

Healthcare trends: Disruptions and Innovation

A Primer

Healthcare transforms with a focus on accessibility, prioritizing IT, the global market is projected at USD 975 billion by 2027. AI and machine learning, expected in 90% of US hospitals by 2025, streamline chronic condition diagnoses. Emerging technologies drive change, influencing preventive and home care in the healthcare landscape.

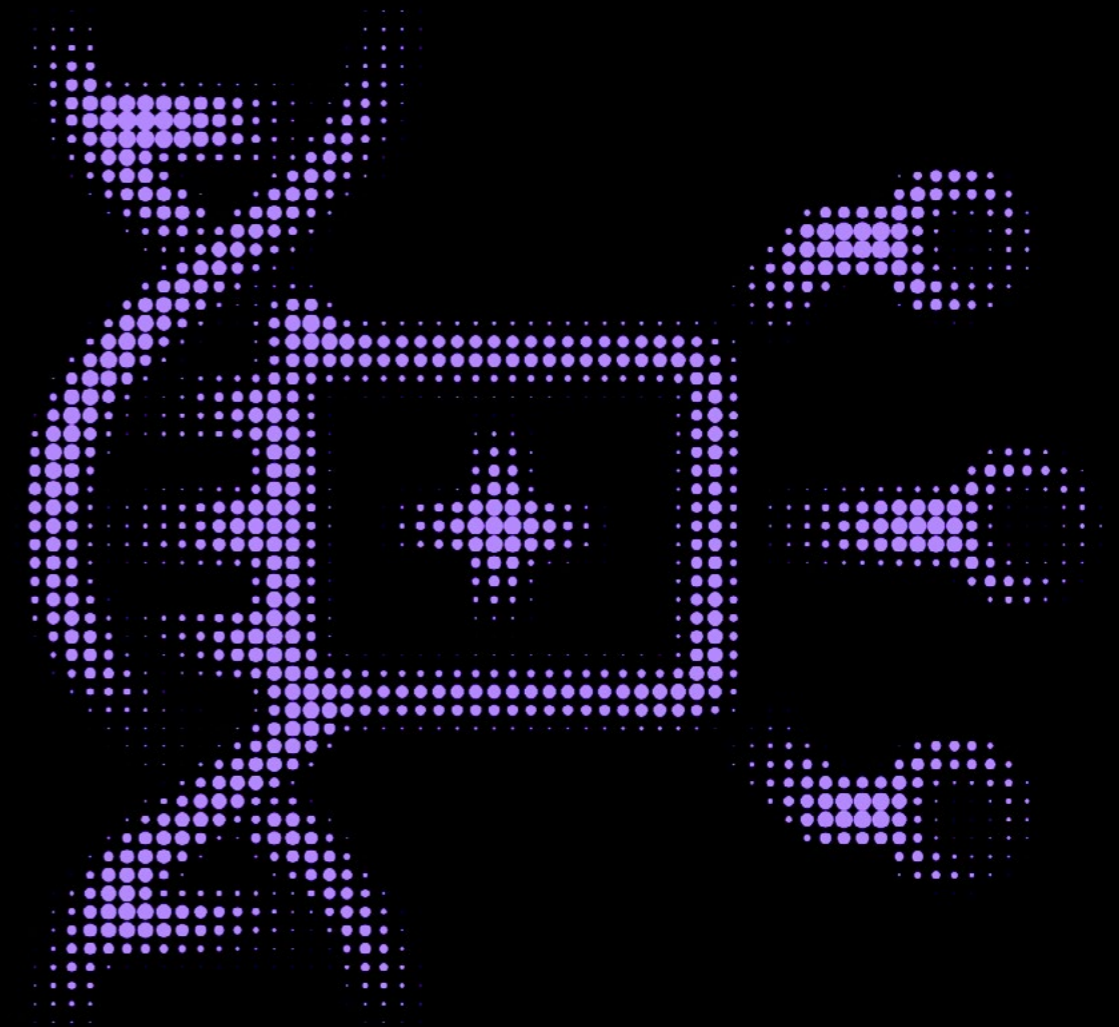
WHAT'S INSIDE!

