Taylor & Francis; 2024 Jun 1.
3. Benzaid C, Taleb T. AI-driven zero-touch network and service management in 5G and beyond: Challenges and research directions. *Ieee Network*. 2020 Feb 12;34(2):186-94.
4. World Health Organization. *Global patient safety action plan 2021-2030: towards eliminating avoidable harm in health care*. World Health Organization; 2021 Aug 3.
5. Kelly JT, Campbell KL, Gong E, Scuffham P. The Internet of Things: Impact and implications for health care delivery. *Journal of medical Internet research*. 2020 Nov 10;22(11): e20135. [jmir.org](https://doi.org/10.2196/20135)
6. Bolton R, Logan C, Gittel JH. Revisiting relational coordination: a systematic review. *The Journal of Applied Behavioral Science*. 2021 Sep;57(3):290-322. [brandeis.edu](https://doi.org/10.1080/00218758.2021.1991111)
7. Abbasi N, Nizamullah FN, Zeb S. AI in Healthcare: Integrating Advanced Technologies with Traditional Practices for Enhanced Patient Care. *BULLET: Jurnal Multidisiplin Ilmu*. 2023 Jun 13;2(3):546-56. [mediapublikasi.id](https://doi.org/10.30605/bullet.v2i3.546-56)

8. Lee D, Yoon SN. Application of artificial intelligence-based technologies in the healthcare industry: Opportunities and challenges. *International journal of environmental research and public health*. 2021 Jan;18(1):271. [mdpi.com](https://doi.org/10.3390/ijerph18010271)
9. Hazarika I. Artificial intelligence: opportunities and implications for the health workforce. *International health*. 2020 Jul;12(4):241-5.
10. Giordano C, Brennan M, Mohamed B, Rashidi P, Modave F, Tighe P. Accessing artificial intelligence for clinical decision-making. *Frontiers in digital health*. 2021 Jun 25;3:645232. [frontiersin.org](https://doi.org/10.3389/fdigh.2021.645232)
11. Rivera SC, Liu X, Chan AW, Denniston AK, Calvert MJ, Ashrafian H, Beam AL, Collins GS, Darzi A, Deeks JJ, ElZarrad MK. Guidelines for clinical trial protocols for interventions involving artificial intelligence: the SPIRIT-AI extension. *The Lancet Digital Health*. 2020 Oct 1;2(10):e549-60. [thelancet.com](https://doi.org/10.1016/S2652-302X(20)30050-9)
12. Varona D, Suárez JL. Discrimination, bias, fairness, and trustworthy AI. *Applied Sciences*. 2022 Jun 8;12(12):5826.
13. Baker RS, Hawn A. Algorithmic bias in education. *International Journal of Artificial Intelligence in Education*. 2022 Dec:1-41.
14. Seh AH, Zarour M, Alenezi M, Sarkar AK, Agrawal A, Kumar R, Ahmad Khan R. Healthcare data breaches: insights and implications. *InHealthcare* 2020 May 13 (Vol. 8, No. 2, p. 133). MDPI. [mdpi.com](https://doi.org/10.3390/healthcare8020133)
15. Jabarulla MY, Lee HN. A blockchain and artificial intelligence-based, patient-centric healthcare system for combating the COVID-19 pandemic: Opportunities and applications. *InHealthcare* 2021 Aug 8 (Vol. 9, No. 8, p. 1019). Mdpi.
16. Mulukuntla S, Pamulaparthivenkata S. Realizing the Potential of AI in Improving Health Outcomes: Strategies for Effective Implementation. *ESP Journal of Engineering and Technology Advancements*. 2022;2(3):32-40. [espjeta.org](https://doi.org/10.30659/espjeta.2022.2.3.32-40)
17. Ahmed Z, Mohamed K, Zeeshan S, Dong X. Artificial intelligence with multi-functional machine learning platform development for better healthcare and precision medicine. *Database*. 2020;2020:baaa010.