# A SYSTEMATIC LITERATURE REVIEW OF ARTIFICIAL INTELLIGENCE IN HEALTH CARE FROM 2017-2025

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**Abstract**
*Artificial Intelligence (AI) is revolutionizing health care by improving diagnostics, optimizing clinical operations, and personalizing treatment. From 2017 to 2025, significant advancements have been made in AI technologies across medical imaging, drug discovery, remote monitoring, and health care administration. This review explores these developments, identifies challenges, and provides a future outlook, emphasizing ethical considerations and regulatory frameworks. The findings underscore the critical need for responsible and equitable AI integration.*
***Keywords:*** *Artificial Intelligence (AI), Health Care Medical Imaging, Remote Patient Monitoring (RPM), AI in Diagnostics, Clinical Decision Support, Drug Discovery*

## 1. Introduction

AI's integration into health care is driven by the rise of data availability, computing power, and algorithmic innovation. It supports clinicians in decision-making, enhances hospital operations, and accelerates biomedical research. This paper reviews AI applications and implications in health care from 2017 to 2025, drawing from peer-reviewed studies and industry developments [1]–[3].

## 2. Applications of AI in Health Care

### 2.1 Diagnostics and Medical Imaging

AI-based image analysis has achieved expert-level performance in identifying diabetic retinopathy, pneumonia, and cancers. For example, Aidoc's computer vision systems reached sensitivities of 93–95% for conditions like pulmonary embolism and intracranial hemorrhage [1], [4].

Robotic surgical systems, enhanced by AI, such as the da Vinci platform, have improved clinical outcomes, including a 25% reduction in positive surgical margins [5].

### 2.2 Drug Discovery and Personalized Medicine

AI accelerates drug discovery through deep learning models that predict drug-target interactions and optimize compound structures [6]. Insitro exemplifies how machine learning bridges experimental biology and computational modeling to expedite drug development.

AI was also central in initiatives like the Alzheimer's Insights AI Prize, which encourages AI-driven insights from clinical data.

### 2.3 Remote Monitoring and Virtual Assistants

AI-based remote patient monitoring (RPM) uses wearable devices and federated learning to detect early signs of deterioration in chronic patients. Automated medical scribes have significantly reduced clinician burnout by handling documentation tasks.

Mental health AI chatbots like Wysa and Youper offer scalable emotional support, though human oversight remains vital.

### 2.4 Operations and Administrative Efficiency

AI streamlines hospital operations, optimizing scheduling, admissions, and resource allocation. AI has been credited with improving diagnostic accuracy by 9–11% and patient monitoring effectiveness by up to 20% between 2021 and 2024.

However, full-scale economic evaluations of AI tools remain limited, with only 29 rigorous studies published between 2017 and 2023 [7][8].

## 3. Ethical, Legal, and Social Issues

### 3.1 Bias and Fairness

AI systems can perpetuate health disparities due to training on biased datasets. Studies recommend fairness-aware learning frameworks to mitigate algorithmic inequities [9]–[11].

### 3.2 Privacy and Security

Healthcare AI systems often involve sensitive patient data. Privacy-preserving machine learning (PPML) and federated learning are critical in maintaining data confidentiality [12], [13].

### 3.3 Explain ability and Transparency

"Black-box" models lack transparency, posing a major barrier to clinician trust. Explainable AI (XAI) techniques and open-source frameworks are proposed to address this issue [14].

### 3.4 Regulation

Regulatory bodies like the FDA and EMA are formulating AI-specific frameworks for medical devices. Post-market surveillance and performance validation are essential [5].

## 4. Challenges to Adoption

1. **Technical limitations**: Generalizability issues, lack of diverse datasets, and interpretability concerns hinder widespread adoption [4], [9].
2. **Economic evaluations**: The absence of standardized economic analysis limits policymaking [8].
3. **Workflow disruption**: Integration with existing health systems requires clinician training and cultural adaptation [13].
4. **Skill degradation**: A recent study warns that overreliance on AI may degrade tumor diagnostic accuracy by up to 20%.
5. **Misuse of general-purpose AI**: Applying non-medical AI tools in clinical settings risks errors and misinformation.
6. **Government AI failures**: Implementation failures in regulatory agencies illustrate risks of premature deployment.

## 5. Future Prospects

AI's future in health care includes the following directions:

- **Federated Learning**: Enables privacy-compliant, multi-institutional model training.
- **Explainable AI (XAI)**: Improves interpretability and clinical adoption.
- **Hybrid Human-AI Decision Systems**: Balance algorithmic precision with human judgment.
- **Global Regulatory Alignment**: Promotes standardized, safe AI deployment.
- **AI-Powered Drug Innovation**: Expected to reduce development time significantly.

## 6. Conclusion

Between 2017 and 2025, AI has evolved from experimental tools to critical healthcare components. While benefits in diagnostics, drug development, and operations are evident, systemic challenges in ethics, regulation, and adoption remain. Collaborative, transparent, and human-centered approaches are essential to fully realize AI's promise in health care.

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