Confederation of Indian Industry

Unleashing digital momentum to shape the future of healthcare

Enabling automation to enforcing transformation

September 2025

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Foreword

Dear Colleagues,

Digital healthcare is a multidisciplinary concept that is at an intersection of digital technology and healthcare. Digital innovation and its integration into various parts of lifestyle are inevitable. As the Indian healthcare industry stands at a pivotal moment in its evolution, digital transformation is no longer a future aspiration but an immediate imperative that will define the quality, accessibility, and sustainability of healthcare delivery in the coming decades.

This report evaluates Indian healthcare industry's journey toward comprehensive digital transformation, highlighting both the remarkable progress we have achieved and the critical challenges that lie ahead. From electronic medical records and telemedicine platforms to AI driven diagnostics and patient engagement tools, etc., we are witnessing unprecedented opportunities to enhance the patient outcomes while improving operational efficiency.

During this decade the pandemic accelerated digital adoption across our industry, demonstrating both our capacity for rapid innovation and the urgent need for robust, scalable digital infrastructure. As we move forward, our focus must remain steadfast on three core principles: patient centric care, data security and privacy, and equitable access to digital health solutions.

The findings and recommendations presented in this report reflect our commitment to leading healthcare into the digital age responsibly and effectively. I encourage all stakeholders to engage with these insights as we work together to transform the Indian healthcare industry.

Rishi Kumar Bagla
Chairman, CII Western Region 2025-26
Chairman & Managing Director,
BG Electricals and Electronics India Ltd.

Foreword

The Indian healthcare sector is witnessing a pivotal transformation, where technology is reshaping patient care and clinical delivery. From AI-assisted diagnostics and predictive analytics to electronic health records and remote monitoring, innovations are enhancing accuracy, efficiency, and patient experience. These advances are enabling providers to deliver care that is faster, safer, and more personalized, while strengthening the overall healthcare ecosystem.

CII Western Region, through its Sub-Committee on Healthcare, has been actively engaging stakeholders, facilitating policy dialogue, and promoting industry collaboration to ensure that technology adoption translates into tangible improvements in patient outcomes and system performance.

This report highlights the journey from fragmented services to integrated healthcare delivery, showcasing opportunities for innovation and collaboration.

As India moves towards India@100, embracing digital healthcare will be crucial in building a patient-centric, accessible, and high-performing healthcare system for the nation.

Dr. Ramakant Deshpande

Chairman, CII Western Region Sub-Committee on Healthcare (2025-26)

Chairman, Asian Institute of Oncology – Cumballa Hill Hospital

Foreword

The landscape of healthcare technology is shifting dramatically, influenced by a myriad of factors including regulatory changes, the rise of digital health solutions and the increasing demand for patient-centric care. As healthcare organizations strive to remain competitive and relevant, understanding the current state of technology is crucial. This report delves into the findings of the EY-CII HealthTech Survey 2025, which captures the latest trends in technology adoption, investment priorities and the challenges faced by Indian hospitals.

Hospitals are increasingly recognizing the importance of investing in advanced technologies to enhance operational efficiency and improve patient outcomes. From upgrading Hospital Information Systems (HIS) and Electronic Medical Records (EMR) to integrating artificial intelligence (AI) and machine learning (ML) solutions, the drive towards a more connected and intelligent healthcare ecosystem is evident. However, this journey is not without its challenges. Many organizations grapple with legacy systems, data management issues, and the need for skilled IT professionals, which can impede their progress towards achieving a fully connected care model.

As we explore the findings of the survey, it becomes clear that the future of healthcare lies in leveraging technology to create a seamless and integrated patient experience. Connected care hospitals are not merely a vision for the future; they are a necessity in today's healthcare environment. By adopting innovative solutions and enabling a culture of digital readiness, healthcare providers can position themselves to meet the demands of an increasingly complex healthcare landscape.

This report aims to serve as a valuable resource for healthcare organizations seeking to navigate their digital transformation journeys. It provides actionable insights and strategic recommendations that can help leaders make informed decisions about technology investments and operational improvements. By understanding the current trends and challenges, organizations can prepare themselves better for the future so that they are equipped to deliver high-quality, patient-centered care.

The healthcare sector is on the brink of a technological revolution, and the time to act is now. As we embark on this journey towards future-ready hospitals, I invite you to engage with the insights presented in this report and consider how your organization can leverage technology to enhance patient care, improve operational efficiency and thrive as healthcare evolves. Together, we can build a future where healthcare is not only accessible but also intelligent, efficient and truly patient-centric.

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Preface

It is with great pride that I present this report, *Unleashing digital momentum to shape the future of healthcare: Enabling automation to enforcing transformation*, a collaborative effort between the Confederation of Indian Industry (CII) and EY.

Indian healthcare sector stands at a transformational juncture. As digital technologies rapidly reshape care delivery, the shift from fragmented services to integrated, patient-centric systems have become both urgent and inevitable. This report captures the industry's current digital maturity, the barriers to adoption, and the opportunities that lie ahead. It brings into focus the need for strategic investments, scalability, and efficiency while putting the patient experience at the centre of transformation.

From smart OPDs and electronic health records to AI-powered diagnostics and remote monitoring, India is witnessing innovations that are not only enhancing efficiency but also redefining the patient experience. At the same time, a supportive policy and regulatory environment anchored by nation-wide initiatives like the Ayushman Bharat Digital Mission are playing a pivotal role in accelerating this transformation.

Looking ahead, the report outlines a strategic roadmap to support Viksit Bharat 2047, positioning digital healthcare as a key enabler of inclusive, resilient, and future-ready national development.

I am confident this report will serve as a valuable guide for policymakers, healthcare leaders, and industry stakeholders — offering actionable insights to drive meaningful transformation. The future of healthcare in India is digital, integrated, and patient-first. Together, let us shape it for a healthier and Viksit Bharat

Joy Chakraborty
Chairman,
CII Hospital Tech 2025 and Chief Operating Officer,
P.D. Hinduja Hospital and Medical Research Centre

Table of contents

08 Executive summary

12 Chapter 1:
From now to next: Charting healthcare's digital maturity curve

26 Chapter 2:
From tactical to strategic: Internal drivers powering healthcare's evolution

50 Chapter 3:
From foundational to future-fit: Innovations impacting healthcare

62 Chapter 4:
From gaps to governance: Establishing trusted cybersecurity and data governance framework

70 Chapter 5:
From aspiration to action: Roadmap for advancing healthcare in the next decade

80 Acknowledgements

Executive summary

Strategic imperatives in HealthTech in India: Capacity expansion and financial sustainability

India's healthcare sector has been expanding rapidly—fueled by rising demand, demographic shifts, and increased private investment. Hospitals and healthcare groups are expanding bed capacity and facilities to address India's persistent supply-demand imbalance.

India currently has only approximately 1.4 beds per 1,000 people, well below the government's own plan and World Health Organization's recommendation of 2-3 beds per 1,000. Further, approximately 60% of this bed capacity is in the private sector—which forms the backbone of tertiary and quaternary healthcare—concentrated in metropolitan and tier-1 cities, leaving smaller cities and towns with significant shortfalls.

With the COVID pandemic exposing this reality to all key stakeholders in the healthcare ecosystem, the sector has seen renewed focus on capacity expansion, especially by the private sector supported by private equity capital.

In most micro-markets, the focus of healthcare providers and investors has been on making healthcare infrastructure and services available to activate latent demand. Clinical excellence and building patient trust have largely been the focus of doctors, both in standalone set-ups and multi-specialty centers.

However, capacity expansion in the sector can only be sustained based on financial viability. With significant pressure on healthcare pricing from the healthcare payors in the past 4-5 years, providers' clear emphasis in on operational efficiencies and productivity enhancement—whether through procurement strategies, staffing optimization, or administrative controls—to protect margins.

On-ground reality: Broken experience, fragmented processes

Many underlying challenges remain unaddressed. A broken experience for key stakeholders—patients, doctors, and administrators—persists across much of the system. Legacy processes and outdated ways of working continue to dominate. Technology adoption, where it exists, has often been reactive and tactical, designed to solve immediate pain points rather than drive long-term transformation.

Operational processes in many hospitals remain largely manual and paper-driven, with only scattered examples of end-to-end digitization. Technology is often restricted to the deployment of Hospital Information Systems (HIS) for front-end activities such as patient registration and billing, and Enterprise Resource Planning (ERP) solutions for back-end functions like accounting or inventory management. Multiple bespoke systems have been added over time, but integration is poor, and interoperability limited, leading to silos that inhibit information flow.

Automation has also been limited. While industry-agnostic use cases such as source-to-pay automation are common in other sectors, they are still in their infancy in Indian healthcare. Doctor-focused technologies, such as Electronic Medical Records (EMRs), have struggled with low adoption. Barriers include a lack of electronic health data, resistance to change among senior clinicians, and poor usability of available solutions.

Traditional go-to-market models also remain dominant. Providers continue to rely heavily on in-person engagement with network doctors, even though this may not be the most efficient channel. While tools such as CRM platforms and contact centers are being introduced, they often face resistance and change management issues that delay return on investment (ROI) and erode confidence. Direct-to-consumer and digital health models, though growing, are still seen by some stakeholders with a degree of skepticism, particularly because of perceptions that they lack the "human touch" central to care delivery.

Shifting priorities: Professional, on-demand 'True care', delivered efficiently

The COVID pandemic has brought notable changes that are beginning to reshape the sector. Private equity investment in healthcare has accelerated, injecting not just capital but also professional management and more structured governance. This has created greater discipline in strategic decision-making and encouraged more systematic adoption of technology and efficiency-driven practices.

At the other end, changing consumer choices and need for instant gratification is also leading to patients demanding a vastly different way of thinking about healthcare, sick care and how it is delivered. They expect healthcare delivery to be similar to services in other areas of their lives in terms of connectivity, mobility, agility, immediacy and with tools for self-direction.

Consumer demand on one side and rising competition on the other—with capacity / footprint expansion, adequate funding, need to differentiate and desire to grow fast and sustainably—is pushing healthcare providers to assess their future readiness design and their digital strategy.

Emerging global trends: Technology becoming native to care

Globally, healthcare providers are rapidly adopting advanced AI and autonomous agents that augment clinical decision-making. From diagnostic imaging to predictive risk scoring, AI is improving accuracy and enabling personalized treatment plans. Robotic-assisted surgery, supported by AI, is assisting clinicians in real-time, making procedures safer and more efficient. Telehealth, once a supplementary service, has now become a cornerstone of modern healthcare, with virtual consultations and remote patient monitoring offering convenient, continuous care.

Wearables and Internet of Medical Things (IoMT) devices are becoming central to chronic disease management. By tracking vital signs such as heart rate, oxygen saturation, and blood pressure, these devices support early intervention and also help extend care to rural and underserved communities. At the same time, personalized medicine is moving beyond the one-size-fits-all model. Genetic testing, behavioral data, and lifestyle information are being integrated to develop customized treatment and nutrition plans tailored to each patient's unique biological profile.

Interoperability remains another critical focus. Data exchange is happening across Electronic Health Records (EHR), HIS, and other digital platforms to enable a smooth flow of information across providers. This integration not only reduces duplication and inefficiencies but also improves continuity of care.

Early adopters, particularly in advanced economies, are already realizing tangible benefits, experiencing streamlined workflows,

reduced administrative burdens, optimized resource allocation, and shorter hospital stays. These hospitals are not only able to achieve cost savings but are also positioning themselves as leaders in innovation—gaining competitive advantage and attracting patients who seek cutting-edge care.

India's health tech journey: Slow start, but evolving rapidly

In India, adoption of digital technologies has been slow and concentrated in pockets. Healthcare service providers with national and regional presence have started investing in AI, digital health platforms, and advanced HIS systems to stay ahead of evolving regulations and healthcare trends. Early movers are laying the foundation for scalable transformation that will yield increasing returns as these technologies mature and become mainstream.

That said, providers continue to face significant barriers that slow down the progress—outdated infrastructure, limited bandwidth, and the challenge of integrating legacy systems that create data silos. Data management—particularly secure storage, continuity planning, and interoperability—remains a complex issue. Shortage of skilled IT professionals within the sector hampers effective management of advanced digital solutions. Patient engagement platforms, though widely available, suffer from low adoption rates, limiting their potential to improve patient experiences.

We conducted an in-depth survey among Indian healthcare providers to map out the maturity curve of digital transformation in the sector. Key findings include:

Key survey findings

Top private players are demonstrating strong adoption of digital, cybersecurity, and cloud solutions, though not yet at full-scale AI-driven, cloud-native maturity	Early adopters are increasing investments towards digital innovation, even though overall IT spend on tech continued to be low for most players	Priority investment areas are new-age HIS and patient engagement platforms	Personalized care and Gen AI adoption are emerging as strong trends shaping the future of healthcare	Strategic priorities are improving patient experience and clinical outcomes

Regulatory landscape: Enabling standard, secure and trusted digital healthcare

Ongoing efforts in India are focused on creating a unified digital health architecture. Initiatives such as the Ayushman Bharat Digital Mission (ABDM) and the Digital Personal Data Protection Act (DPDP Act) are shaping the standards for secure identification, data exchange, and national-level interoperability. Work is also underway on frameworks for IoT integration, secure APIs, and governance structures to ensure that digital health systems are both scalable and trustworthy.

Future ready healthcare—The 5S framework

Over the next decade, healthcare is expected to increasingly become personalized, predictive and participatory. The line between physical and digital care will continue to blur, with patients accessing services seamlessly across multiple settings—healthcare service providers, homes, and communities. To accelerate this shift, we recommend a 5S framework:

- **Scalable infrastructure:** Build secure, robust systems capable of supporting advanced technologies.
- **Seamless patient engagement:** Develop intuitive digital platforms for personalized engagement and seamless self-service experience
- **Strategic data usage:** Use real-time insights to enable proactive care and optimize resources.
- **Strengthened sustainability and compliance:** Align with evolving regulations while developing clinical, financial, and environmental sustainability to safeguard patient data and build trust.
- **Smart AI and automation:** Pilot, refine and scale AI-driven tools to improve decision-making and operational efficiency.

5S framework for future-ready hospitals

Scalable infrastructure | Seamless patient engagement | Strategic data usage | Strengthened sustainability and compliance | Smart AI and automation

Drawing the roadmap - Siloed to Connected information systems, Fragmented to Integrated processes, Broken to Seamless experience—enabling a shift from reactive 'Sick care' in hospitals to preventive, personalized, proactive and on-demand 'True care'.

As healthcare evolves, healthcare service providers are transitioning from standalone IT systems to connected, intelligent care ecosystems. In the smart healthcare service provider of the future, silos will dissolve as information flows across physical, remote, and virtual settings. Priorities will shift towards prevention, prediction and proactive intervention. More care will take place at home and in the community, while healthcare service provider buildings will be designed to support wellbeing as much as treatment.

At the heart of these future-ready healthcare service providers will be a real-time, self-learning intelligence layer. Integrated platforms will continuously harmonize data from EHRs, IoT devices, genomics, and lifestyle trackers to generate adaptive insights. Clinicians will rely on AI-powered dashboards to simulate outcomes, flag risks, and recommend tailored treatment pathways. Operationally, predictive analytics will forecast patient demand, optimize staffing, and prevent supply chain bottlenecks.

In time, healthcare service providers are expected to evolve into cognitive ecosystems, where every clinical and administrative action is informed by anticipatory, evidence-based intelligence. This transformation means healthcare that is no longer reactive but truly proactive, preventive and precision driven.

01

From now to next

Charting healthcare's digital maturity curve

ACTUAL VS TARGET
ONTIME DELIVERY
AVG ORDER SIZE
NEW CUSTOMERS
MARKET SHARE
CUSTOMERS SATISFACTIONS

The technological transformation of healthcare service providers is marked by varying levels of digital maturity. This progression can be broadly understood across five stages of adoption, reflecting the evolution of infrastructure, applications, and security readiness. Today, a large proportion of providers report having established integrated ecosystems supported by advanced cyber and data security protocols. While most organizations have a defined roadmap for migrating business-critical applications to the next generation cloud-ready solutions, many have already advanced in this transition and are now experimenting with AI and GenAI solutions—signaling the next wave of innovation in healthcare delivery.

Digital maturity of healthcare providers

Where are we today? 10% 50% 40%

We surveyed top healthcare service providers in India to understand their current digital maturity. This distribution signals a decisive industry-wide pivot toward advanced digital capabilities—underscoring not just intent, but clear focus on rapid transition.

Nursing homes, standalone hospitals in tier-2/3 cities	Low-cost chains, standalone hospitals in metros, tier-1 cities	Most regional chains, large standalone hospitals in metros	Most national chains, new hospitals in metros	
Level 1	Level 2	Level 3	Level 4	Level 5
Manual processes with legacy HIS/ERP with several manual processes, basic security framework and on-premise applications supported by manual business continuity protocols.	Manual processes with comprehensive HIS, legacy backend ERP with basic integrations, standard cybersecurity, on-premise applications with standard BCP and selective adoption of cloud solutions.	Partly digitized processes with a new-age HIS and standard ERP in a partly integrated ecosystem, multiple bespoke apps, advanced cyber and data security protocols and an enhanced BCP framework with a roadmap for cloud transition of business-critical applications.	Partly digitized/ paperless and controlled processes with new-age HIS and leading ERP, in a largely integrated ecosystem multiple bespoke apps, supported by AI and GenAI pilots, and standard BI applications, business-critical applications hosted on cloud with advanced BCP.	Business-critical applications are fully cloud-based (private/public cloud) with advanced BCP and cyber-security and an AI adoption roadmap, supported by a fully integrated ecosystem, scaled AI/GenAI applications, automated paperless processes, and comprehensive BI tools for insights and decision-making.

Identifying the barriers in the digital journey

Healthcare is undergoing rapid digital transformation, reshaping both patient care and operational efficiency. Yet, this journey is far from seamless. Providers often face barriers that stem from outdated infrastructure and resource constraints. Legacy systems, hardware limitations, complex data management needs, and the absence of advanced business intelligence tools weigh down progress. Compounding these challenges are gaps in IT team capabilities, leaving many organizations struggling to fully unlock the potential of digital technologies.