1 Key Takeaways

2 Key drivers shaping trends in healthcare

3 Business Trends driving innovation

4 Technology Trends aiding the business



Key takeaways

- 1 Healthcare IT is a top priority of providers**
For nearly 80% of healthcare providers, healthcare IT is one of the top 5 strategic priorities, and the key areas for investment in software over the next few years include revenue cycle management (RCM), security and privacy, patient intake/flow, clinical systems, and telehealth¹.
- 2 AI, ML and IoMT in healthcare are rapidly developing**
Technologies like AI, IoMT, and Machine Learning are expected to be used in 90% of US hospitals by 2025 to allow rapid diagnosis of chronic conditions². The value of IoMT solutions has increased in the last five years – from heart monitors to mass-market solutions that monitor physical activity; consumer awareness has grown significantly⁴.
- 3 The exponential rise of healthcare apps**
The global mHealth apps market growth is primarily driven by the increasing adoption of fitness and medical apps to collect and track health-related data, improve patient health,

The healthcare IT market is predicted to escalate to USD 974 billion by 2027, indicating a growth rate of 19.8%²

and raise awareness about maintaining physical health and lifestyle improvements⁶.

- 4 Role of technology**
Technology-driven innovation can improve the understanding of patients, enable the delivery of more convenient, individualized care and create USD 350 – 410 billion in annual value by 2025⁵. Major hospital systems are opening access to their (patient) data to enable LLM development enabling Gen AI derived innovations.
- 5 Cost of medical errors**
Diagnostic errors affect an estimated 12 million Americans yearly, leading to more harm to patients than any other medical errors combined. Missing early cancers and heart diseases are the most common diagnostic errors and have caused over 100,000 lost lives and cost USD 750 billion⁷.
- 6 Necessity of data interoperability and regulations**
Data breaches are a significant concern for

healthcare organizations, with over 93% experiencing one in the past three years⁸. Along with compliances like HIPAA and GDPR, providers must implement robust data security measures, to safeguard their patients' valuable information.

- 7 Expanding hospital boundaries**
The future of hospitals is digital and extends beyond its walls. Hospitals will use technology to predict care needs, integrate patient data, automate tasks, and coordinate care delivery. AI alerts, holistic datasets, automated tasks, and remote healthcare and data centers will be common for insight-informed decisions.
- 8 Patient engagement and experience**
Patient engagement is crucial for a better healthcare system. By taking responsibility for their health and engaging in activities that help improve their condition, patients can play an active role in building a better healthcare system.

Key drivers shaping trends in healthcare

1 Need for patient centricity

Patients now expect a satisfying healthcare experience, like what they receive in other industries, such as banking and retail. With technological advancements, it is now feasible and cost-effective to meet these expectations and provide patients with a superior experience.

2 Data integration & Security

Healthcare data is vital for informed decision-making, and global healthcare data is predicted to exceed 10 trillion GB by 2025¹⁰. Interoperability enables seamless sharing of information between healthcare providers, and safeguarding medical data is important because it contains sensitive information.

3 Need for seamless integration

Integration connects applications, streamlines processes, and unifies healthcare providers, and is vital for seamless patient care. This ensures coordinated care delivery, reduces errors, enhances patient outcomes, and

promotes a holistic approach to healthcare beyond data management.

4 Staff shortages - Workforce crisis

By 2030, there is a projected shortfall of 15 million healthcare workers worldwide, with 13 million being nurses alone, up from 6 million prior to the pandemic⁹. Staffing shortages lead to negative patient outcomes, including hospital-acquired infections, patient falls, higher chances of death, and lack of access to emergency care, treatment for chronic illnesses, or prenatal care.

5 Shift from curative to preventive healthcare

Preventive healthcare reduces costs, improves quality of life, promotes early detection, and aligns with advancing healthcare technologies and government policies. Following are few healthcare trends, split into business and technology categories, with changes in one influencing the other. As tech evolves, there will be more connections between these trends.

