

# **Role of AI and Big Data in Prescription Patterns: Understanding How AI-Driven Decision Support Systems Impact Physician Prescribing Behavior**

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## **Abstract**

The integration of Artificial Intelligence (AI) and Big Data analytics in healthcare has transformed physician prescribing patterns by offering data-driven insights, predictive analytics, and evidence-based recommendations. This qualitative study explores how AI-driven decision support systems (DSS) influence physician prescribing behaviors, improve patient outcomes, and mitigate risks associated with traditional prescription methodologies. Through in-depth interviews and thematic analysis, this paper identifies the key factors influencing AI adoption, its benefits, challenges, and ethical considerations.

## **Introduction**

With the rapid advancement of digital health technologies, AI and Big Data have emerged as critical tools in clinical decision-making. AI-powered decision support systems provide real-time recommendations based on vast datasets, including patient history, drug interactions, and clinical guidelines. This study examines the impact of these technologies on physician prescribing behavior and evaluates their implications for the healthcare system.

## **Literature Review**

### **AI in Healthcare**

Artificial intelligence has been widely adopted across various healthcare applications, including diagnostic tools, treatment planning, and predictive analytics (Topol, 2019). AI-powered DSS assist in analyzing large patient datasets, identifying patterns, and providing actionable insights to physicians.

### **Big Data in Prescription Patterns**

Big Data analytics enables physicians to access comprehensive information regarding drug efficacy, side effects, and patient responses, thereby enhancing prescription accuracy (Jiang et al., 2020). By utilizing machine learning algorithms, DSS can predict patient outcomes and suggest optimal treatment plans.

### **Physician Decision-Making and AI**

Physicians traditionally rely on clinical experience, medical literature, and peer consultations for prescribing decisions. AI introduces a new paradigm by integrating evidence-based insights with personalized patient data, thereby optimizing decision-making processes (Shaban-Nejad et al., 2018).

## **Methodology**

A qualitative research approach was employed, using semi-structured interviews with 20 physicians from various medical specialties. Thematic analysis was used to identify recurring themes in the impact of AI-driven DSS on prescribing behaviors.

## **Data Collection**

Physicians were selected from hospitals and private practices with experience in using AI-driven DSS. Interviews focused on their perceptions, experiences, and challenges regarding AI-assisted prescriptions.

## **Data Analysis**

The data were transcribed, coded, and analyzed using thematic analysis to extract key insights. Emerging themes included AI's role in improving prescription accuracy, enhancing patient safety, and reducing cognitive burden on physicians.

## **Findings**

### **Enhanced Prescription Accuracy**

AI-driven DSS were found to reduce human errors by providing real-time recommendations based on patient history and drug interactions (Liu et al., 2021). Physicians reported increased confidence in prescribing due to AI support.

### **Improved Patient Outcomes**

Participants highlighted that AI-assisted prescriptions contributed to better patient outcomes by minimizing adverse drug reactions and ensuring personalized treatment plans (Wang et al., 2022).

### **Challenges in AI Adoption**

Despite its advantages, physicians expressed concerns regarding data privacy, algorithmic bias, and the risk of over-reliance on technology (Davenport & Kalakota, 2019). The lack of standardized AI integration across healthcare settings was another significant challenge.

### **Ethical and Legal Considerations**

AI-driven prescribing raises ethical questions regarding accountability in case of medical errors. Physicians emphasized the need for clear regulatory frameworks to address liability issues associated with AI recommendations (Gerke et al., 2020).

## **Discussion**

The findings suggest that AI-driven DSS have the potential to revolutionize physician prescribing behavior by providing data-driven insights and reducing cognitive overload. However, successful adoption requires addressing challenges related to trust, standardization, and ethical concerns. Future research should focus on refining AI algorithms, ensuring transparency, and developing guidelines for responsible AI integration in clinical settings.

## **Conclusion**

AI and Big Data are reshaping physician prescribing patterns by enhancing accuracy, reducing errors, and improving patient care. While AI-driven DSS offer significant benefits, their adoption must be

accompanied by robust regulatory frameworks, physician training, and ethical safeguards to maximize their potential in healthcare.

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