Key pillars of technology landscape	Major challenge	Moderate challenge	Minor challenge
Hardware (server/end user), network infrastructure	20%	10%	30%
Business critical application upgrade (HIS, ERP, etc.)	10%	40%	50%
Data storage and management, BCP	20%	60%	20%
Data lake, business intelligence tools	50%	40%	10%
Cybersecurity and data privacy	20%	30%	50%
Patient engagement platforms, CRM	20%	40%	40%
Capability building and upskilling IT teams	60%	30%	10%
AI and GenAI use cases	10%	20%	70%

More than half (60%) of healthcare service providers in the EY-CII **HealthTech Survey 2025** identify capability building and upskilling IT teams as a major tech-related challenge at present, underscoring the need for enhanced skills within their workforce. Half the providers (50%) indicate challenges in bringing data together and driving adoption of business intelligence (BI) tools. Hardware and network infrastructure (20%), as well as data storage and management (20%), are seen as moderately challenging but by a significant portion of respondents (60% for data management). Cybersecurity and data privacy, along with patient engagement platforms, are also perceived as moderate challenges by 30% and 40% of healthcare service providers, respectively. In contrast, AI and GenAI use cases (10%) and business-critical application upgrades (10%) are seen as less pressing issues.

Most healthcare providers realize that having a strong team to support digital initiatives along with the ability to generate real time insights will help take informed decisions to make way for implementation of new age technology.

1. Hardware, server, and network infrastructure

A robust hardware and network infrastructure is the cornerstone of any successful digital transformation initiative. Many healthcare service providers, however, work with outdated servers, end user systems and inadequate network capabilities, which can severely limit their ability to deploy new technologies and expose them to security risks. At the same time, upgrading hardware requires substantial capital investment and meticulous planning, as the transition can disrupt ongoing operations.

2. Legacy business-critical applications

A legacy system presents a formidable barrier to digital transformation in healthcare settings. It can be a struggle to integrate these critical applications, often built on outdated technology stacks, with modern solutions, resulting in data silos and operational inefficiencies. The dilemma for healthcare providers is whether to modernize the applications or replace them entirely, both of which can be resource-intensive and time-consuming. Many healthcare service providers are now prioritizing the upgrade of foundational systems, recognizing that a strong technological backbone is essential for their digital transformation efforts.

New-age Health Information System (HIS) vendors have recognized that integration is a top priority for Chief Information Officers (CIOs) when scouting for new HIS solutions. Learning from this, many health tech companies, including HIS vendors, are creating integrated ecosystems by combining two to three applications across the full suite of necessary tools. This approach fosters a win-win situation for both HIS and other critical business applications like ERP and CRM. As a result, CIOs gain confidence that integration will not hinder their transition to a fully integrated digital ecosystem.

3. Data storage and management, business continuity planning (BCP)

Effective data storage and management are particularly vital in healthcare, where vast amounts of sensitive data are generated daily. Healthcare service providers must navigate the complexities of secure data management while complying with regulations (such as Digital Personal Data Protection Act or DPDP Act and Health Insurance Portability and Accountability Act or HIPAA). Implementing robust BCP strategies is critical to safeguard against data loss or system failures. Many organizations are, therefore, increasingly leaning towards cloud-based solutions that offer scalability, flexibility, and cost-effectiveness to enable easier data access and enhanced disaster recovery capabilities. However, some healthcare service providers may find cloud solutions expensive, instead preferring on-premise systems which also give them a perception of greater control over data.

4. Data lake and sophisticated BI tools

Building a data lake and establishing golden records are approaches used to maximize the utility of data. A data lake provides a platform for aggregating clinical, operational, and financial information from various systems—such as Health Information System (HIS), Picture Archiving and Communication Systems (PACS), Laboratory Information System (LIS), pharmacy, insurance, and patient engagement platforms—into a single, scalable repository for analytics, predictive modelling, and AI-enabled decision support. Golden records, created through master data management, help maintain a consistent and accurate single source of truth (e.g., identity for each patient across different systems, addressing issues like duplicate records, mismatched IDs, and incomplete histories). These methods can help improve uniformity in patient experience across networks, resource allocation, care coordination, and enable future models such as value-based care.

However, implementation continues to be a challenge for many healthcare organizations due to fragmented IT systems, limited Electronic Medical Record (EMR) adoption, inconsistent use of standards and lack of interoperability across vendors. These challenges can affect opportunities for improving patient engagement, operational efficiency, and data-driven insights for network or service planning.

5. Cybersecurity and data privacy

As healthcare organizations increasingly adopt digital solutions, data security and privacy have become critical priorities. Recent cyberattacks on healthcare facilities have underscored these vulnerabilities, reinforcing the sector's position as a prime target for malicious actors. Addressing these risks requires robust safeguards, including encryption, multi-factor authentication, and regular security audits. Compliance with evolving regulations, such as the DPDP Act, adds further complexity, demanding continuous vigilance and significant resource investment.

To stay ahead, providers must move from reactive measures to proactive cybersecurity strategies.

Advanced technologies—such as AI-driven threat detection systems—offer powerful tools to protect sensitive patient information. While leading organizations are already conducting impact assessments and strengthening their defenses, industry-wide adoption remains uneven, leaving many providers exposed to persistent risks.

6. Patient engagement platforms

The successful implementation of patient journey management systems and engagement platforms - covering integrated digital and physical journeys supported by robust CRM systems and mobile health applications - can significantly uplift patient experience. While many leading providers have launched such platforms and apps over the last 4-5 years, **several** of them are seeing challenges with gaps in digital to physical transition in the patient journey, non-intuitive user experience, lack of personalization and engaging functionalities - leading to lower than desired adoption and hence delay in unlocking full potential of the platforms.

7. Talent availability

The effectiveness of a healthcare provider's IT team is fundamental to driving digital transformation. A key challenge, however, is the limited availability of skilled professionals with expertise in Health Information Management Systems and other advanced digital solutions. Traditionally, healthcare has not been the preferred destination for top IT talent. This is now changing, as private equity investments and evolving ownership structures have brought a sharper focus on professional management, making the sector increasingly attractive to skilled technology professionals.

Challenges to effective technology implementation

As healthcare service providers take forward their digital transformation initiatives, CIOs are encountering a range of complex challenges. More than half of the respondents (60%) in the EY-CII HealthTech Survey 2025 feel stakeholders' resistance to change towards new technologies is a major challenge. Another 40% highlight integration of new applications with legacy systems as a key constraint. While multiple internal strategies such as training, upskilling, and communication of rationale and benefits can help change stakeholders' viewpoint, integration with a non-compatible core system shrinks the opportunity to unlock the new technology's full potential. Most respondents, however, consider budget constraints and staff training moderate challenges.

Challenges while implementing new technology	Major challenge	Moderate challenge	Minor challenge
Resistance to change	60%	40%	0%
Integration with existing systems	40%	30%	30%
Budget constraint	20%	70%	10%
Staff training requirements	20%	70%	10%

> Change management starts with stakeholder analysis and engagement during the product development phase. It is crucial to involve users early to reduce resistance later.
>
> **Sudeep Dey**
> CIO and CISO, Aster DM Healthcare

Emerging themes driving digital investments

As early adopters gain competitive advantage from rapid digital transformation driven by technological innovation and patient-centric care initiatives, it is prompting organizations to accelerate digital investments that enhance operational efficiency, improve clinical outcomes, and maintain leadership in an evolving healthcare landscape.

Here are some key themes in digital investments in healthcare in the past five years.

Technology investment areas	High priority	Medium priority	Low priority
Capability building and upskilling IT teams	60%	30%	10%
Data lake, business intelligence tools	50%	40%	10%
Patient engagement platforms, CRM	20%	40%	40%
Data storage and management, BCP	20%	60%	20%
Cybersecurity and data privacy	20%	30%	50%
Business critical application upgrade (HIS, ERP, etc.)	10%	40%	50%
AI and GenAI use cases	10%	20%	70%
Hardware (server/end user), network infrastructure	10%	60%	30%

More than half (60%) of the hospitals prioritize investing in capability building and upskilling IT teams, followed by data lake and BI tools (50%). In contrast, hardware upgrades and business critical application enhancements are low on priority (each at 10%). Of medium priority for investments are business critical application upgrades (40%) and data storage and management (60%). This indicates a balanced focus on operational efficiency along with importance being given to cybersecurity and patient engagement platforms. Overall, the findings related to technology investments emphasize the strategic approach to developing internal capabilities and leveraging data-driven insights while managing essential infrastructure investments.

1. Upgrading clinical and operational systems

Healthcare organizations are increasingly investing in modern HIS to establish robust foundational capabilities. These systems include integrated EMR and dedicated tools for doctors and nurses to enable connected care. Providers are focusing on comprehensive, user-friendly EMR solutions that support clinical decision-making and drive improvements in patient care. Also, there is a clear shift towards improving system interoperability and leveraging data analytics to generate actionable insights.

2. Adopting patient engagement tools

The share of digital investments in patient engagement tools is steadily increasing, reflecting a growing focus on enhancing patient experience.

Healthcare providers are adopting mobile applications, patient portals, and AI-driven communication platforms to play a more active role in patients' healthcare journeys. These tools not only streamline appointment scheduling, access to medical records, and secure messaging, but also enable personalized engagement and improve adherence to treatment plans, thereby strengthening overall care delivery.

3. Integrating AI, GenAI and ML technologies

The integration of AI and ML technologies is accelerating in healthcare, with organizations investing in AI-driven tools for predictive analytics, patient triage, and personalized treatment plans. After diagnostics for screening diseases, AI is being applied to the next key use case around generating and summarizing health data–such as automating clinical documentation through ambient listening, generating longitudinal health summaries by synthesizing patient reports across varied formats, etc. This has the potential to enhance the quality and comprehensiveness of clinical records, including OPD prescriptions, OT notes, and discharge summaries.

While AI has gained some scale across diagnostics use cases, most other applications remain at the proof-of-concept (POC) stage. Certain use cases show scalability potential, particularly as providers digitize all patient touchpoints to leverage data for improved outcomes, operational efficiency, and profitability. Several healthcare organizations have piloted AI tools in complex case management, emphasizing the

importance of addressing specific business challenges rather than adopting AI for its own sake. On the clinical front, although the doctor community remains cautious, overall enthusiasm for AI adoption in healthcare is steadily increasing.

> The next wave of healthcare innovation will connect AI, data, genomics and clinical expertise into a seamless fabric of care. Real progress will come when technology not only improves efficiency but also anticipates patient needs, protects their privacy and delivers better outcomes at scale.
>
> **Dr. Ritu Garg**
> Chief Innovation Officer, Fortis Healthcare

Successful AI use cases across hospitals in India

AI in radiology: A large hospital chain is exploring AI-assisted radiology reporting where CT and MRI images are analyzed to aid in stroke management and early detection of lung cancer through advanced imaging techniques.

AI-based resource allocation: A 500-bed South India legacy hospital chain has invested in an AI-based nursing app which enhances resource allocation and operational efficiency by utilizing AI algorithms to optimise nurse allocation based on patient condition, nurse skill-set and demand-supply of resources.

AI-based critical care monitoring tool: A regional chain based in western India is implementing a monitoring tool that captures vital organ measurements. This AI-driven tool can indicate potential health issues such as the need for ICU beds or specific medications based on the data collected.

GenAI ambient listening tool: A large private national hospital chain partnered with a leading voice-based AI provider to streamline EMR data entry with 99% accuracy. A cloud-based SaaS solution was deployed across 37 sites and 25 medical specialties without requiring additional hardware along with full data security compliance. This AI implementation has successfully streamlined clinical documentation by saving 44 hours monthly in administrative task while enhancing operational efficiency and documentation quality across the organization. The provider also claims to achieve INR21 as ROI on every rupee spent on this technology via increased consultation capacity and improved resource allocation.

Voice to prescription AI tool: An innovative voice to prescription tool captures patient doctor conversations, categorizing symptoms, medical history and treatment plans to automate prescription generation by eliminating noise. This allows doctors to concentrate more on patient interaction rather than administrative tasks.

AI for mental health: A large multispeciality national chain is building AI for mental health support for corporate clients which connects users with psychologists. The belief is that AI can serve as a supportive agent in the counselling process, which is crucial for patient care. Efforts are underway to streamline the initial workout for patients, encompassing all investigations, initial findings and medical history. The EMR system feeds data into the AI, which then generates a summary report for patients, providing a layman's understanding of their health issues.

4. Harnessing data analytics and business intelligence

With growing investments in data analytics and BI tools, healthcare providers are leveraging big data to drive informed decision-making across patient care and operations. Integrated healthcare ecosystems enable management to analyze vast datasets, uncover patterns, and make evidence-based decisions, enhancing both patient outcomes and operational efficiency. By turning data into actionable insights, organizations are optimizing resource allocation and strengthening the overall quality of care delivery. Ultimately, these capabilities translate into measurable business impact—improving operational performance, reducing costs, increasing patient retention, and driving revenue growth.

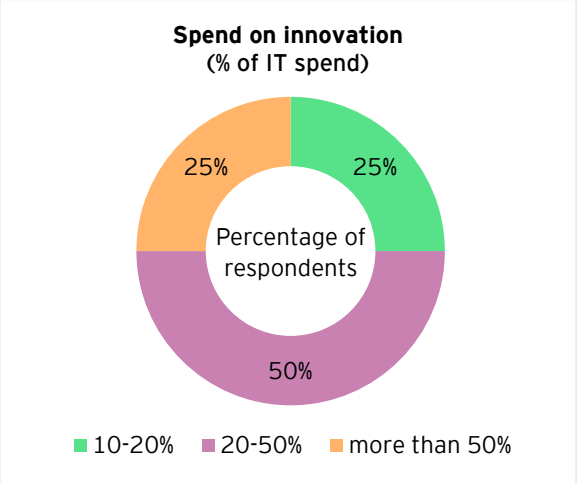
5. Bigger role for cybersecurity investments

Digitized healthcare operations require robust cybersecurity measures. Investments in advanced cybersecurity technologies and protocols have increased to safeguard sensitive patient data against breaches and cyberattacks. Providers are prioritizing comprehensive security strategies, including timely system updates and patches, incident response planning, secured connected medical devices, access controls, employee training, and regular risk assessments and security audits. These measures are critical to maintaining data integrity, ensuring patient trust, and supporting the safe adoption of digital healthcare solutions.

Closing the gap: Current spend and future needs

Historically, healthcare service providers have viewed IT services primarily as a cost center, focused on infrastructure maintenance and upkeep of existing applications. However, with the expansion of corporate healthcare chains, rising private equity investments and the influx of highly skilled professionals from other industries, IT is increasingly taking on a strategic role—contributing to improving patient experience, driving revenue growth and enhanced operational efficiency through digital tools.

Recent years have also seen a notable shift in digital spending patterns among healthcare providers. According to the EY-CII HealthTech Survey 2025, 45% of providers report IT spending of 0.5%–1% of revenue, 10% spent 1%–2%, and another 45% allocated more than 2% of revenue to IT. Providers actively pursuing digital transformation have increased their IT budgets over the past 2–3 years, aligning with future plans to unify group-level systems, enable data consistency, and implement innovative solutions across clinical and non-clinical functions.



Innovation has emerged as a key differentiator among digitally mature healthcare systems. In the survey, 50% of providers report allocating 20%–50% of their IT budget to digital innovation, while roughly one-fourth spent less than 20% and another one-fourth spent over 50% on initiatives addressing core challenges. As innovation becomes central to strategic priorities, spending on digital initiatives is expected to rise by 20%–25% over the next 2–3 years, with the remainder of the IT budget continuing to support technology upgrades, cybersecurity, and data storage.

Key factors driving prioritization and investment decisions

The rapid emergence of healthcare startups in India and globally has introduced healthcare providers to a wide spectrum of innovative solutions across the patient care continuum as well as non-clinical operations. This influx of technology-driven offerings is reshaping traditional healthcare delivery models and backend processes, prompting organizations to reassess their digital transformation strategies and integration frameworks.

In response, some healthcare providers have established innovation cells or dedicated digital health departments to systematically evaluate emerging technologies. These cross-functional teams—spanning strategy, IT, and operations—define the provider's technology roadmap, build business cases, and drive implementation at scale. Investment decisions are guided by cost-benefit analyses, alignment with digital maturity, and identification of systemic gaps. Prioritization typically focuses on four strategic pillars: enhancing patient experience, improving clinical outcomes, driving cost efficiency, and unlocking new revenue opportunities.

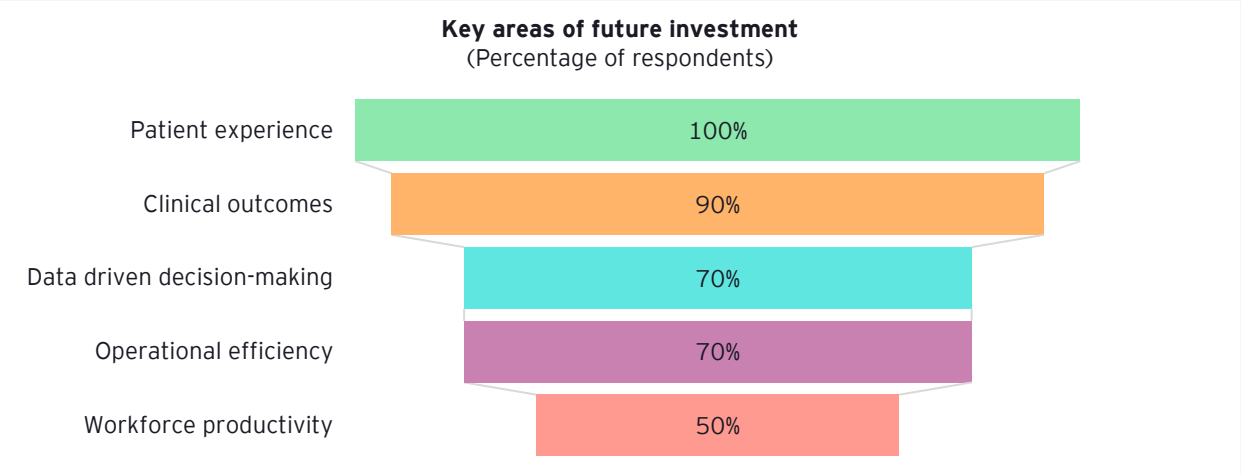
Across all themes, ROI remains a critical lens for evaluating digital health investments. While some technologies generate immediate financial gains affecting revenue and EBITDA, others deliver long-term value by enhancing patient experience and clinical outcomes—benefits that translate into sustained financial impact over time.