Business trends

- Telemedicine
- Retail healthcare
- Health data security
- mHealth apps
- Data interoperability
- Sustainable healthcare
- Precision medicine
- Nanomedicine
- Population health management
- Regenerative medicine

Technology trends

- Artificial intelligence
- Cloud adoption
- Nanotechnology
- IoMT & Wearable devices
- Bioprinting
- Digital twins & Virtual reality
- Health data analytics
- Robotics
- Organ care technology
- Gene editing – CRISPR/Cas9

Business trends driving innovation

The table below gives a snapshot of some of the key drivers shaping the current and upcoming business trends in the industry.

Business trends	Key drivers				
	Rising patient expectations	Shift from curative to preventive healthcare	Need for seamless integration	Data integration and security	Increasing staff shortages
Telemedicine	●		●	●	●
Retail healthcare	●		●		●
Health data security		●	●	●	
mHealth apps	●	●	●	●	●
Data interoperability		●	●	●	
Sustainable healthcare	●	●			
Precision medicine	●	●	●	●	
Nanomedicine	●	●			
Population health management	●	●	●	●	
Regenerative medicine	●				

Key insights

- While a majority of the mHealth apps focus on fitness, lifestyle, and diet, there has been a growing demand for clinically focused apps that aid in health condition management. This trend is expected to continue as virtual care gains popularity and becomes an integral part of healthcare.
- With the increasing healthcare data, interoperability and data security is crucial to ensure that medical data is used derive insights in multiple areas such as precision medicine, mHealth apps and Population Health Management.

1 **Telemedicine**

The pandemic has accelerated the adoption of telehealth and telemedicine, specifically remote patient monitoring (RPM). The telemedicine market is projected to grow significantly, with the global market size expected to increase to nearly USD 280 billion by 2025. **The acceptance and adoption rate of telemedicine services among Americans has steadily increased over the last five years¹¹.**

2 **Retail healthcare**

Major retailers such as Walgreens, Walmart, and Optum-United Health Group provide services like vaccinations, health screenings or injury treatment, preventive care, and wellness services, aiming to provide convenient and accessible healthcare services. **Retail healthcare has gained popularity due to its convenience, extended hours of operation, and the ability to provide services without appointment.**

3 **Health data security**

The COVID-19 pandemic has led to a surge in cyberattacks, particularly in the banking and healthcare sectors. **In 2020, the healthcare industry saw a 58% increase in targeted data breaches, with breach costs at an all-time high¹³.**

To tackle this issue, healthcare organizations must take proactive measures, such as regularly conducting risk assessments, upgrading their cybersecurity infrastructure, and complying with regulatory standards such as HIPAA and GDPR.

4 **mHealth apps**

mHealth apps have transformed healthcare by providing easy access to health monitoring, medication management, and wellness. They empower patients to manage their prescriptions, schedule doctor appointments, and receive personalized notifications. **Future trends in these apps include advancements in mental health support, gamification and social elements to foster user engagement and motivation.**

5 **Data interoperability**

The use of AI-driven data interoperability is transforming healthcare data exchange by addressing the challenges arising from the lack of standardization. **By utilizing advanced technologies like machine learning and natural language processing, interoperability streamlines workflows and enhances organizational efficiency, ultimately leading to improved healthcare outcomes.**

There is a shift towards longitudinal virtual care, integration with virtual health solutions, and hybrid virtual/in-person care models, indicating a bright future for telemedicine services and impacting sustainability in healthcare.

6 **Sustainable healthcare**

The healthcare industry is responsible for 4.6% of global greenhouse gas emissions, of which the sectors contributing the most are hospital care (36%), physician and clinical services (12%), and prescription drugs (10%)¹⁴. **Practices such as circular healthcare, Telehealth, Virtual Hospitals, and technology-driven diagnostics help reduce the environmental impact.** For example, telemedicine reduces the carbon footprint of healthcare, with significant savings¹⁵.

