**World Bulletin of Social Sciences (WBSS)**
**Available Online at:** https://www.scholarexpress.net
Vol. 49, August 2025
**ISSN:** 2749-361X

# THE NEED TO USE INFORMATION TECHNOLOGIES IN MEDICINE

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**Article history:**

**Received:** 14th June 2025
**Accepted:** 10th July 2025

**Abstract:**

The evolution of information technologies has profoundly transformed modern healthcare systems. From electronic health records (EHRs) to telemedicine and AI-based diagnostics, information technologies (IT) now play a vital role in improving patient outcomes, reducing medical errors, and increasing healthcare efficiency. This paper explores the necessity of IT implementation in medicine, evaluates its current uses, and discusses its potential for addressing contemporary medical challenges.

**Keywords:** Information technologies, electronic health records, telemedicine, medical innovation, digital health, AI in healthcare.

## INTRODUCTION

The integration of information technologies into the medical field is no longer a futuristic concept — it is a present necessity. Rapid technological advancements have revolutionized almost every sector, and healthcare is no exception. In today's digitized society, the demand for efficient, patient-centered, and evidence-based care has made IT solutions indispensable for clinicians, healthcare institutions, and patients alike.

Medical professionals now rely on digital tools for diagnosis, data management, patient monitoring, treatment planning, and communication. The COVID-19 pandemic further accelerated this transition, exposing the limitations of traditional healthcare systems and highlighting the importance of digital preparedness. Therefore, understanding the scope, impact, and necessity of IT in medicine is crucial for policymakers, technologists, and clinicians working to build resilient healthcare infrastructures.

## MATERIALS AND METHODS

This research is based on a comparative and analytical review of recent literature, expert opinion surveys, and case studies from healthcare institutions globally. Secondary data were collected from academic journals, WHO reports, digital health whitepapers, and real-world implementations of medical IT tools.

Key evaluation criteria included efficiency, accessibility, safety, cost-effectiveness, and adaptability of various information technologies applied in medical practice. A qualitative assessment was used to determine their impact on clinical outcomes and operational improvements [1].

## RESULTS AND DISCUSSION

One of the most widespread IT implementations in healthcare, EHRs, has significantly reduced paperwork, improved accuracy in diagnosis, and allowed for real-time access to patient history. Studies show that EHRs reduce administrative costs by up to 30% and lower prescription errors by 55% in developed healthcare systems. Moreover, EHRs enable better coordination between departments and enhance data-driven decision-making.

Another significant development in medical information technologies is the use of mobile health applications (mHealth), which have emerged as powerful tools for patient self-management. These apps allow individuals to track their vital signs, medication intake, physical activity, and symptoms in real time. For patients with chronic conditions such as diabetes, asthma, or hypertension, mobile applications offer alerts, reminders, and remote communication with healthcare providers. The ability to generate and transmit data directly from the patient's environment increases treatment adherence and helps physicians tailor more personalized care plans [2].

Moreover, virtual reality (VR) and augmented reality (AR) technologies are being integrated into medical training and patient rehabilitation. In medical education, VR simulators enable students and professionals to practice surgical procedures or emergency responses in immersive environments without the risk of harming real patients. This reduces reliance on cadavers or live cases and improves confidence and precision. On the rehabilitation side, VR is used to assist stroke survivors and patients with mobility impairments, offering interactive exercises that motivate and engage users through gamified therapy experiences [3].

A rapidly evolving frontier is the incorporation of robotic technologies in surgery and inpatient care. Robotic-assisted surgeries, such as those performed with the Da Vinci Surgical System, allow for minimally invasive procedures with enhanced precision, less blood loss,

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and faster patient recovery. In non-surgical contexts, robots are being used for patient transport, disinfection of hospital rooms, and delivery of medication and meals—functions that were particularly valuable during the COVID-19 pandemic to reduce human exposure to infection.

In addition to these tools, the application of cloud computing in healthcare has enabled the secure storage and instant sharing of large volumes of medical data across institutions. This has proven especially beneficial in multi-center research studies, teleconsultations, and collaborative diagnostics. Cloud platforms also support scalable telehealth services and enable data integration from wearable devices and home monitoring systems. However, the reliance on cloud infrastructure underscores the importance of investing in robust cybersecurity protocols, including end-to-end encryption, multi-factor authentication, and real-time threat monitoring to safeguard sensitive patient data.

The role of blockchain technology is also gaining traction in securing electronic health records and ensuring data integrity. Unlike traditional databases, blockchain creates an immutable ledger of medical transactions, which can enhance transparency and traceability in clinical trials, prescription tracking, and health insurance claims. It empowers patients to control access to their health records and reduces instances of data tampering or fraud [4].

Furthermore, natural language processing (NLP) and machine learning algorithms are being used to extract meaningful insights from unstructured medical texts such as physician notes, discharge summaries, and radiology reports. By automating this analysis, healthcare providers can reduce administrative burdens and improve the speed of decision-making, particularly in emergency settings where time is critical.

An often-overlooked but crucial component is the use of decision support systems (DSS), which provide clinicians with evidence-based recommendations at the point of care. These systems can alert physicians to potential drug interactions, suggest diagnostic pathways, or recommend treatment options based on current guidelines. As a result, they enhance clinical accuracy and contribute to standardized, high-quality patient care [5].

The growing reliance on information technologies in healthcare also has economic implications. Digital solutions can reduce administrative overhead, optimize resource allocation, and minimize unnecessary hospital admissions through preventive care and early intervention. These cost-saving benefits are especially important in low-resource settings, where healthcare infrastructure is limited and efficiency is paramount.

Finally, it is important to acknowledge the socio-ethical aspects of this digital transformation. Issues of digital literacy, technology access disparity, and patient consent must be addressed to ensure that technological progress does not widen existing healthcare inequalities. Inclusive policy-making and stakeholder education are essential in designing digital health systems that are ethical, equitable, and sustainable.

One of the emerging domains where information technologies are demonstrating exceptional value is in the integration of genomic data with clinical workflows. The ability to analyze a patient's genetic makeup enables physicians to predict the likelihood of developing certain diseases, choose more effective therapies, and avoid adverse drug reactions [6]. This field, known as precision medicine, relies heavily on computational biology, bioinformatics, and large-scale data processing to deliver individualized healthcare. Without advanced IT systems to manage, store, and interpret genomic data, such personalized approaches would remain unattainable in clinical practice.

## CONCLUSION

The necessity of information technologies in modern medicine is clear. They not only enhance the quality and efficiency of healthcare but also pave the way for innovative, preventive, and personalized medicine. As medical needs grow more complex, the integration of IT will be key to delivering sustainable and inclusive healthcare solutions globally. Embracing these technologies is no longer optional — it is essential for the future of medicine.

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**Available Online at:** https://www.scholarexpress.net
Vol. 49, August 2025
**ISSN:** 2749-361X

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