Historically, healthcare providers and investors, driven by rapid growth and efficiency imperatives, prioritized investments focusing on revenue assurance or cost optimization with visibility on

returns in the short term. However, the paradigm is clearly shifting—forward-looking operators are now investing in patient-centric technologies, recognizing that in India's competitive healthcare landscape, sustainable differentiation will increasingly depend on elevating patient experience as a key factor that drives patient choice and brand loyalty.

> Organizations should not look for immediate returns on technology. Rather, technology creates the building blocks for the organizations that form the bedrock of success. Technology creates an impact on patient care delivery, patient experience, process excellence and the optimization of resources in the long run.
>
> **J.P. Dwivedi**
> Chief Information Officer, Rajiv Gandhi Cancer Institute and Research Centre

Shaping the future: Strategic investment priorities



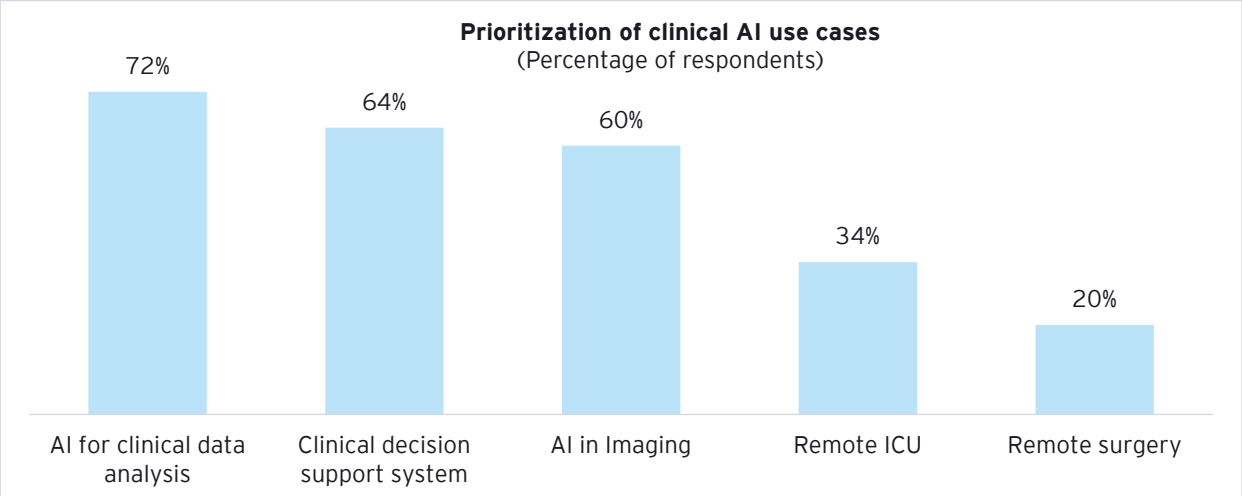
Healthcare providers are increasingly aligning their technology investments with broader organizational strategies. This strategic approach means that digital initiatives not only modernize infrastructure but also drive measurable improvements in patient care, operational efficiency, and overall organizational performance.

Patient experience has emerged as the top priority, not only as a driver of satisfaction scores but also as a critical lever for improving treatment adherence and clinical outcomes. Further, clinical excellence and quality monitoring are gaining prominence in CIO agendas, and there is a strong emphasis on enabling a 360-degree patient view to support timely, data-driven interventions.

Data visibility comes next and remains foundational across all decision-making layers from the CEO to frontline clinical teams, underscoring the need for structured, real-time insights.

Operational and workforce efficiency follow closely in the investment hierarchy. Emerging technologies such as agentic GenAI and AI-driven analytics are being explored to streamline workflows, reduce administrative burden, and optimize resource utilization.

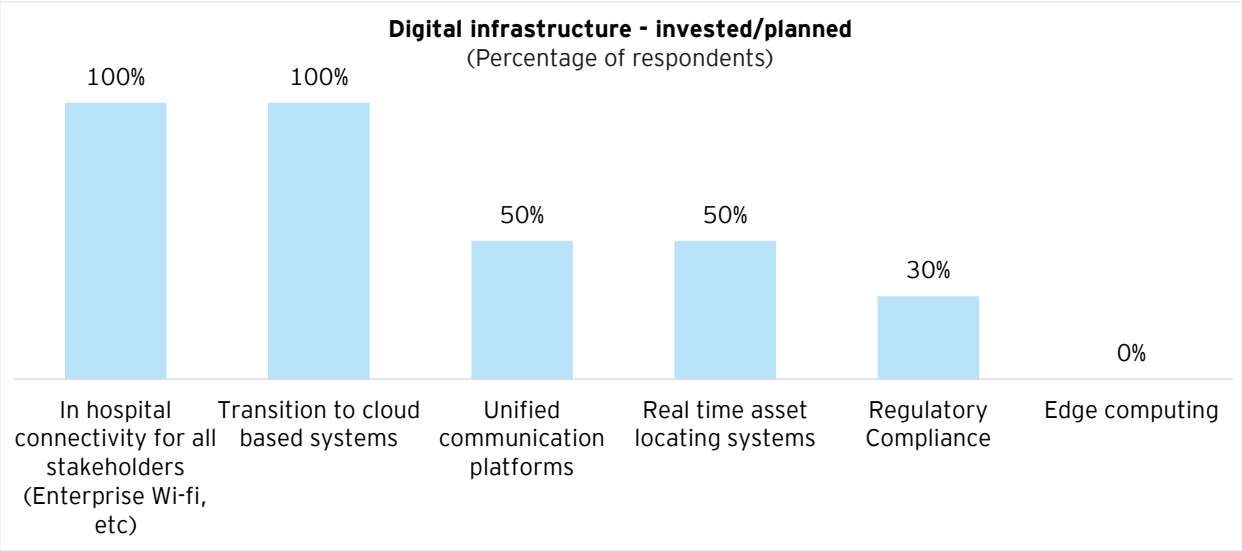
With increasing research and development in clinical areas, rising interest among clinicians and use of new-age technologies like AI, some specific use cases have become center of focus among CIOs.



The survey reveals a clear prioritization of clinical use cases, with a strong focus on AI for clinical data analysis (72%) and clinical decision support systems (64%). AI in imaging also holds significance at 60%, while remote ICU (34%) and remote surgery (20%) are lower on the priority list at present.

To effectively leverage new-age technologies, it is essential for CIOs to establish a robust IT infrastructure within healthcare organizations. Consequently, providers are prioritizing investments to build or strengthen this foundation within a short timeframe.

Healthcare service providers' digital infrastructure investments made or planned in 1-2 years



In the survey, 100% of the healthcare service providers consider in-hospital connectivity, including enterprise Wi-Fi systems, essential and have implemented it. Cloud-based systems are also widely adopted to modernize infrastructure and enhance operational efficiency. Unified communication platforms and real-time asset tracking systems are acknowledged as moderately important, with 50% of providers recognizing their value. Around 30% respondents cite regulatory compliance as a priority, while edge computing is currently not considered a priority by any participant.

> The healthcare service provider CIO is no longer just a technology custodian but a strategic partner in care delivery — where technology serves as the backbone of patient experience, clinical outcomes, and sustainable growth. Every digital decision must balance innovation with sustainability, guided by agility, security, and measurable impact to keep healthcare service providers future-ready.
>
> **Vinod Raman**
> Group Chief Technology Officer, Quality CARE India Limited

Balancing technology advancements with data privacy and data protection

While investing in technology to enhance patient care is essential, safeguarding patient data and upholding privacy standards must remain a top priority. Robust data privacy and security measures are critical not only for regulatory compliance but also for maintaining patient trust. Balancing technological advancement with strong data protection enables healthcare providers to build a resilient ecosystem that meets both operational and ethical obligations.

Some of the measures that can be taken in this regard include:

a. **Robust internal policies:** Comprehensive data governance policies should define procedures for data handling, storage, and sharing. Clear protocols for incident response and breach notification, combined with regular staff training, foster a culture of accountability and ensure timely action in the event of security incidents.

b. **HIPAA/ISO compliance**: Adherence to HIPAA regulations and ISO standards is essential for protecting patient information. Regular assessments, encryption, secure data transmission, and thorough documentation of risk assessments and mitigation strategies demonstrate accountability and support continuous improvement in data security.

c. **Third-party audits**: Independent audits help evaluate security effectiveness, identify vulnerabilities, and inform improvements. Scheduling regular audits ensures ongoing compliance and adaptability to evolving threats, reinforcing the organization's commitment to robust data protection.

d. **Access controls and permissions**: Role-based access controls (RBAC) limit data access to what is necessary for specific roles. Regularly updating permissions and implementing multi-factor authentication (MFA) further strengthens data security, maintaining the principle of least privilege.

Current measures undertaken by hospitals for data protection and data security

100%	90%	70%	70%
Internal Policies – Governance structure and Policy Implementation	Third Party Audits – External audit for identification of gaps	ISO/HIPAA Compliance – Compliance to standards	RBAC – Role Based Access control with Multi-factor Authentication (MFA)

With 100% of healthcare service providers having robust internal policies, it is evident that they recognize the critical importance of establishing comprehensive frameworks for data privacy and security. Additionally, the high emphasis on third-party audits (90%) reflects a proactive approach to identifying vulnerabilities. At the same time, 70% healthcare service providers in the survey cohort also emphasize ISO/HIPAA compliance and access controls measures to enable data safety

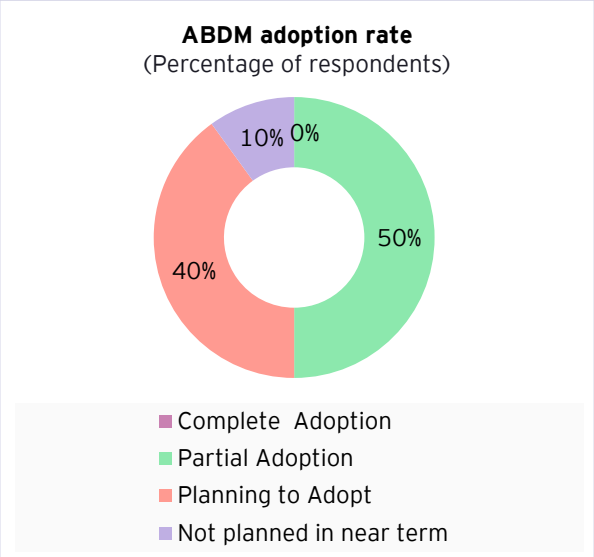
Adoption of Ayushman Bharat Digital Mission (ABDM)

The Ayushman Bharat Digital Mission (ABDM) is a landmark initiative aimed at creating a comprehensive, interoperable digital health ecosystem in India. By leveraging technology, ABDM seeks to improve accessibility, efficiency, and quality of healthcare services nationwide. Its core objective is to establish a robust digital infrastructure that enables seamless exchange of health information among patients, providers, and insurers.

ABDM empowers patients by facilitating access to their medical records and healthcare services, supporting more informed decisions. Beyond individual care, it enables data-driven insights for public health management and policy formulation.

However, adoption among private healthcare providers has been slow and needs to accelerate to fully realize the Mission's potential and drive meaningful healthcare transformation across the country.

> Lots of initiatives are being taken by the government for adoption of newer technologies, digitization and compliance. We would need definite timelines and a dedicated SPOC for the initiatives taken.
>
> **Girish Koppar**
> GM- IT, Wockhardt Hospitals Ltd.

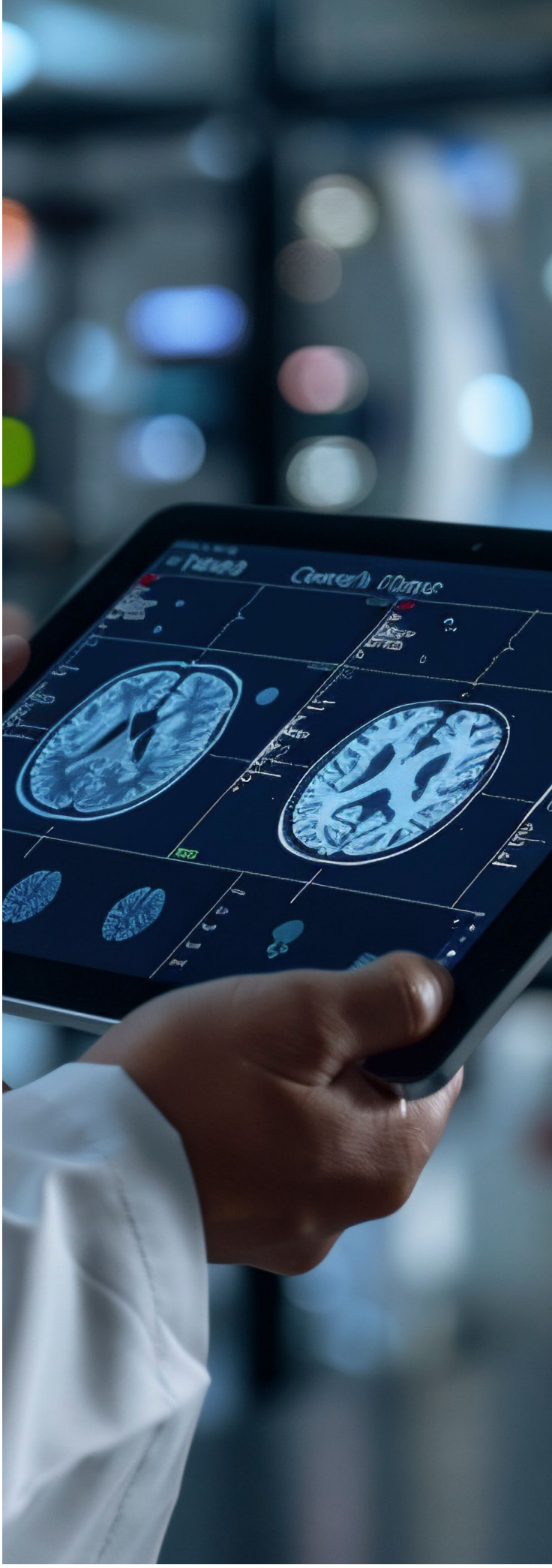


Currently, 50% of healthcare service providers report a status of partial adoption of ABDM, while 40% indicate plans for future adoption. Conversely, 10% have not yet formulated any near-term plans for implementation. Notably, the absence of complete adoption of the ABDM initiative across all healthcare service providers underscores the critical need for enhanced collaboration and focus from both the healthcare sector and government entities to drive successful implementation.

To conclude, the EY-CII HealthTech Survey 2025 highlights three strategic priorities for building future-ready healthcare organizations:

1. **Scalability and efficiency** – Replacing fragmented legacy models with standardized, centralized systems to optimize costs, enhance efficiency, and accelerate growth.
2. **Patient experience** – Positioning seamless, end-to-end journey management across physical and digital touchpoints as a key differentiator.
3. **Data-driven insights** – Advancing towards real-time decision-making through integrated, analytics-led systems.

> While medical technology has taken us to new frontiers of medical treatment for patients, the overall adoption of technology in the healthcare sector has lagged in comparison to other sectors. Embracing technological advancements is imperative for sustainability of healthcare systems. AI, Robotics and 3D printing are shaping the future of medical treatment. Coupled with digital health technologies, this will create a new level of efficiency, personalisation, and accessibility in the healthcare sector.
>
> **Vishal Bali**
> Executive Chairman, Asia Healthcare Holdings



02

From tactical to strategic

Internal drivers powering healthcare's evolution

50%
55%
80%

The healthcare industry is witnessing the emergence of internal drivers as powerful differentiators that are redefining how organizations operate, scale, and deliver care. Efficiency is no longer just a cost-control measure, it is a strategic imperative. Streamlined workflows, optimized staff deployment and automation are enabling clinicians to focus on high-value services and reducing delivery costs without compromising quality. This emphasis on efficiency sets the stage for scalability, which has become a central pursuit for healthcare organizations.

As healthcare service providers expand their physical and digital reach through new facilities, telehealth networks, and integrated wellness centers, the challenge of growth without precision becomes apparent. Such expansion risks spiraling complexity and cost; however, leading systems are countering this with standardized processes, interoperable platforms, and rigorous throughput management. This strategic approach not only addresses the challenges of scalability but also enhances the overall patient experience, which now commands boardroom attention.

> We are at a pivotal moment in healthcare. The future is not just about adopting AI or cloud—it is about delivering safer, faster, more efficient and personalized care while ensuring measurable returns for the system. Our vision of the 'Healthcare service provider of the future' is already here: Patient centric, sustainable, agile, scalable, AI-driven and cloud-ready.
>
> **Gaurav Loria**
> Group Chief Quality Officer & Group Head Operations (SVP), Apollo Hospitals

Driving scalability with expanding footprint and sustaining efficiency

As healthcare organizations expand, the challenge of scaling operations while sustaining efficiency becomes increasingly critical. Many healthcare service providers continue to operate with distributed and decentralized legacy systems, processes, and policies that lack standardization—resulting in fragmented care delivery and operational silos. At the same time, there is a strong emphasis on cost optimization across procurement, resource consumption, and manpower, yet these efforts often fall short of incorporating long-term sustainability. To address these gaps and enable future-ready growth, the sector is shifting towards scalable, integrated solutions.

The shift includes adoption of centralized and controlled systems such as Health Information Systems (HIS), Picture Archiving and Communication Systems (PACS), Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), and centralized contact centers.