7 Personalised medicine

Personalized medicine uses an individual's genetic profile to inform disease prevention, diagnosis, and treatment. **This approach is based on the idea that each person is unique and requires tailored treatment rather than "one size fits all".** Advances in genomics provide researchers with a better understanding of genetic differences, predicting disease risk and identifying effective treatments¹⁶.

8 Nanomedicine

Nanomedicine uses nanotechnology to diagnose, cure, and prevent disease using nanoscale components, tools, and methods in the healthcare industry. **It includes the design and engineering of nanoparticles and nanoscale structures to interact with biological systems at the cellular and molecular levels.** Targeted drug delivery, imaging agents, biosensors, tissue engineering, and other medical uses all use these nanomaterials.

9 Population health management

It is a methodical approach to monitor and enhance the health of each person within a population and involves analyzing healthcare data to identify trends, evaluate risk factors

The increasing availability of genetic data and the incorporation of this data into medical records are expected to accelerate the adoption of personalized medicine in the coming years.

and improve care delivery. **Strategies like public awareness campaigns, screening initiatives and early intervention services are also a part of this approach.** These can help reduce healthcare costs, improve quality of life, and reduce disparities in access to healthcare.

10 Regenerative medicine

It is an interdisciplinary subject that uses engineering and life science principles to encourage regeneration, could potentially repair damaged and diseased tissues and entire organs. It entails applying innovative biomedical techniques to activate the body's healing

mechanisms and encourage the growth and repair of damaged tissues. **Stem cell therapy, tissue engineering, biomaterials, gene therapy, and cellular therapies are just a few of the numerous methods and treatments included in the subject of regenerative medicine.**



Healthcare business trends and key stakeholder



Doctors & nurses: Enables better monitoring of patients, preventive care emphasis, data-driven decision-making, and breakthrough therapies, ultimately improving patient outcomes and satisfaction.



Patients: Increased convenience, cost savings, personalized care, improved access to health information. This includes remote consultations, personalized health tracking.



Pharmacists: Facilitates automatic pill dispensing, remote consultations through telemedicine, ensures seamless data exchange for comprehensive patient information.



Healthcare administrators: Increased patient engagement, revenue generation, streamlined workflows, and enhanced decision-making.

Technology trends aiding the business

The graphic below shows how different Technology trends impact each of the business trends. For example, Nanotechnology impacts Nanomedicine and Regenerative Medicine trends and has minor or no impact over other areas, while Health data security is a crucial area that impacts every trend with various levels of impact.

Business trends	Technology trends									
	Artificial intelligence	Cloud adoption	Nanotechnology	IoMT & Wearable devices	Bioprinting	Digital twins & Virtual reality	Health data analytics	Robotics	Organ care technology	Gene editing CRISPR/Cas9
Telemedicine	●	●	●	●	●	●	●			
Retail healthcare	●	●		●	●	●	●	●		
Health data security	●	●		●	●	●	●	●	●	●
mHealth apps	●	●		●		●	●			
Data interoperability	●			●			●			●
Sustainable healthcare		●	●			●				
Precision medicine	●	●	●	●	●	●	●		●	●
Nanomedicine		●	●		●	●		●	●	●
Population health management	●	●		●	●	●	●		●	
Regenerative medicine			●	●	●	●	●		●	●

Key insights

- **Machine learning and AI** has significantly impacted the healthcare sector, especially during the pandemic. Other AI applications that can enhance medical research and clinical decision-making are image recognition, natural language processing, and predictive analytics.
- **Healthcare generates vast amounts of data** that can be utilized to enhance patient care and improve decision-making. Health data analytics involves gathering and scrutinizing this data to detect patterns and trends. It is essential to ensure data security and interoperability to make sure that the resulting insights are valuable across all domains.

● High impact ● Medium impact ● Low impact

1 Artificial intelligence
AI is revolutionizing healthcare by analyzing patient data, developing new drugs, and improving diagnoses. The global AI market for healthcare is projected to reach USD 188 billion by 2030³. **AI applications like image recognition, natural language processing, and predictive analytics have the potential to enhance medical research and clinical decision-making while also transforming processes like Prior Auth and Insurance.** GenAI also has multiple use cases in healthcare such as report generation, assisting in corporate functions, clinical analytics.

