

5. Use Of AI In Healthcare - HEALTH / SCIENCE & TECH

A professional agency has revealed that regulated data, including patient records and medical information, is especially at risk, accounting for 89% of all data policy violations occurring in the area of generative AI usage

Artificial Intelligence (AI) is rapidly transforming healthcare systems worldwide by improving diagnostic accuracy, enhancing clinical decision-making, and accelerating medical research. In India, the integration of AI into healthcare has the potential to address critical challenges such as shortage of medical professionals, uneven healthcare access, and rising disease burdens. However, the use of AI also raises concerns related to data privacy, cybersecurity, ethics, and regulatory oversight.

1. Role and Applications of AI in Healthcare

Disease Diagnosis and Medical Imaging

1. AI systems can analyse large volumes of medical images such as X-rays, CT scans, and MRIs to detect abnormalities with high precision.
2. AI-powered diagnostic tools help identify diseases such as cancer, tuberculosis, diabetic retinopathy, and cardiovascular conditions at early stages.
3. Machine learning algorithms continuously improve diagnostic performance as they process more medical data.

Clinical Decision Support

1. AI-based decision-support systems assist doctors in interpreting complex medical data and recommending treatment options.
2. These systems analyse patient history, lab results, and clinical guidelines to support evidence-based decision-making.
3. AI reduces the risk of diagnostic errors and improves the consistency of medical care.

Hospital Administration and Workflow Management

1. AI automates routine administrative tasks such as appointment scheduling, billing, electronic health record management, and documentation.
2. Hospitals can optimise bed allocation, staff scheduling, and resource utilisation through AI-driven analytics.
3. This increases efficiency and allows healthcare professionals to devote more time to patient care.

Drug Discovery and Medical Research

1. AI accelerates the drug discovery process by analysing large biological datasets and identifying potential drug molecules.
2. It reduces the time required for clinical trials and pharmaceutical development, lowering costs for the healthcare industry.
3. AI also helps researchers analyse genetic and molecular data to identify new therapeutic targets.

Personalised Medicine

1. AI can analyse genomic data, lifestyle factors, and medical history to create personalised treatment plans.
2. Precision medicine allows doctors to design therapies tailored to the individual characteristics of each patient.
3. This approach improves treatment effectiveness and reduces adverse drug reactions.

2. Public Health Surveillance and Disease Prediction

1. AI can analyse large-scale health data to detect patterns of disease outbreaks and epidemiological trends.
2. Governments and health agencies use AI models to predict epidemics, monitor disease spread, and plan public health interventions.
3. AI also supports vaccination planning and healthcare resource allocation.

Expanding Healthcare Accessibility

1. AI-powered telemedicine platforms, virtual health assistants, and chatbots can deliver medical guidance to patients in remote areas.
2. This is particularly relevant for India where rural regions often face shortages of doctors and specialists.
3. AI tools can assist frontline healthcare workers in primary health centres.

2. Indian Council of Medical Research (ICMR) Priorities for AI in Healthcare

Collating High-Quality Health Data

1. Reliable AI systems require large volumes of high-quality and standardised medical data.
2. ICMR emphasises the need to integrate datasets from hospitals, research institutions, and public health programs.

Strengthening Public-Private Partnerships

1. Collaboration with the technology sector, startups, and private healthcare providers is essential for developing scalable AI solutions.
2. Partnerships can help translate research innovations into real-world applications.

Generating Real-World Evidence- ICMR's network of institutes can generate clinical evidence on the effectiveness of AI tools in real healthcare settings. Real-world validation ensures that AI systems remain safe, reliable, and effective.

Building an AI-Ready Healthcare Workforce

1. There is a need to integrate health professionals, data scientists, and AI experts into a common workforce ecosystem.
2. Medical professionals must receive training in AI-based tools and digital health technologies.