To unpack this transformation more deeply, let us explore three interconnected themes that are shaping the path forward:

1. Distributed and decentralized legacy models, processes, and policies not standardized

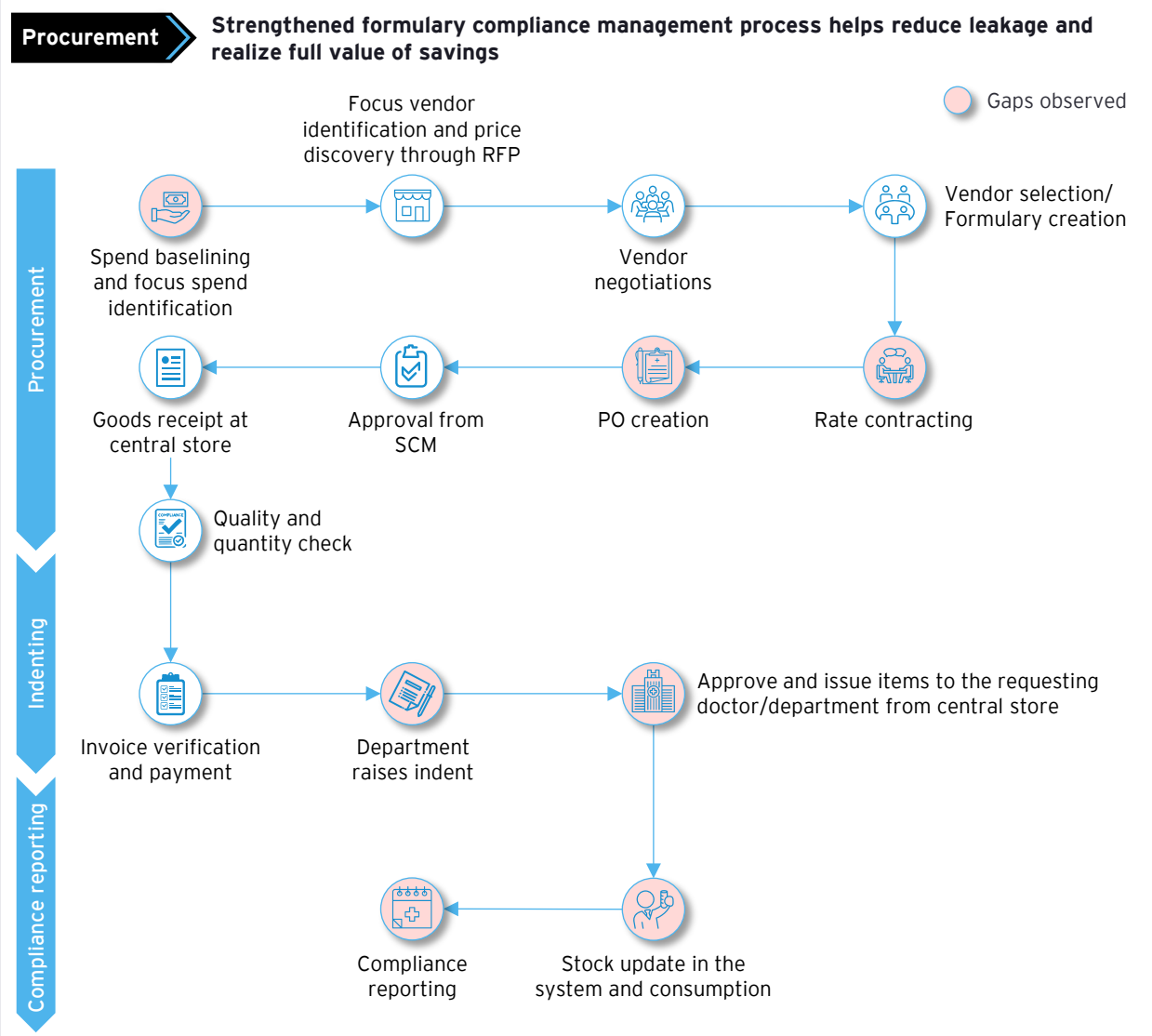
Many health systems still grapple with distributed and decentralized legacy models, processes and policies that are not standardized. Applications are often deployed reactively to meet emerging operational needs, resulting in poor data integration and diminished visibility across clinical and administrative functions. Operating on decentralized organizational structures—with healthcare service providers, primary care units, and other health agencies, each running independent legacy IT systems — can lead to fragmentation in governance, digital architecture, and data standards. While decentralization can bring local autonomy and responsiveness, it often results in duplication, limited interoperability, and inefficiencies in service delivery.

This challenge is particularly pronounced in multi-healthcare service provider chains, especially those that have expanded through acquisitions and legacy HIS and disparate allied applications coexist with newer platforms. The lack of standardization across facilities leads to inconsistent patient experiences, limited access to longitudinal clinical data during referrals, and operational inefficiencies stemming from disconnected data sets.

Insights from the EY-CII HealthTech Survey 2025 reveal a critical operational challenge among rapidly expanding healthcare service provider networks—particularly those growing through acquisitions. The accelerated pace of geographic expansion has led to a fragmented IT landscape, characterized by disparate systems and siloed applications. As CIOs pivot toward a shared services model to unlock scale efficiencies, they encounter significant friction. Legacy infrastructure, inconsistent data architectures, and lack of interoperability have made resource pooling complex and data integration arduous.

2. Significant focus on cost management and optimization, however, sustainability not factored in

With growing organizations, there is a sharp focus on cost management and optimization across areas like procurement, consumption, and manpower. Healthcare systems diligently pursue cost containment, yet interference from institutional inefficiencies such as complex regulations, fragmented demand, low procurement capacity, and duplicative supply chains undermines effective spending, particularly in many low- and middle-income countries like India. Healthcare service providers rarely incorporate sustainability into cost optimization strategies. Tactical measures like bulk purchasing and vendor consolidation deliver short-term savings, but lack the structural resilience needed for long-term impact. Embedding sustainability into cost strategies through automated compliance tracking, integrated procurement systems, and data-driven decisioning can transform cost management from reactive firefighting to proactive value creation.



Material procurement for medical supplies typically represents 30%–35% of the overall healthcare expenditure in a multi-specialty tertiary care healthcare service provider. One-time strategic procurement transformation can lead to cost savings of approximately 30%.[1] In most healthcare service providers, procurement still faces several digital gaps that impacts efficiency and transparency.

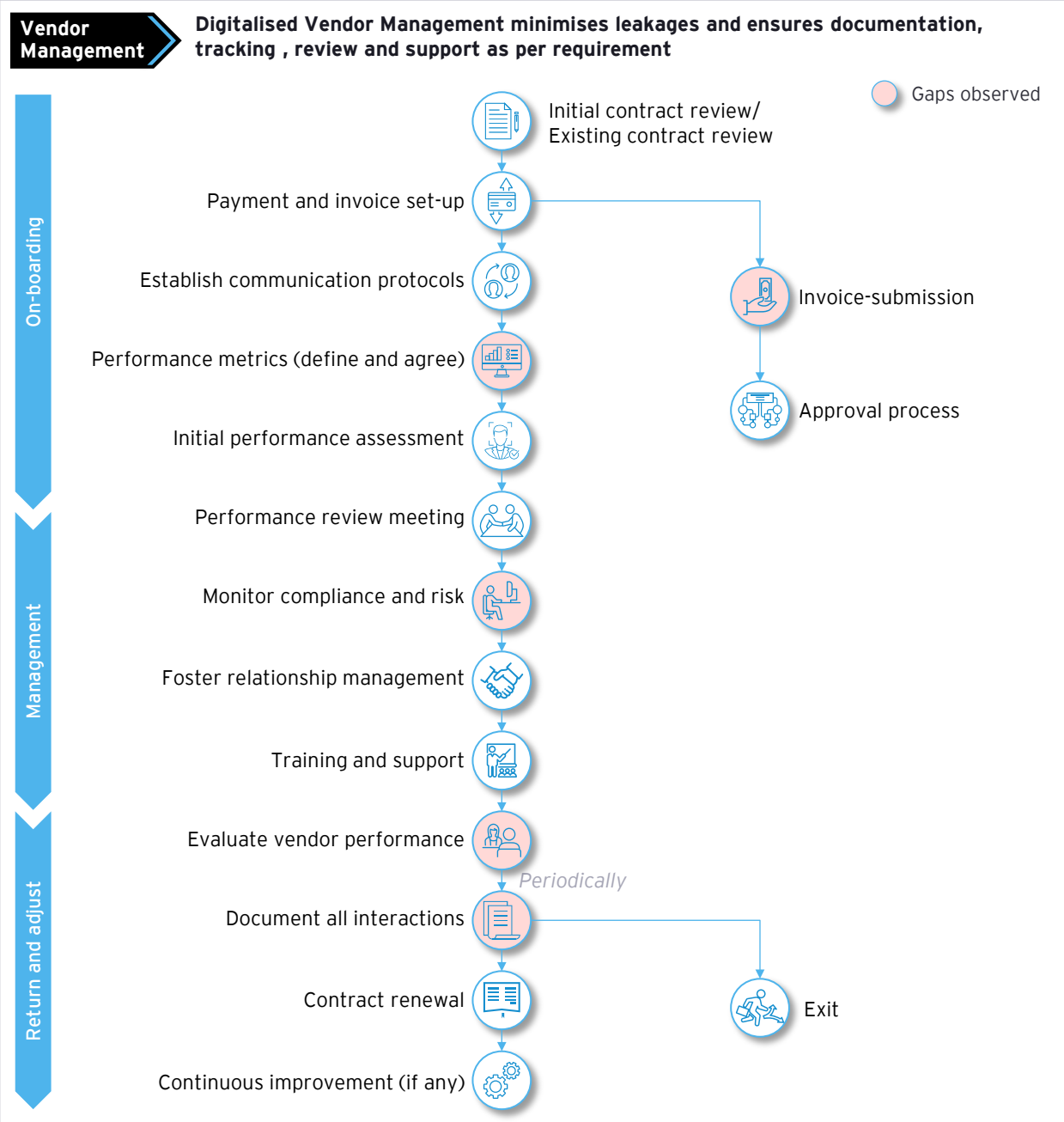
Low commercial effectiveness is due to unclear improvement potential, limited supplier intelligence, and poor spend visibility caused by uncoded item masters, leading to ad-hoc negotiations. By leveraging tools such as digital 'requests for quote' (RFQs) for scientific price discovery and structured supplier market intelligence to identify company qualification and supplier engagement themes, organizations can set clear cost-saving targets and execute data-driven, product-specific negotiations focused on total cost of ownership (TCO), not just purchase price.

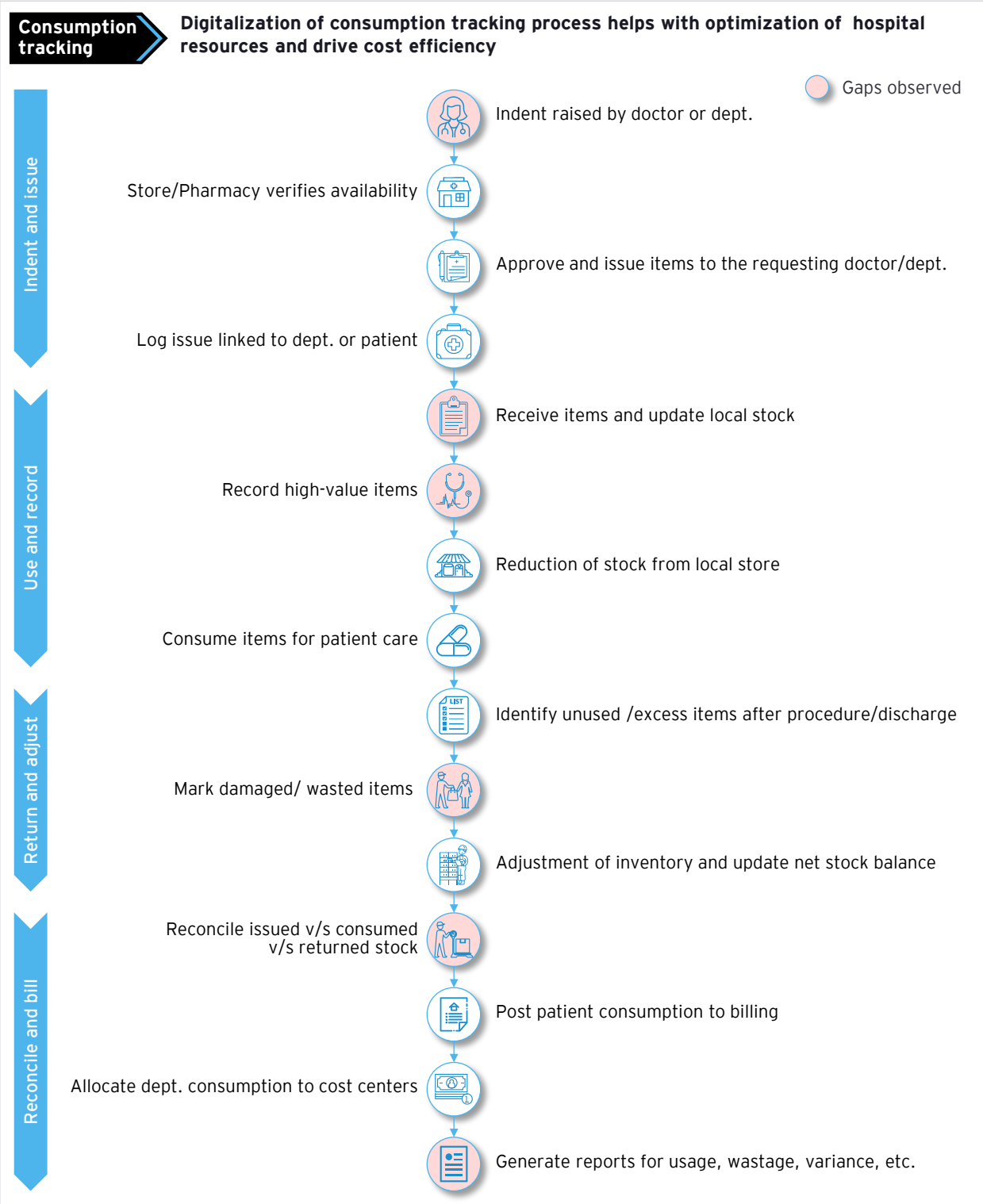
Sub-optimal formulary compliance can lead to 30%–40% value leakage, especially in the initial 3–4 months post-implementation without robust controls. Strengthening compliance through preventive measures—such as digital rate masters, system-restricted dispensing, and SKU blocking—combined with usage guidelines for high-cost items and granular tracking by department, doctor, or item, enables targeted interventions.

Ongoing monitoring of clinical outcomes and drug escalation through analytics and BI dashboards enables sustained compliance and improved value realization.

[1] Re-engineering Indian healthcare 2.0 Tailoring for inclusion, true care and trust August 2019

Vendor management - In most hospitals vendor selection and evaluation remains manual, creating bias and delays, which can be addressed through digital vendor portals and AI-based scoring. Rate contract negotiations, usually paper- or email-driven, extend turnaround times, but e-negotiation and bidding tools can bring speed and traceability. Supplier performance is rarely tracked effectively post-contracting, whereas dashboards with SLA and KPI monitoring can ensure accountability. Purchase orders are often created manually, increasing duplication and errors; automation integrated with ERP and inventory systems can resolve this. Poor coordination between procurement, stores, and finance further slows processes, but centralized systems with real-time workflows improve collaboration. At the goods receipt stage, quality validation is inconsistent, which can be strengthened through digital QC checklists and barcode or RFID scanning. Stock updates in central stores are also prone to inaccuracies, and IoT-enabled inventory management offers real-time accuracy. Compliance monitoring is another weak spot, but rule-based engines with automated alerts can enable adherence to purchase policies. Manual invoice matching and verification create payment bottlenecks, which e-invoicing, with automated three-way matching, can eliminate. Finally, fragmented vendor management data prevents meaningful spend analysis, a gap that advanced analytics dashboards can fill by providing visibility and driving cost optimization.





Material consumption optimization is inherently complex, requiring close collaboration with clinicians within their areas of expertise. In the absence of standardized clinical pathways, associated systems and processes have historically been underdeveloped, often resulting in inefficiencies and significant material wastage.

While the common perception is that patient heterogeneity limits standardization, AI and GenAI can significantly enhance standardization opportunities. By leveraging AI to stratify patient pools based on risk profiles, clinical complexity markers (e.g., surgery duration, comorbidities, length of stay), and historical outcomes, healthcare service providers can uncover hidden patterns and segment patients into clinically meaningful, homogeneous groups. GenAI can then assist in defining and dynamically updating standardized clinical pathways and material usage norms for each group, based on

real-time data, clinical guidelines, and best practices from across institutions. This enables more precise, data-driven decision-making, reduces variation, and supports more efficient and personalized resource utilization.

Lack of clinician awareness about material consumption can be addressed through digital dashboards and real-time analytics showing clinician-wise cost per case. Integrating data from Electronic Health Records (EHR) and procurement systems enables accurate benchmarking and peer comparisons. Coupled with virtual collaboration tools, these interventions promote transparency, knowledge sharing, and cost-conscious clinical practices.

Lack of system controls limits adherence to norms, with only ~30% compliance when monitoring is retrospective.[2] Implementing automated consumption booking based on standard bills of material (BOM) within HIS, combined with built-in approval workflows, can control deviations.

Workforce optimization in healthcare service providers is one of the most critical aspects which has significant cost impact and requires balance efficiency without compromising quality. Bringing in technology solutions, especially to automate repetitive tasks and reduce effort in searching for information or resources can improve the time spent on low-productive tasks.

The porter management system, for example, runs on an algorithm for identifying the nearest available resource to the requesting department. It allows real-time visualization and reduces time spent on communication via telephone by replacing it with nudges on the app. It also reduces the step count by optimizing the porter allocation process, allowing nurses to focus on other tasks.