2 Cloud computing
Healthcare providers mostly rely on edge computing for real-time data processing and analysis. They plan to use public cloud services for improved business continuity and disaster recovery setups. **The healthcare industry lags in cloud adoption but is expected to grow from 27% to 51% within the next three years**¹⁷. The healthcare cloud market is expected to be worth USD 89.4 billion by 2027, growing at a CAGR of 17.8% ¹⁸.

3 Nanotechnology
Nanotechnology promises to revolutionize

Healthcare providers currently use edge computing for real-time data processing and analysis but are planning to adopt public cloud services for better business continuity and disaster recovery in the next three years.

healthcare by enabling precise diagnosis, targeted drug delivery, and enhanced treatment options. Nanoscale materials and devices can access cellular and molecular levels, offering early disease detection through ultra-sensitive diagnostics. Nano-engineered drug carriers ensure medicines reach specific tissues, minimizing side effects. Additionally, nanobots can perform precise surgeries at the microscale, reducing invasiveness and recovery times.

4 Internet of medical things (IoMT) and wearable devices
The market for IoMT is expected to increase to \$187.60 billion in 2028, with a CAGR of 29.5%¹⁹. It comprises wearable sensors, 5G devices, and remote patient monitoring (RPM) devices, becoming increasingly popular for real-time monitoring, diagnosis, and therapy delivery. **Wearable medical devices can gather and transmit personal health data in real-time to healthcare professionals.**

5 Bioprinting
3D bioprinting has enabled the healthcare industry to produce external prostheses, implants, personalized airway stents, and surgical planning, including challenging open-heart procedures and the first-ever face transplant. **Soft robotics technology has enabled 3D bioprinting directly inside the human body, offering the potential to create complex, functional tissues and organs without transplantation.** Soft robotic systems are designed to navigate and operate within the body, allowing precise deposition of living cells and biomaterials to fabricate customized tissue constructs²⁰.

6 Digital twins & Virtual reality

Digital twins are increasingly used in healthcare and life sciences to enable physicians to determine the best course of treatment at the point of care using digital care-backed clinical decision-support solutions and thousands of variables. **It has expanded to new areas of digital care, including medical device development, disease modelling, and digital therapeutics.** Digital twins can potentially quickly bring lifesaving innovations to the market, while AR and VR can enhance medical education and training.

7 Health data analytics

It involves collecting, cleaning, and analyzing large amounts of health data to identify patterns that can be used to make informed decisions about patient care, allocate resources effectively, shape public health policy. **Predictive analytics is an important component of health data analytics.** Global healthcare analytics market is expected to grow at a CAGR of 21.4%, indicating the growing importance and adoption of health data analytics in the healthcare industry²¹.

8 Robotics

The use of robotics in healthcare is expected

Unlocking healthcare data can revolutionize areas like personalised medicine and Population Health Management. Advanced analytical tools can identify subpopulations to optimize personalized treatment protocols.

to grow significantly in the coming years as the technology develops and becomes more affordable. The development of soft robots made of flexible materials that can safely interact with human tissue can help with minimally invasive surgery procedures, patient rehabilitation, and wound care. **Nanorobots that can be injected into the body to deliver drugs or perform surgery are in the early stages of development.**

9 Health data analytics

Previously, organs were transported in an ice-cold solution from a deceased donor to the recipient, but this led to organ damage and reduced the time for storage before transplantation. **Organ care technology allows organs to be preserved in a near-physiological state, increasing the chances of a successful transplant and reducing the risk of rejection.**

10 Gene editing - CRISPR/Cas9

CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) and gene editing allow for precise modification of DNA, leading to possibilities such as correcting genetic mutations and developing targeted therapies. **This technology has the potential to eradicate hereditary diseases, enhance disease resistance, and enable personalized medicine.** However, ethical concerns must be addressed, and regulatory frameworks must be updated to ensure responsible use.

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