3. Core Ethical Principles for AI in Health

Although the principles may vary across frameworks, six widely recognised principles guide responsible AI use in healthcare -

1. **Safety and Effectiveness** - AI systems must be clinically validated and reliable.
2. **Transparency and Explainability** - AI algorithms should be interpretable and understandable to medical professionals.
3. **Privacy and Data Protection** - Patient data must be protected through strong security frameworks.
4. **Accountability** - Healthcare institutions must remain accountable for decisions influenced by AI.
5. **Fairness and Non-discrimination** - AI systems must avoid biases that may disadvantage certain populations.
6. **Human Oversight** - AI should assist healthcare professionals rather than replace human medical judgment.

4. Arguments in Favour of AI in Healthcare

Improved Diagnostic Accuracy

1. AI can analyse vast medical datasets far faster than humans.
2. This allows earlier detection of diseases and improved diagnostic precision.

Enhanced Efficiency

1. Automation of administrative and analytical tasks reduces the workload of healthcare professionals.
2. This improves hospital efficiency and patient service delivery.

Personalised Treatment

1. AI enables precision medicine, allowing treatments tailored to individual patients.
2. This leads to better health outcomes and more effective therapies.

Early Disease Prediction

1. AI models can identify risk factors and patterns that signal potential health problems.
2. Preventive healthcare becomes more effective through early interventions.

Faster Drug Development

1. AI significantly reduces the time required to identify drug candidates and analyse clinical trial data.

2. This accelerates the availability of new medicines.

Improved Healthcare Access

1. AI-powered telemedicine platforms enable healthcare services in rural and underserved regions.
2. Digital tools also support community health workers in delivering basic medical services.

5. Concerns and Challenges in AI-based Healthcare

Risk of Data Leakage

1. Healthcare workers may inadvertently include patient details in AI prompts or uploaded documents, exposing sensitive data.
2. Generative AI tools often process data on external servers, raising confidentiality concerns.

Use of Personal AI Accounts

1. Employees may use personal AI tools or cloud services instead of secure institutional platforms.
2. This increases the risk of unauthorised data sharing and security breaches.

Cybersecurity Threats

1. Healthcare institutions are frequent targets of cyberattacks and ransomware incidents.
2. Increased digitalisation expands the attack surface for cybercriminals.

Lack of Awareness and Training

1. Many healthcare professionals lack adequate training in data security and AI usage protocols.
2. This increases the likelihood of accidental data exposure.

Ethical and Regulatory Challenges

1. AI systems may create algorithmic biases if trained on incomplete or unrepresentative datasets.
2. Data breaches could violate medical confidentiality and data protection laws.
3. Ethical concerns also arise regarding accountability for AI-assisted medical decisions.

6. India's Policy Framework for AI in Healthcare

Strategy for AI in Healthcare for India (SAHI)

1. SAHI functions as a national framework for integrating AI into healthcare services.
2. It provides policy recommendations for developing, testing, and deploying AI solutions in the health sector.
3. The strategy focuses on scalability, affordability, and ethical governance of AI systems.

BODH – Benchmarking Open Data Platform for Health AI

1. BODH is a benchmarking platform designed to test and validate AI solutions for healthcare.
2. It ensures that AI systems meet quality and reliability standards before large-scale deployment.
3. The platform was developed by Indian Institute of Technology Kanpur in collaboration with the National Health Authority.

Integration with Digital Health Ecosystem

1. AI-based healthcare initiatives align with India's broader digital health ecosystem, including electronic health records and digital public health infrastructure.
2. This integration helps create data-driven healthcare systems capable of improving service delivery and health outcomes.

Conclusion

Artificial Intelligence holds transformative potential for improving healthcare delivery, disease diagnosis, and medical research in India. By enhancing efficiency, enabling personalised medicine, and expanding access to healthcare services, AI can significantly strengthen the country's health system. However, effective governance frameworks, strong cybersecurity measures, ethical safeguards, and capacity-building initiatives are essential to ensure that AI is deployed responsibly and benefits all sections of society.

Source - <https://www.thehindu.com/sci-tech/health/healthcare-workers-use-of-genai-platforms-might-risk-leaks-of-sensitive-patient-data-study/article70699644.ece>