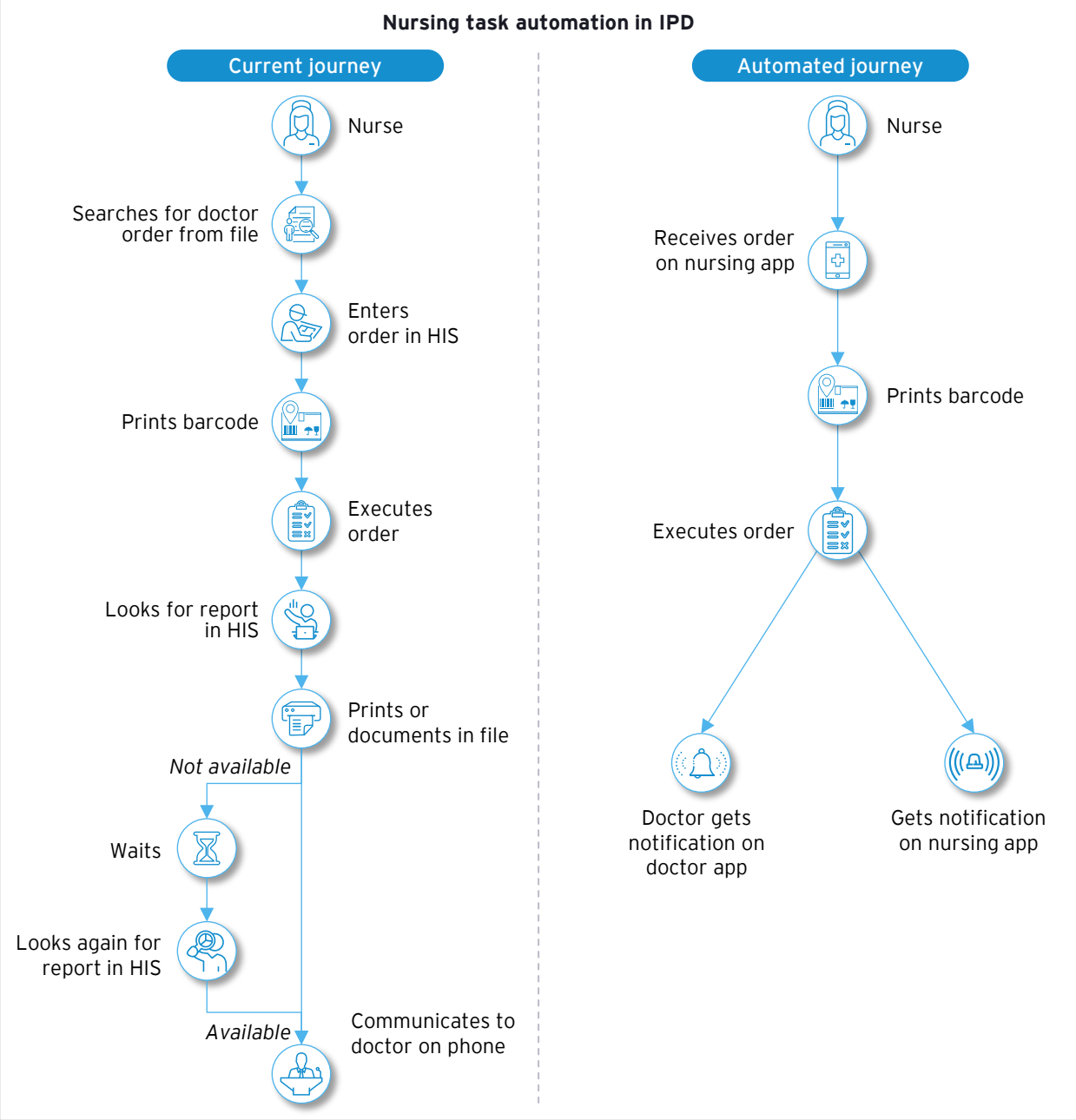
Automation of nursing staff's repetitive tasks can also significantly improve productivity and allow them to spend more time on clinical activities. Smart work allocation based on nurse skill set and patient condition can greatly impact productivity, optimize time spent on activities and improve clinical outcomes. A workforce productivity exercise based on scientific principles of estimating efforts based on acuity, activity, load and skill set of the resource deployed helps in dynamic staffing, such that the patient gets the best suited staff. All this can be automated for auto-allocation across shifts and across wards to enable workforce optimization.

[2] Re-engineering Indian healthcare 2.0 Tailoring for inclusion, true care and trust August 2019

Key levers to improve workforce productivity

Tech intervention

Current state (Staff per occupied bed)	Efficiency improvement through LEAN	Increase leverage by pooling, centralizing and multi-skilling	Tech enablement and process redesign	Horizon 1 (Staff per occupied bed)
Nursing 2.5-2.7	▪ Rule of thumb --> Acuity based staffing ▪ Capacity based --> Patient load based ▪ staffing with exigency planning ▪ Efficient patient cohorting) ▪ Staggered staffing in non-peak hours ▪ Eliminate non-value adding documentation	▪ Multi-skill staff (e.g., Team leaders for supervision as well as patient allocation) ▪ Delegate non-clinical tasks to Auxiliary Nurse Midwives (ANMs) and GDAs ▪ Streamline span of control (e.g., supervisor to staff ratio)	▪ Enable tools and technology (e.g., ISBAR for handover, nurse utility belts) (ISBAR: Identification, Situation, Background, Assessment, and Recommendation)	Nursing 1.5-1.7
Outsourced 2.5-2.7	▪ Optimize regular cleaning frequency (3 times -->2 times) ▪ Combine housekeeping and General Duty Assistant (GDA) into a single pool of multi-skilled staff	Pool staff for on-demand tasks (e.g., discharge room cleaning)	▪ Process redesign (e.g., optimize frequency of out of ward movement) ▪ App based task allocation (e.g., dynamic allocation to nearest free staff) ▪ Enable tools and technology (e.g., chutes and dump elevators)	Outsourced 1.5-1.7
Support 1.3-1.6		Non patient facing staff: ▪ Streamline span of control (move to lean organizational structure)	Patient facing staff: ▪ Promote self-service non-patient facing staff ▪ Automate routine tasks (e.g., using RPA for systems) ▪ Streamline billing ▪ Outsource non-core functions (e.g., payroll processing	Support 0.8-1.0
Junior Doctor 0.8-1.0		Streamline deployment in lean hours (cross specialty exposure)	Smart modules to ease documentation (e.g., drop-downs, checkbox and auto population options)	Junior Doctor 0.7-0.8



> From electronic medical records to remote monitoring and AI-supported diagnostics, technology is helping healthcare providers improve efficiency, cut down errors, and deliver more consistent, high-quality outcomes for patients.
>
> **Harish Manian**
> Group CEO, Baby Memorial

3. Focus on building scalable systems and centralized controlled processes through HIS, PACS, ERP, CRM, centralized contact center

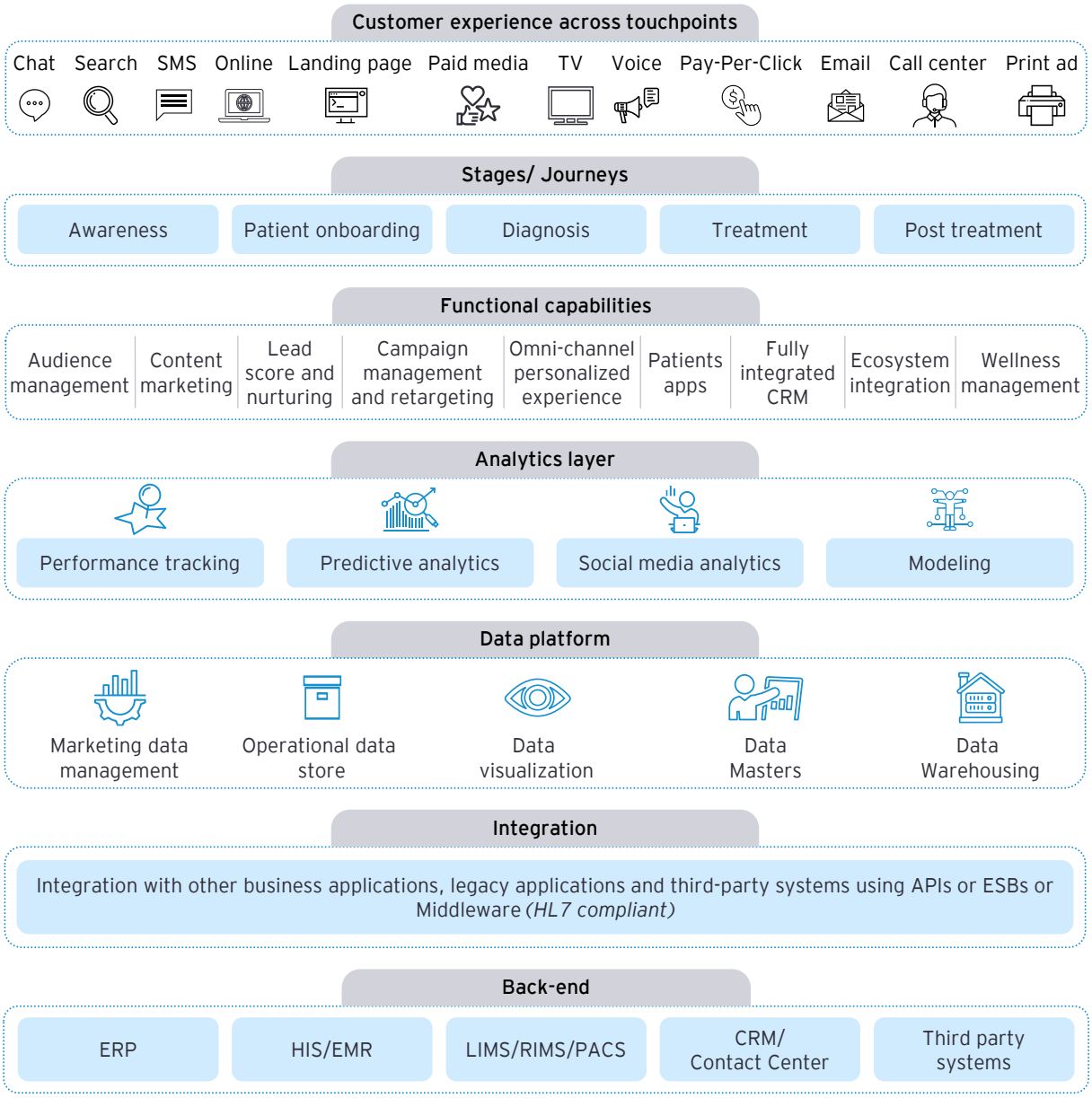
The implementation of scalable systems and centrally managed processes through HIS, PACS, ERP, CRM, and unified contact centers are transforming healthcare organizations' operational models and growth trajectories. Establishing an integrated digital infrastructure allows providers to optimize workflows, eliminate redundancies, and standardize protocols across the network, thereby enhancing efficiency and cost-effectiveness. For example, in radiology and pathology, images and reports can be shared and accessed instantly across the network, reducing

delays and avoiding repeated tests. This allows specialists to focus more on diagnosis and decision-making rather than administrative tasks, improving both efficiency and patient care.

A centralized CRM and contact center elevate patient engagement and facilitate systematic lead generation and nurturing, supporting improved conversion rates and sustained patient loyalty. This consistency ensures patients receive uniform service and care quality throughout all facilities, strengthening trust and brand reputation.

At the organizational level, synthesized data from HIS, ERP, and CRM platforms provide leadership with actionable insights into clinical, operational, and financial metrics, enabling informed decisions regarding future expansion strategies in response to demand trends, utilization patterns, and regional opportunities. Centralized governance reinforces compliance, security, and accountability, while real-time analytics enable decision-makers to strategically allocate resources and project growth.

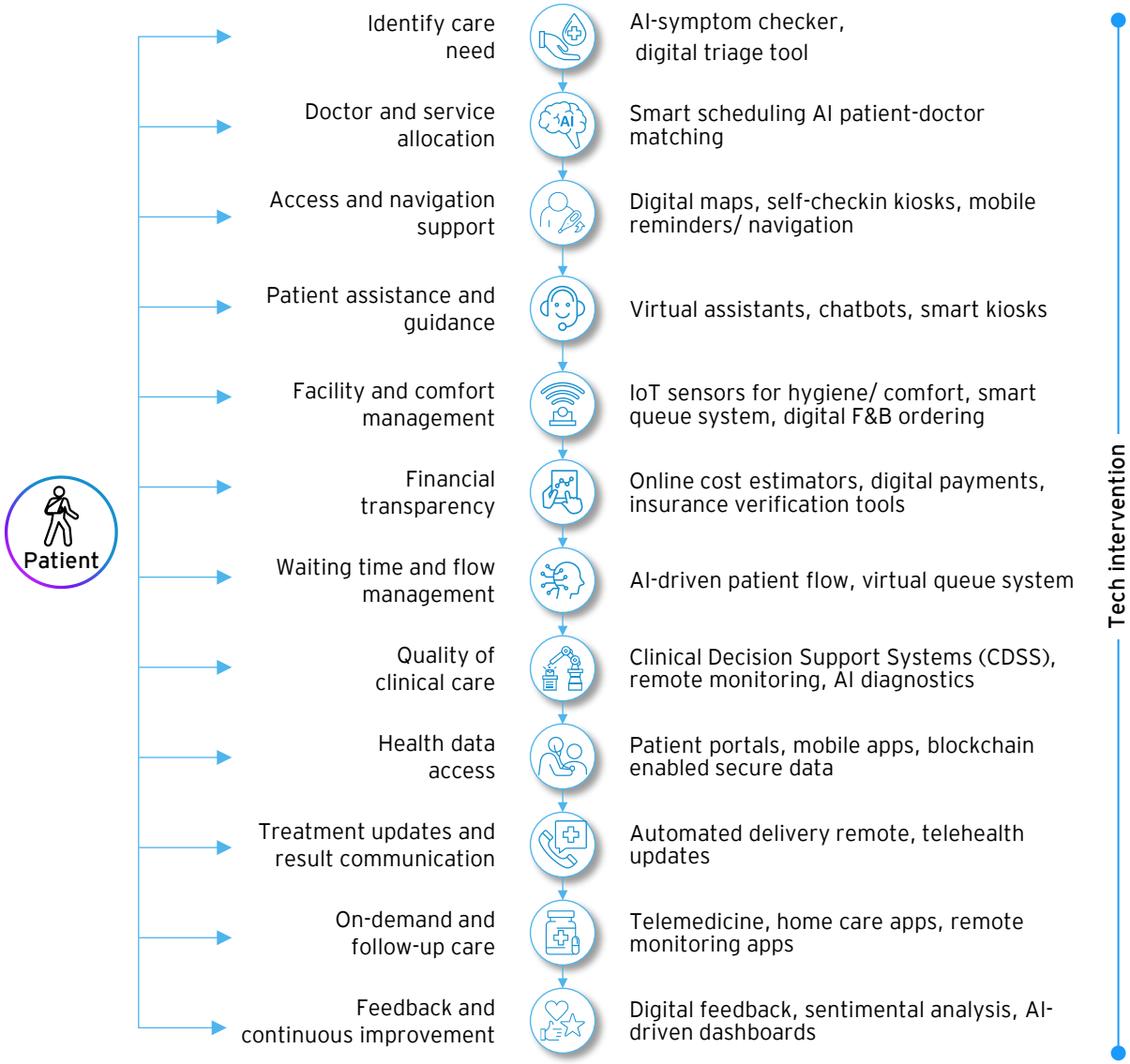
Reference model for patient journey and capabilities required to improve lead generation, conversion and patient engagement



Driving better patient experience as a differentiator

Improving patient experience is increasingly recognized as a core strategic differentiator in healthcare systems not just for quality, but for trust, engagement, and achieving patient lifetime value. This requires a fundamental reorientation by placing the patient at the center of every digital initiative.

Keeping patient at the center of digital strategy will help extract Patient Lifetime Value



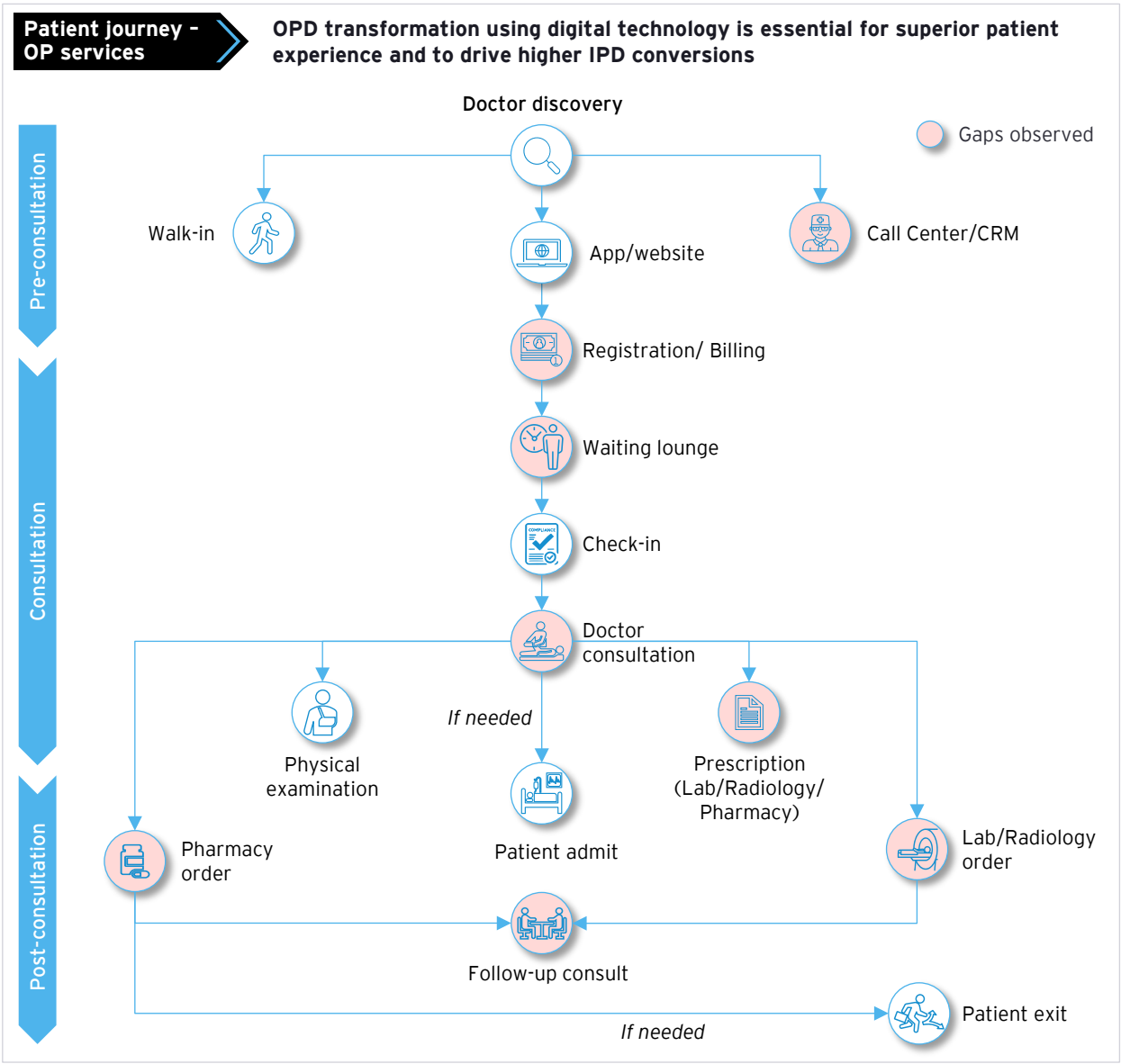
However, this potential is often undermined by a broken patient experience through the journey due to the multiplicity of stakeholders and systems. Patient experience is frequently disrupted by a fragmented care journey involving stakeholders such as physicians, nurses, diagnostic labs, pharmacies, insurers, and administrative teams, each operating within separate systems and processes.

At every stage, from appointment booking to diagnosis, treatment, billing, and post-discharge follow-up, patients often encounter duplication of effort, such as repeating medical histories, undergoing redundant tests, or resubmitting documents. Communication gaps lead to delays in decision-making, inconsistent instructions, and, in some cases, contradictory information. The lack of interoperability between hospital information systems, lab management platforms, pharmacy records, and insurer portals forces patients to act as intermediaries, carrying reports, prescriptions, and approvals from one touchpoint to another.

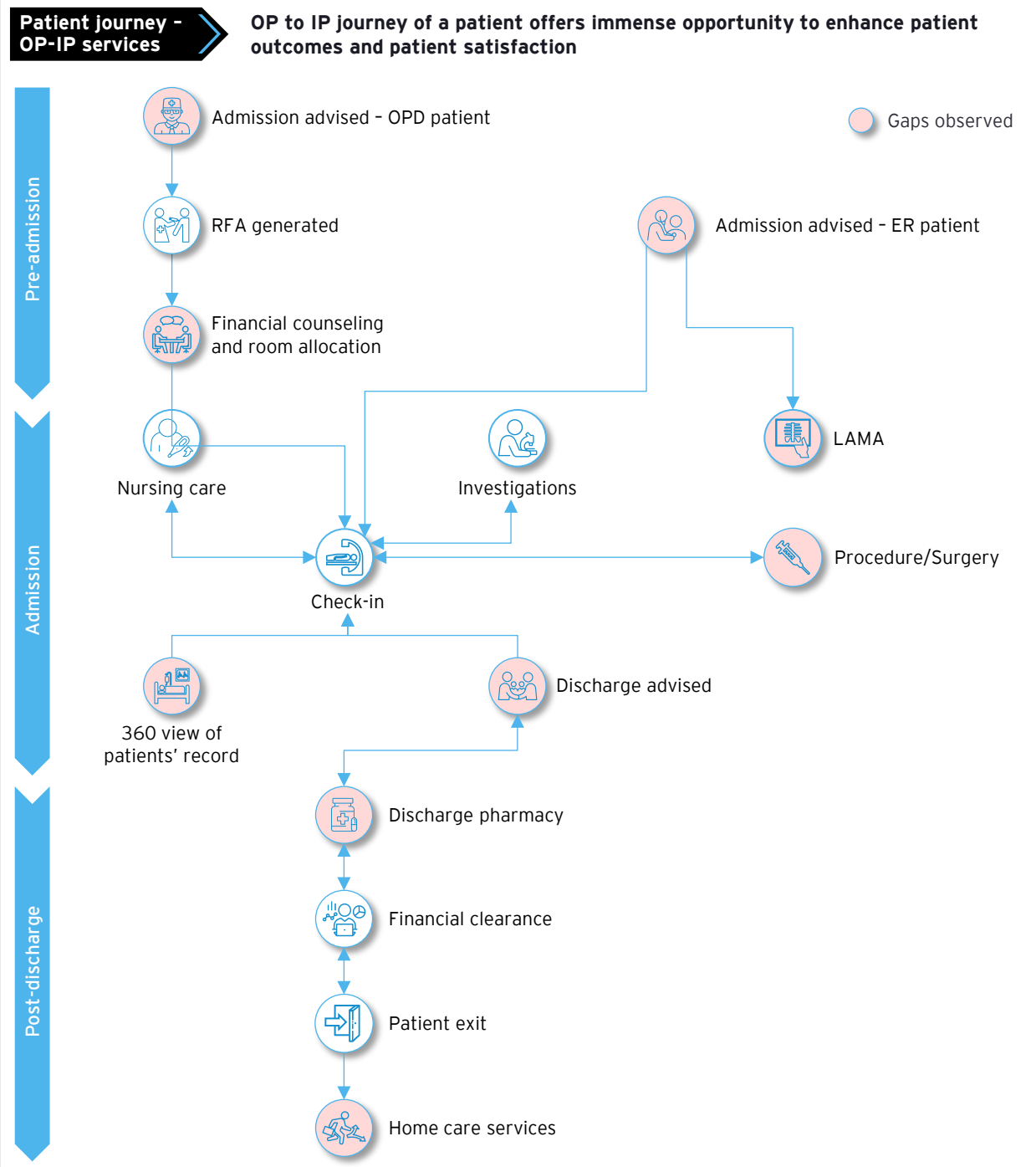
This not only increases stress and confusion but also diminishes trust in the system. Moreover, limited visibility into care progress and fragmented digital tools prevent a unified, patient-centric view, making the journey feel disjointed rather than coordinated and supportive.

Healthcare service providers must pursue platform integration to deliver a seamless, omnichannel experience that fosters trust, loyalty, and continuity of care. Beyond experience, integrated digital ecosystems generate enterprise-wide data visibility. This visibility empowers clinical and non-clinical teams to make timely, data-driven decisions, enhance care outcomes, optimize resource allocation, and drive operational efficiency.

> Digitization is no longer optional – it is essential for enhancing customer experience, boosting productivity and scaling operations. Forward-thinking leaders must treat it as a strategic investment to future-proof their organization.
>
> **Sapna Agarwal**
> Associate Vice-president-Operational Excellence, HCG Hospital



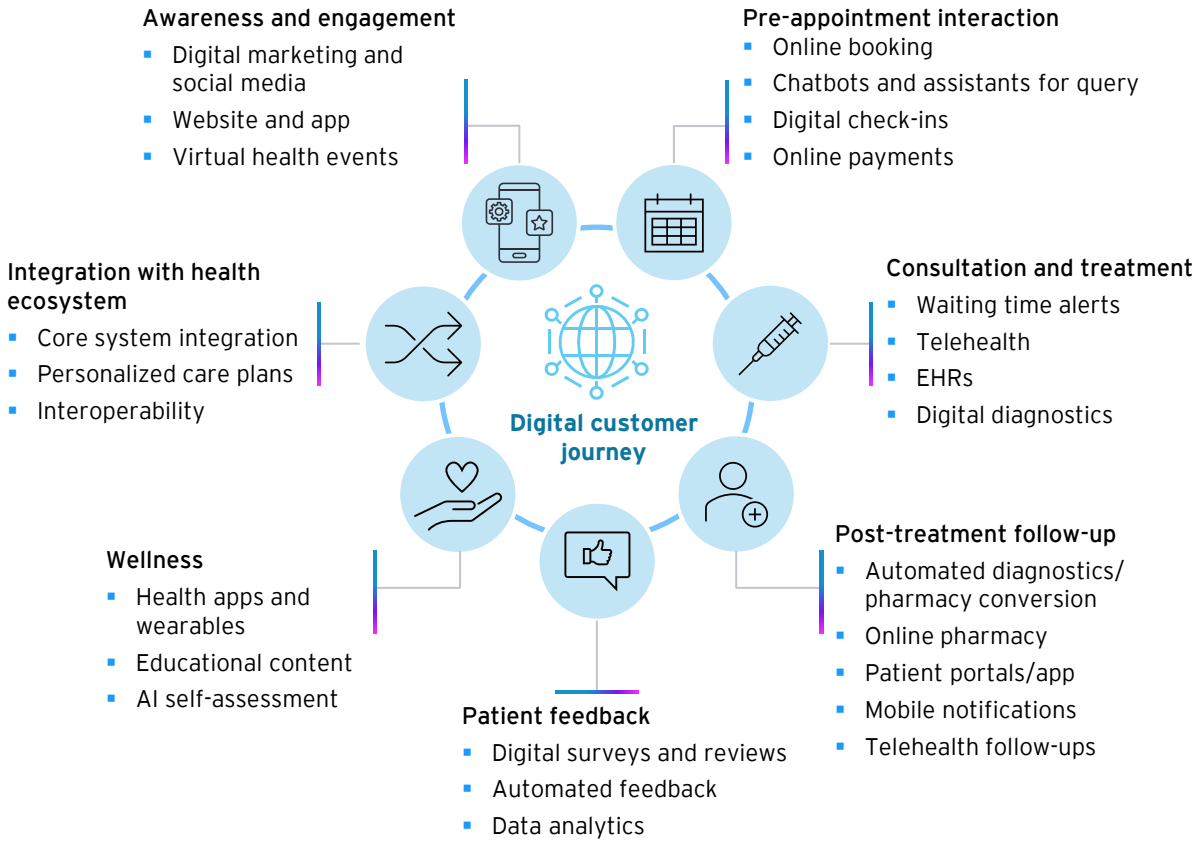
Source: EY-P Analysis



Source: EY-P Analysis

> For today's patient, healthcare is a continuous journey - beginning with health awareness and extending into post-care. By digitizing this entire lifecycle - from finding the right doctor to ongoing support - we are creating seamless, personalized and coordinated experiences across every touchpoint, whether digital or physical. This not only empowers clinicians and healthcare workforce to deliver empathetic care, but also strengthens patient trust and long-term engagement with the healthcare system, ultimately leading to better health outcomes.
>
> **Varun Khanna**
> Group MD, QCIL

The digital footprint in the user journey encompasses awareness, appointment, consultation, follow-up, feedback, health management and ecosystem integration



To address the challenges due to fragmented care journey, there is a growing focus on end-to-end patient journey management. In today's hybrid healthcare landscape, improving patient accessibility requires more than just a single digital touchpoint, it demands integrated, multichannel approaches. By meeting patients where they are, healthcare service providers can drive equitable access, improve satisfaction, and unlock long-term value across both clinical and operational dimensions.

The modern patient journey is evolving into a seamless, tech-enabled experience—beginning at the digital front door, continuing through smart IPD interactions, and extending into post-care engagement.

Expanding the digital front door: Reimagining patient access across channels

- **Discovery platforms broaden digital reach:** Healthcare service provider websites, patient apps and third-party review platforms help patients discover care options even before establishing contact. These tools are key in early decision-making and doctor discovery, allowing users to compare providers, services, locations, and ratings in real time. A well-optimized web presence improves findability and streamlines the journey from search to service.
- **Mobile apps as the front door to care:** Mobile health apps serve as anywhere, anytime, personalized entry points into the healthcare service provider system. They allow patients to schedule appointments, access test results, message providers, and manage chronic conditions all from their phones. When designed with an effective UI/UX, the apps enhance usability, and if integrated with EHRs, they reduce administrative burden and drive stronger patient engagement.
- **Third-party platforms increase visibility and choice:** Patients often use third-party sites like health directories, insurer portals, or health aggregators to discover providers, compare services, and book appointments, especially when the patient is not tied to a specific healthcare service provider. Being visible on these platforms expands reach and gives patients more ways to access care.
- **Call centers bridge digital gaps:** Not all patients are digitally connected or comfortable using apps. Call centers remain vital for scheduling, triaging, and solving queries especially for elderly, low-literacy, or underserved populations. When integrated with EHRs and CRM systems, they offer real-time support while capturing valuable interaction data.

Transforming traditional OPDs into Smart OPDs: Elevating the digital experience for patients and clinicians

As healthcare service providers strive to modernize OPDs, the vision of a Smart OPD—one that is digitally enabled, patient-centric, and operationally efficient—is rapidly gaining traction. This transformation hinges on four key pillars: queue elimination, meaningful patient engagement, digital consultation enablement, and streamlined post-consultation services

1. Skipping queues: Digitizing the first mile

Forward-thinking healthcare service providers are leveraging their mobile apps to eliminate traditional bottlenecks. Features such as pre-registration during appointment booking, mobile check-in upon arrival, and digital prepayments allow patients to bypass queues and proceed directly for consultation. Self-service kiosks facilitate billing, registration, and report collection, reducing dependency on front-desk staff and minimizing wait times. This shift not only enhances patient convenience but also alleviates operational pressure during peak hours, enabling focus on higher-value tasks.

2. Meaningful patient engagement: Turning wait time into value time

Waiting for a consultation remains one of the most underutilized phases of the patient journey. By integrating AI-powered tools, QR codes, and mobile apps, healthcare service providers can now deliver hyper-personalized content tailored to each patient's condition and history. Patients can be prompted to upload previous medical records, respond to structured questionnaires about their symptoms, and engage with educational material relevant to their visit.

GenAI tools can then synthesize these inputs into concise clinical summaries, enabling doctors to quickly grasp the patient's context without sifting through extensive documentation. This not only improves consultation quality but also empowers patients to participate actively in their care.

3. Digital consultation chambers: Empowering clinicians with smart tools

Clinicians often spend a significant amount of time reviewing historical records and manually documenting prescriptions. While EMRs are becoming standard, adoption remains uneven. Younger, tech-savvy doctors may embrace EMRs readily, but for many busy practitioners, healthcare service providers could invest in training nursing staff or deploying medical transcriptionists to support documentation.

The emergence of GenAI co-pilots offers a transformative solution. These tools can draft digital prescriptions by synthesizing data from HIS, patient-uploaded documents, and real-time doctor-patient conversations (ambient listening).

4. GenAI: Helping healthcare professionals focus on care delivery

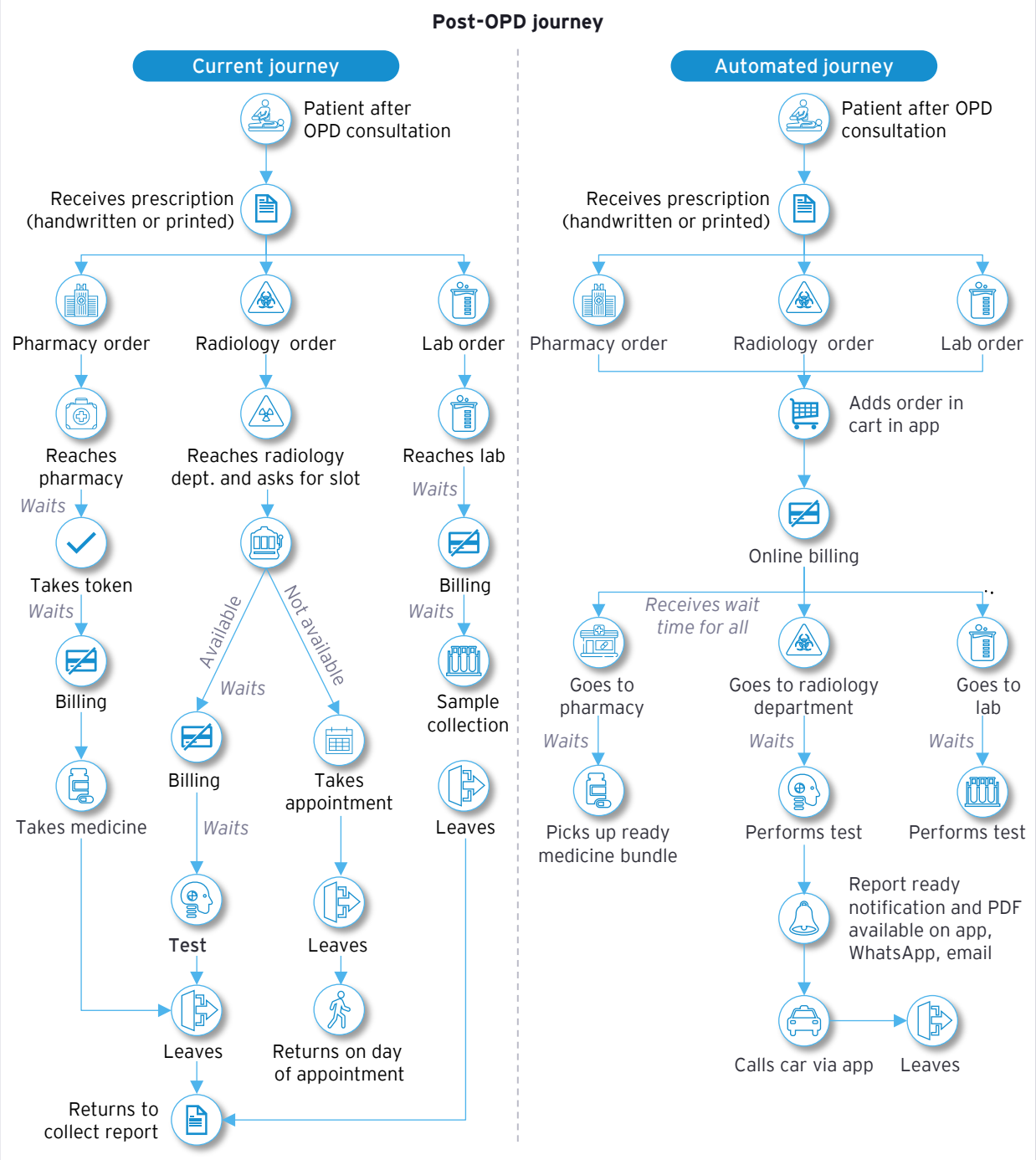
GenAI is reshaping outpatient documentation by passively "listening" to doctor–patient conversations, even across languages and noisy environments, and converting them into structured case sheets in real time. Beyond transcription, these systems can suggest medications, diagnostics, and next clinical actions tailored to the patient's condition. By cutting administrative load, physicians can focus on care delivery, boosting OPD throughput and overall clinical efficiency.

5. Swift post-consultation services: Transitions beyond the chamber

Post-consultation activities such as ordering investigations and dispensing medications are often time-consuming and fragmented. Automated selection and pre-billing of diagnostic and pharmacy services can significantly reduce patient wait times and improve compliance with prescribed treatments.

Integration across EMR, HIS, and mobile platforms is critical. When supported by digitally reimagined workflows, these systems can help patients move swiftly through the final stages of their visit.

It must be understood that the transition from traditional OPDs to Smart OPDs is not merely a technological upgrade—it is a strategic imperative. Healthcare service providers that embrace this transformation will unlock new levels of operational efficiency, clinician productivity, and patient satisfaction. By embedding digital tools across the patient journey and building a culture of continuous innovation, healthcare institutions can redefine outpatient care for the modern era.



> Our AI-powered, voice-enabled OPD prescription system transforms clinical workflows by converting doctor-patient conversations into structured prescriptions in real time. With multilingual instructions, tele-consultations, and integrated post-OPD services, it enhances efficiency, improves patient understanding, and drives better engagement — a key milestone in our digital transformation.
>
> **Rajiv Sikka**
> Group CIO, Medanta Hospital

Digitizing inpatient care: Enhancing efficiency and reducing anxiety

While outpatient transformation has gained momentum, inpatient care remains a critical frontier for digital innovation. The admission process, often marked by anxiety and delays, is ripe for reengineering. Patients are typically required to submit insurance documents, sign consent forms, and make advance payments before room allocation—steps that can be cumbersome and time-consuming.

By leveraging mobile apps, WhatsApp, and secure messaging links, healthcare service providers can digitize these workflows. Patients can share insurance documents, sign digital consent forms, and receive real-time updates on room allocation from their phones. This not only reduces administrative friction but also alleviates anxiety for patients and their families, setting the tone for a more reassuring care experience.

Reimagining ward operations: Empowering nursing and support services

Inpatient care is anchored by nursing teams, who often bear the dual burden of clinical responsibilities and service coordination. Overloaded nursing staff are expected to manage patient queries, help with clinical stability, and execute orders promptly—often without adequate digital support.

In such instances, digital tools offer immense potential. Allied services such as dietetics, physiotherapy, phlebotomy, portering, housekeeping, and food and beverage can be digitized to streamline task allocation, reduce turnaround times, and improve accountability. Many mature healthcare service providers have pioneered clinician and nurse apps to digitize clinical pathways, including cross-referrals, critical test reporting and order fulfilment.

Beyond clinical documentation, there is also merit in digitizing administrative workflows like room allocation, OT booking and clearance, patient transfers, and discharge processes—which can often be manual, error-prone, and time-intensive. A digital-first approach can introduce real-time visibility, operational efficiency, and improved patient throughput.

Post-hospitalization care: Mobile apps as recovery companions

The patient journey does not end at discharge. Post-hospitalization care is increasingly being redefined by mobile apps that serve as hubs for recovery and continuous engagement. These platforms enable patients to book follow-up appointments and diagnostics, order prescribed medications, receive medication reminders and track adherence, monitor symptoms and vital signs, and access personalized educational content.

Integration with IoT-enabled devices—such as wearable sensors, smart pill dispensers, and home health monitors—allows real-time transmission of health data (e.g., heart rate, blood pressure, glucose levels) to care teams. This facilitates early detection of complications, timely interventions, and reduced readmissions.

Transition to data-driven insights

Modern healthcare is being reshaped by the convergence of digital documentation, connected medical devices, and holistic patient 360 views. This transformation empowers clinical teams with data-driven insights across every stage of care—from OPD to IPD and beyond. These innovations not only streamline workflows but significantly enhance clinical decision-making and patient outcomes. Real-time access to patient histories, device-generated data, and AI-powered insights enable clinicians to act faster, with greater precision and confidence. Moreover, this capability allows operations team to identify deterrents to good patient experiences in real-time, enabling immediate intervention when necessary.

Transition to EMR to capture clinical data and other systems for non-clinical data

Transitioning to EMRs can significantly improve the way clinical data is captured, enabling real-time access, higher accuracy, and enhanced coordination among healthcare providers. EMRs support clinical decision-making through integrated tools and standardized documentation. Apart from enhanced collaboration, direct access to updated patient clinical condition and orders given, structured data from EMR can help to easily measure and monitor patient safety clinical parameters. Combined with predictive analytics, it enables early detection of diseases, thereby allowing timely intervention and reducing the chances of complications. Along with GenAI, EMR can also reduce nurse handover time.

Alongside EMR, non-clinical systems such as HIS, ERP, and CRM platforms manage administrative functions like billing, scheduling, inventory, and patient engagement. These systems improve operational efficiency and financial sustainability while supporting the overall patient experience. Seamless integration between clinical and non-clinical systems is essential for a holistic, data-driven healthcare environment.

Hospital	Impact
Max Healthcare	By deploying standards-based diagnosis in Electronic Health Record system, Max Healthcare has been able to reduce Venous Thromboembolism (VTE) from 40% to 80%. It has also implemented Bar Code Medication Administration (BCMA) for medication administration in IPD, compliance of which has significantly improved from 52% to 90%.[3]
Manipal Hospital	Implemented a Google Cloud GenAI-powered nurse handoff system to streamline the transfer of patient information between shifts. This intervention has reduced the average handover time from 90 minutes to approximately 20 minutes, saving over 75% of the time previously spent on documentation and coordination.[4]
Narayana Health	Introduced AIRA, an AI-driven tool designed to streamline patient records. It can learn both digital and scanned patient records to instantly create clinical timelines and smart tags, ensuring no critical detail is overlooked. [5]

[3] Max Healthcare improves patient safety with e-health record system | CIO

[4] How Manipal Hospitals sped up nurse handoffs across 37 hospitals | Google Cloud Blog

[5] Narayana Health unveils AIRA by Athma, AI tool for patient data management | Company News - Business Standard

Data-driven personalized engagement with patients

As healthcare shifts from a population-based, disease-centric model to a patient-centered, data-driven approach, leveraging electronic health records and big data becomes paramount. This transition allows tailoring disease risk profiles, prevention strategies, and wellness plans uniquely to each individual. Technologies like collaborative filtering are being applied to generate personalized recommendations akin to those used by streaming services and e-commerce, enabling truly individualized care pathways. In chronic disease prevention, digital systems utilize real-time sensor data, ML, and behavior-based feedback systems to support precision support—by detecting at-risk behaviors and delivering timely, personalized intervention.

In addition, Large Language Models (LLMs) are being leveraged to enhance patient engagement through conversational agents. Case studies include applications like mental health support chatbots, summary tools, and AI-powered engagement systems. These tools can interpret unstructured dialogue and provide guided, personalized interactions—though they should be deployed with strong considerations around privacy, bias, transparency, and regulation.

Also, there is a need for continuous patient journey analytics for tracking activities like specialist visits, searches, or care gaps, allowing healthcare systems to identify ideal moments for intervention. Players who utilized these analytics witnessed engagement rates rise from 18% to 31%. [6]

With the power of data analytics Narayana Health reports being able to reduce: discharge turnaround time by 52%, OPD delays by 32%, wait time by 14% and lab turnaround time by 50%.[7]

> With rapidly increasing competition and already evolved consumer expectations, now is the time for healthcare providers to revamp their patient interactions using digital technology to reduce information asymmetry, create transparency, and deliver efficient and effective care. In my opinion, that's the key to creating differentiation and competitive advantage.
>
> **Raj Gore**
> Healthcare industry leader

Comprehensive BI dashboards, real time information availability for decision making

Healthcare analytics historically suffered from delays of 24 to 48 hours, which limited timely interventions[8]. Real-time analytics with stream processing and in-memory computing now reduce this latency to seconds or minutes, enabling clinicians to act during patient encounters and boosting patient satisfaction by up to a 30%.[9]

Modern BI architectures integrate real-time data from EHRs, devices, and workflows, breaking down silos between clinical and operational analytics. This integration can reduce patient length of stay by nearly 0.7 days while aligning clinical performance with operational gains.[10]

During emergency situations like COVID-19, Johns Hopkins deployed an interactive decision-support dashboard that integrated predictive models with real-time healthcare service provider data. The administrator-designed tool enabled scenario exploration and daily capacity recommendations, empowering faster, more informed leadership decisions.[11]

[6] Customer Journey Analytics: Cracking the Patient Engagement Challenge for Payers
[7] Narayana Health's tech choices aimed at efficient patient care, infrastructure, better clinical care quality: Group CFO Sandhya J - Times of India
[8] https://eajournals.org/ejcsit/wp-content/uploads/sites/21/2025/05/Real-Time-Healthcare-Analytics.pdf
[9] https://eajournals.org/ejcsit/wp-content/uploads/sites/21/2025/05/Real-Time-Healthcare-Analytics.pdf
[10] https://eajournals.org/ejcsit/wp-content/uploads/sites/21/2025/05/Real-Time-Healthcare-Analytics.pdf
[11] An Interactive Decision-Support Dashboard for Optimal Hospital Capacity Management

In an era where patient expectations are shaped by the immediacy of quick commerce and 10-minute delivery benchmarks, real-time operational intelligence is emerging as a critical differentiator for healthcare providers. Leading private healthcare service provider chains are actively exploring the concept of "Operational War Rooms", centralized command centers that surface live operational, financial, and patient experience KPIs. These war rooms empower dedicated cross-functional teams to orchestrate rapid, coordinated interventions across departments, aligning staff actions with dynamic patient needs. By institutionalizing real-time responsiveness, healthcare service providers can shift from reactive service delivery to proactive experience management—driving both operational excellence and patient delight.

Top KPIs measured across revenue and cost levers

Revenue

- Average Revenue Per Occupied Bed (ARPOB) bridge by payor mix, speciality mix, acuity mix, room mix, price revisions
- Revenue bridge (Budget vs Actuals/Current period vs previous period/Current period vs same period last year)
  - by business unit
  - by speciality
  - by revenue category
  - by key revenue drivers (ARPOB/ occupied beds)

Call center

- Call abandonment rate
- First call resolution
- Average handling time
- Transfer rate
- Cost per call
- Call arrival rate
- Agent utilization rate
- Escalation rate
- Resolution rate
- Agent knowledge and competency scores

CRM

- Campaign response rate
- No. of responses by campaign
- No. of bookings from campaign
- Number of retained customers
- Amount of new revenue
- Amount of recurring revenue
- Time-to-close by channel
- Self-service for booking with feedback
- No. of usage of digital front door.
- Voice of customer scores

Workforce

- Workforce cost as % of revenue
  - Overview-Month-on-month (MoM) trend
- Deep-dive by category, department contributing to cost impact
- Employee analysis
  - Number of joiners, resignations, absconding employees by age

Procurement

- Margin %, Innovator share %
- Material cost as % of revenue
- Unit-wise comparison

Workforce

- Workforce cost %
- Workforce cost per occupied bed day (OBD)
- Staff per occupied beds
- Span of control
- Increment impact, replacement cost impact
- Department level staffing metrics for priority departments
- Department-wise workforce requirement, actuals, excess and shortfall

ROI from digital solutions can potentially range between 20%-25% incremental revenues and 15%-20% cost savings

Area	Potential solution stack	Impact
Patient acquisition	*Website UI/UX/SEO*, social listening, patient and doctor apps/portals, chatbot, *digital and targeted marketing*, digitally enabled sales force	↑ 8%-10% of revenue
Patient servicing/ conversion	Omni-channel contact centre, *lead management, conversion management*, query management	↑ 4%-5% of revenue
Patient experience	Intelligent queue management, patient touchpoint digitization, bill estimation / proactive communication, automated support services pathway, automated feedback management	↑ 4%-5% of revenue
Revenue assurance	*Intelligent automation and audits (RPA)*, QR code-based solutions	↑ 2%-3% of revenue
Patient lifetime value	*Targeted engagement platform*, self-care tools, chronic care management, virtual/remote care	↑ 5%-7% of revenue
Clinical outcomes	Intelligent EHR, clinical pathway automation, *patient dashboards*, remote monitoring, IOT (in-hospital/wearables)	↑ 20%-25% productivity
Cost optimization / efficiency	*Procurement / consumption compliance automation, dynamic workforce planning,* intelligence process automation (RPA)	↓ 15%-20% of cost
Insights based operations	*Operational control towers, BI dashboards*	↓ 10%-15 % of cost

When implemented holistically along with process redesign, targeted staff enablement and robust performance tracking, digital solutions can unlock substantial financial impact for healthcare providers. Organizations that execute effectively are seeing potential uplifts of 20%–25% in incremental revenues and 15%–20% in cost savings, according to an EY analysis. These gains directly translate into healthier P&Ls and stronger EBITDA margins. The key lies in moving beyond isolated tech deployments to integrated transformation, where digital tools are embedded into core workflows, compliance is automated, and frontline teams are empowered to drive sustained operational and financial performance.

> Digital health, cloud-based radiology, AI-assisted diagnostics, and remote ICU monitoring have allowed us to extend world-class care into small towns and mountain communities that were once invisible to mainstream healthcare. Sehat Chaupals and teleconsultations ensure early detection and continuity of care, preventing both medical tragedies and financial ruin. For us, technology is not an add-on — it is the equaliser that allows a farmer's family in Karnal or a shopkeeper in Srinagar to receive the same quality of care as someone in Delhi. If India is to achieve true universal healthcare, technology-led equitable distribution is non-negotiable.
>
> **Dr. Shuchin Bajaj**
> Founder Director, Ujala Cygnus Hospitals

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03

From foundational to future-fit

Innovations impacting healthcare

Technological advancements are not just altering the way healthcare is delivered but also redefining how individuals experience and interact with it daily.

At the forefront of this transformation is AI, including GenAI, which is revolutionizing diagnostics, medical imaging analysis, outcome prediction and clinical decision-making. Simultaneously, the integration of Internet of Things (IoT) devices and wearable health technology is enabling continuous health monitoring beyond clinical settings. From tracking heart rate and blood oxygen levels to detecting early symptoms of common illnesses, wearables have evolved into powerful medical tools.

Another significant shift is the move toward personalized medicine. No longer reliant on a one-size-fits-all model, healthcare is becoming increasingly tailored, leveraging genetic testing and lifestyle data to create individualized treatment plans. This approach allows clinicians to choose medications, therapies and even nutrition plans based on a patient's unique biological profile.

Digital transformation is bolstered by the widespread adoption of integrated Electronic Health Records (EHRs), making it possible for patient data, ranging from prescriptions to lab reports, to be easily accessible across care settings. Enhancing this infrastructure, blockchain technology is being deployed to secure medical data, offering transparency and protection against tampering or unauthorized access.

Telemedicine, which surged during the pandemic, is evolving into a full-fledged digital healthcare ecosystem. It now encompasses virtual consultations, remote diagnostics and digital therapeutics—all underpinned by secure data exchange and intelligent automation.

India is poised to lead the global digital health transformation, driven by large-scale initiatives that address critical challenges. With healthcare service providers under pressure from rising patient volumes and staffing shortages, AI is being deployed to improve diagnostics, predict complications, assist in robotic surgeries, deliver virtual care and streamline workflows.

> AI in healthcare is just at its beginning—the real breakthroughs are yet to come, bringing surprises that will empower compassion, precision and connection, unlocking a future where patients and providers thrive together.
>
> **Mahesh Shinde**
> Director IT and Telecom, P.D. Hinduja Hospital and Medical Research Center

Upcoming tech developments in healthcare offerings

Enhancing patient experience	Data-driven therapies	From drug discovery to personalized therapies	Enhancing healthcare in non-clinical operations	Driving precision in complex interventions
Technology is delivering care anytime, anywhere with AI, wearables, telehealth and connected intelligence	AI is transforming diagnostics from reactive snapshots to proactive, personalized foresight	AI is accelerating drug discovery and powering truly personalized therapies	AI is transforming healthcare operations into intelligent, connected and patient-centric systems	Robotics and AI are redefining precision, safety and access in medical interventions
Telehealth	Early detection	Target discovery	Demand planning	Surgical Robotics
Wearables	Smart imaging	Virtual trials	Supply chain	Microscale accuracy
Personalized care	Precision care	Adaptiveness	Financial resilience	5G connectivity
Predictive care	Digital biomarkers	Synthetic data	Smart workforce	AI navigation
Care continuity	Risk prediction	Genomic insights	Claims automation	Cardio and Neuro
Connected records	Workflow automation	Digital therapeutics	Patient engagement	Miniaturization

Enhancing patient experience

Technology is transforming the way patients experience healthcare, making it more seamless, personalized and accessible than ever before. Digital front-door solutions such as telemedicine platforms, mobile health apps and AI-powered chatbots enable patients to access care anytime, anywhere, while reducing wait time and administrative hurdles. Unified EHRs lead to continuity across providers, minimizing repetitive tests and enhancing trust in the system. Wearables and remote monitoring tools empower patients to actively manage their health, while predictive analytics enable clinicians to deliver tailored care journeys. Together, these advancements foster transparency, engagement and a patient-centric ecosystem where convenience, speed and quality of care converge.

Building awareness

AI and GenAI are reshaping population health by segmenting communities through risk and behavioral insights, enabling highly targeted interventions. Conversational AI chatbots now deliver preventive care reminders, public health alerts and vaccine outreach across digital channels, while also countering misinformation and improving health literacy during outbreaks. GenAI expands this reach with personalized, multilingual content in text, audio and video and even supports therapeutic, anxiety-reducing conversations as "virtual counselors." Real-world cases illustrate the impact: India's MyGov Corona Helpdesk reached 30 million citizens with COVID-19 updates via WhatsApp, while a maternal health non-profit has been able to use DeepMind-powered models in Mumbai to cut maternal health dropout risks by 30% by making critical care accessible for vulnerable groups.[12]

[12] How Google and ARMMAN's innovative partnership is transforming maternal healthcare in India - BusinessToday

Telemedicine, tele-nursing and beyond: Transforming virtual care delivery

Virtual care has matured into hybrid models blending online triage, virtual consults and in-person visits for improved access. Virtual nursing supports documentation, education and discharge remotely whereas 'Healthcare service provider-at-home' programs—driven by monitoring and tele-rounding—bring safe acute care into homes.

A leading hospital chain in India illustrates how using tele-nursing services offered across their digital platforms allow nurses to provide remote counselling, medication education and post-discharge monitoring, especially for chronic disease patients.

Telepsychiatry leads in adoption for behavioral health with specialties like dermatology, oncology, pediatrics and chronic care also expanding. Accessibility is now core with rural coverage, inclusive design and multilingual tools considered standard.

AI and GenAI are sharpening telehealth: intelligent triage optimizes pathways while computer vision aids rehab and diagnostics. Beyond AI, wearables reduce readmissions, asynchronous care cuts wait times, tele-ICUs extend specialist oversight while virtual rehab, tele-pharmacy and tele-stroke programs improve recovery and emergency response. Together, these advances drive a more accessible, efficient and outcome-focused ecosystem.

Tele-pharmacy allows patients to consult pharmacists remotely for medication counselling, prescription management, therapy optimization and adherence monitoring. It also bridges gaps in rural/underserved areas and supports chronic disease management where continuous follow-up is vital. For example, India's A leading online pharmacy, consultation and diagnostic platform integrates pharmacist consultations with home delivery and adherence support. Such models enhance medication safety, access and continuity of care—particularly in underserved regions.

The next phase of growth is expected to be marked by regulatory clarity—particularly FDA guidance around AI and software-as-a-medical-device—accelerating safe adoption. At the same time, consumerization is embedding telehealth into retail, employer and technology platforms. Emerging markets could drive mobile-first, inclusive models and success may increasingly be judged on outcomes thereby reducing costs, expanding access and improving patient satisfaction.

Intelligent patient monitoring

Wearables and connected devices now enable round-the-clock monitoring, with unified dashboards consolidating multiple sensor feeds into a single clinical view. Machine learning filters cut false alarms, digital twins forecast patient trajectories for earlier intervention and GenAI compresses continuous streams into concise summaries. Adaptive algorithms further personalize thresholds to each patient's history and context.

Use cases are expanding rapidly: ECG patches detect arrhythmias and support post-stent recovery, continuous glucose monitors guide real-time insulin adjustments, oximeters/spirometers track COPD and asthma at home, maternity teams monitor fetal and neonatal vitals and oncology programs oversee chemotherapy side effects to reduce avoidable admissions.

In addition, mainstream wearables are gaining clinical validation as AI-native firmware enables real-time action. Integration with EHRs through healthcare data standards for information exchange such as Fast Healthcare Interoperability Resources (FHIR) Bulk Data is becoming standard, while mobile-first kits extend access in emerging markets.

The real measure of progress would be fewer hospital visits, improved chronic disease control and higher patient satisfaction.

Delivering treatment and managing care path

AI is strengthening care management by predicting treatment outcomes, identifying adherence risks and flagging pathway deviations. Digital assistants reinforce compliance, manage side effects remotely and provide free clinicians for higher-value care.

By integrating EHR, genomic and patient-level data, it personalizes treatment in complex areas like oncology and chronic disease, while also predicting adverse drug reactions.

The impact is visible. Mount Sinai hospitals in the New York City reported quadrupled monthly delirium detection rates (4.4% to 17.2%) using AI.[13]

Wearables and IoT

IoT wearables are shifting healthcare from episodic visits to continuous, proactive management by streaming real-time vitals such as ECG, SpO_2 and

[13] AI Model Improves Delirium Prediction, Leading to Better Health Outcomes for Hospitalized Patients | Mount Sinai - New York

glucose directly into clinician dashboards. Coupled with AI analytics, these devices detect subtle physiological changes, predict risks and trigger timely interventions improving diagnostic accuracy, reducing avoidable admissions and enabling dynamic treatment adjustments for chronic diseases. Globally, leading consumer brands are moving beyond lifestyle tracking and into clinically relevant use cases, while some MedTech leaders are extending therapeutic devices toward consumer adoption, creating a converging ecosystem of medical-grade and consumer technology. In India, high smartphone penetration, low-cost data and strong digital infrastructure have accelerated adoption, pushing wearables from fitness accessories into mainstream healthcare. With rising chronic disease burden, real-time tracking is no longer a novelty but is fast becoming a necessity. The market, valued at US$1.04 billion in 2024 and projected to reach US$4.2 billion by 2033 (CAGR 15.5%),[14] is reinforced by national programs like Ayushman Bharat and PM-Ayushman Bharat Health Infrastructure Mission (PM-ABHIM) that embed wearables into preventive care delivery.

Transition of care

AI is shifting healthcare from reactive treatment to proactive prevention by enabling continuous monitoring of chronic conditions, flagging early risks and supporting anticipatory interventions that stabilize patients at home. The critical transition from hospital to home, often the weakest link, is improving as GenAI generates local-language discharge instructions, visual medication calendars and personalized reminders that boost adherence without overloading clinicians.

AI-driven risk scoring now predicts re-admissions at discharge and routes actionable steps to care coordinators, from medication prompts to scheduled outreach, reducing preventable hospitalizations. The impact is tangible. US-based Johns Hopkins University cut emergency department boarding times by ~30% and OR transfer delays by 70% using an AI command center.[15]

[14] India Medical Wearables Market Size, Trends & Report 2033

[15] Constant Updates Streamline Patient Flow at the Johns Hopkins - GE HealthCare Command Center

Unified patient view

Interoperability: From isolated systems to a unified view of the patient

Healthcare's shift to digital unified patient records, but true data sharing still lags. Rising costs, regulatory pressure and security needs are now driving interoperability—where connected systems aggregate data, generate insights and improve provider–patient relationships. Despite widespread EHR adoption, many datasets remain siloed or outdated, leaving patient information fragmented and hard to act on. Interoperability standardizes and contextualizes data, so lab results, prescriptions and care plans flow seamlessly across providers and geographies. Achieving this requires common standards, modern infrastructure and security by design—unlocking continuity of care, advanced analytics and innovation at scale.

Data transformation

Curation of raw data	Proactive diagnostics and early decision making	Diagnosis and testing	Clinical decision-making
Descriptive (Explore the data)	**Diagnostic** (Understand the data)	**Predictive** (Use the data)	**Prescriptive** (Provide value from the data)
Continuous gathering of structured and unstructured data from multiple sources	Analyzing complex data to identify or confirm the presence of diseases and conditions	Anticipating future health risks, suggesting treatments by analyzing current and historical data.	Recommending specific clinical actions, interventions or treatment pathways

The health ecosystem comprises various types of real-world data—including patient, population, and organization level datasets. Transitioning from isolated raw data to structured patient-level information enables the creation of unique, longitudinal datasets that integrate extended health or medical records with episodic treatment periods. These curated datasets provide robust opportunities for analysis, generating insights that deliver value to patients, healthcare providers, payers, pharmaceutical companies, and the broader economy.

The progression of healthcare data from descriptive to prescriptive analytics creates a powerful pathway to unlock value for research and population health studies. Descriptive, diagnostic, predictive, and prescriptive analytics form a continuum that transforms health data into practical, actionable insights. This evolution enables proactive interventions and evidence-based decisions, driving improvements in research, public health policy, and patient care.

Data-driven therapies

Proactive diagnostics and early decision-making

Proactive diagnostics is redefining healthcare by shifting from symptom-driven encounters to continuous sensing and earlier intervention. By integrating EHRs, labs, imaging and medication histories with real-time inputs from wearables and home monitoring, systems are generating foresight on who is likely to deteriorate, who needs testing and which treatment to initiate. Screening is becoming sharper with AI-assisted breast cancer trials like EDITH in England, autonomous tools such as IDx-DR for diabetic retinopathy and multi-cancer blood tests like Galleri pushing liquid biopsy toward routine use. Digital biomarkers are also scaling with smartwatches validated in the Apple Heart Study [16]for atrial fibrillation and home-based monitoring for COPD or heart failure, while AI models are extracting hidden insights from routine tests like ECGs and CT scans to accelerate intervention.

GenAI is adding personalization and efficiency to this shift. It creates patient-specific "risk stories" by combining vitals, imaging, medications and social risk factors, guiding investigations and treatment choices. It also improves patient engagement through plain-language explanations of screening trade-offs and preparation instructions. Operationally, GenAI is streamlining workflows with auto-drafted radiology reports, ambient documentation and seamless clinical decision support. Together, these advances are moving diagnostics from snapshots to continuous, personalized and actionable insights—reshaping both patient outcomes and healthcare delivery.

Diagnosis and testing

AI and GenAI are reshaping diagnostics by enabling earlier detection of cancers, chronic and neurological conditions while augmenting laboratory and imaging workflows. Machine learning analyzes biopsy and genomic data, while GenAI drafts reports, summarizes findings and suggests differentials—reducing errors and radiologist workload. Beyond human vision, AI detects subtle disease patterns across X-rays, CTs and MRIs with expert-level accuracy, as demonstrated by leading firms in artificial intelligence (AI) solutions for medical imaging, offering AI-powered tools that assist radiologists and healthcare providers in the early detection and diagnosis of various medical conditions.

Predictive system's sepsis alerts, flag risks hours before symptoms appear, allowing clinicians to intervene earlier and deliver more personalized care.

In critical care, these smart systems process vast real-time data streams to detect early deterioration, reducing burnout and freeing time for patients. Emerging platforms from tech giants that offer LLM models are already advancing diagnostic reasoning, record summarization and image interpretation. As adoption scales under stronger governance, diagnostics will shift toward faster, more consistent and outcome-driven care pathways with minimal operational friction.

Clinical decision-making

Clinical decision-making (CDM) has always been central to healthcare, traditionally driven by guidelines and clinician judgment. With digital transformation, AI and GenAI are redefining this process—delivering faster, evidence-based and more personalized outcomes. AI is shifting CDM from reactive to predictive by forecasting sepsis risks, recommending ICU transfers and triaging urgent radiology scans. In oncology, it enables therapy personalization by combining genomic and clinical data, while ML-based models refine risk–benefit assessments in conditions such as atrial fibrillation. GenAI adds further intelligence by fusing multimodal data—labs, notes, imaging, symptoms—into cohesive narratives, drafting differentials, suggesting investigations and explaining rationales in natural language. It also enhances shared decision-making with patient-friendly, multilingual explanations that boost understanding and adherence, while adapting to local practice patterns. Leading institutions like US-based Cleveland Clinic are already integrating AI with wearables and IoT to continuously monitor chronic patients, preventing deterioration and avoidable admissions.

[16] Apple Heart Study launches to identify irregular heart rhythms - Apple

From drug discovery to personalized therapies

AI-led accelerated drug discovery

Speeding target identification

- Hospitals generate rich clinical, genomic and imaging data
- This data can be leveraged to identify novel drug targets and design molecules
- It can speed up target identification and molecule optimization

Synthetic data and virtual trials

- Synthetic data replicates clinical patterns while safeguarding privacy
- It enables stronger AI model training with diverse populations
- Virtual trials simulate drug response and safety early

Precision medicine and scalability

- It supports precision medicine by matching therapies to sub-populations
- It can scale R&D by integrating real-world evidence and biomarker discovery
- It shortens development cycles and reduces costs

Speeding target identification

Hospitals generate rich clinical, genomic and imaging data that, when combined with AI, can fuel partnerships with pharma to accelerate discovery of new therapies. Leveraging this real-world evidence helps identify novel targets, biomarkers and disease pathways while aligning innovation with patient needs. AI models trained on hospital datasets can rapidly design drug-like molecules, optimize binding and predict safety profiles—cutting years from traditional trial-and-error research.

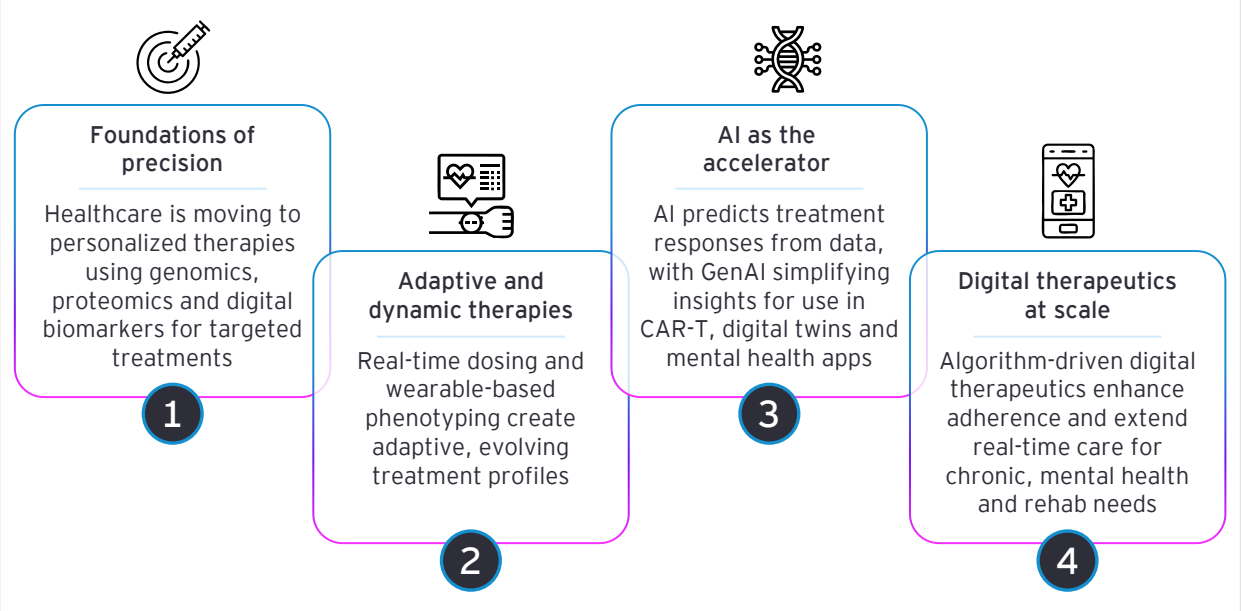
Synthetic data and virtual trials

Synthetic data allows hospitals to safely share patient insights with pharma partners by replicating real clinical patterns without exposing sensitive information. When combined with AI, these datasets strengthen model training and enable more representative analysis across diverse populations. Virtual trials and digital twins then build on this foundation, allowing researchers to simulate drug responses, anticipate safety issues early and optimize candidate molecules before moving into costly clinical phases.

Precision and scalability

AI brings scalability to R&D pipelines by integrating real-world evidence, patient stratification and biomarker discovery. This enables precision medicine—matching therapies to sub-populations—and ensures faster transition from lab to clinic. Ultimately, AI enables shorter development cycles, lower costs and improved success rates in high-risk drug pipelines.

Personalized therapies



Healthcare is rapidly shifting from generalized treatment protocols to precision-driven therapies that reflect the unique biology, lifestyle and clinical context of each individual. Breakthroughs in genomics, proteomics and digital biomarkers are enabling targeted drugs, immunotherapies and tailored dosing regimens that maximize efficacy while minimizing risk. This personalization is increasingly adaptive, powered by real-time data from wearables and connected devices that continuously update a patient's health profile, allowing therapies to evolve dynamically with changing conditions.

AI plays a catalytic role, predicting treatment responses from vast clinical and real-world datasets and using GenAI to translate complex insights into actionable guidance for clinicians and patients alike. Innovations such as CAR-T therapies, digital twins in cardiology and adaptive mental health platforms highlight this acceleration. Meanwhile, algorithm-driven digital therapeutics are extending precision care at scale—refining recommendations in real time, enhancing adherence, reducing hospital readmissions and expanding access in areas like chronic disease management, mental health and rehabilitation. Together, these advancements are transforming personalized therapies into a continuously learning, responsive ecosystem that redefines how care is delivered.

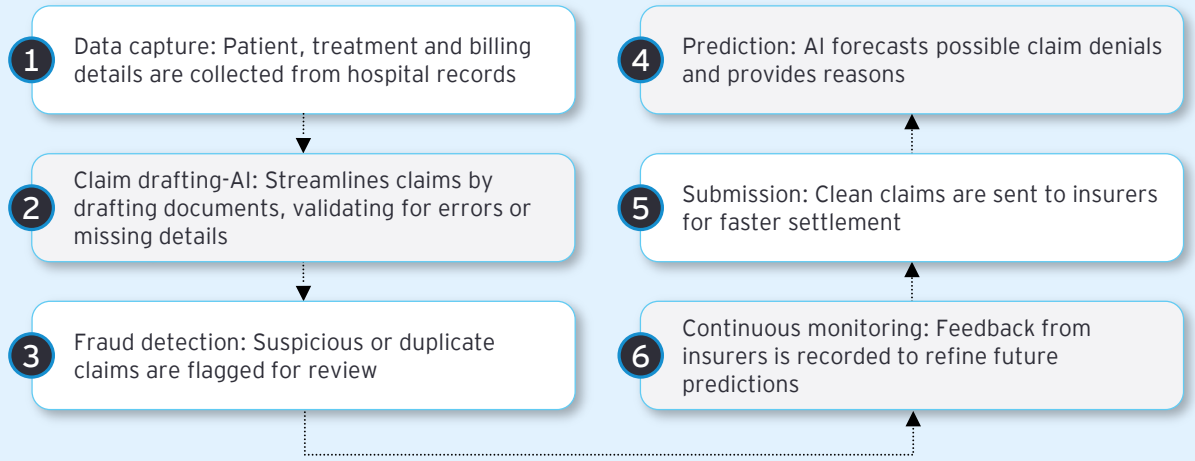
Enhancing healthcare in non-clinical operations

Healthcare operations are shifting from manual, fragmented processes to intelligent, connected ecosystems. AI and GenAI are no longer back-office enablers—they are embedded in core workflows, orchestrating everything from capacity planning and workforce scheduling to supply chain visibility and claims processing. By predicting demand surges, reallocating resources in real time and reducing administrative bottlenecks, these technologies unlock measurable gains in efficiency and resilience. The result is not just smoother operations, but healthcare systems that are more agile, patient-centric and financially sustainable.

With regulators tightening governance, AI is moving safely from pilots to core workflows. Predictive models now forecast demand, optimize staffing and manage inventory, while digital twins simulate scenarios to pre-empt surges. HR tools automate screening, predict attrition and personalize training, with GenAI supporting interviews and onboarding. Finance and compliance are streamlined as AI automates coding, denial prediction and fraud detection, while GenAI drafts appeals, bills and payout summaries to boost transparency and collections.

Patient engagement and branding is amplified with multilingual, personalized content, sentiment monitoring and wearable-linked assistants for outreach, follow-ups and remote monitoring. Together, these advances are improving efficiency, financial resilience and patient-centered care. Predictive models can also forecast potential PR issues based on keyword clusters and review spikes. This allows health systems to maintain high-frequency, personalized engagements with varied patient segments at a fraction of traditional efforts.

Use case for automating insurance claim: Major healthcare service providers apply AI to automate insurance claims billing, flag errors or fraud and predict claim denials. These systems reduce payment delays and manual workload, support regulatory compliance, and significantly improve cash flow for financially strained health networks.



Driving precision in complex interventions

01

Robotics and AI as partners

Robotics and AI are redefining complex interventions by enhancing dexterity, accuracy and real-time decision support—reducing risks, improving outcomes and expanding the boundaries of what surgeries can achieve

02

Connectivity and miniaturization

Advances in connectivity and miniaturized robotics are enabling ultra-low-latency remote procedures and cellular-scale interventions, expanding access to expertise while making treatments safer, faster and more precise

The convergence of robotics, AI and advanced connectivity is redefining the boundaries of complex medical interventions. Robotic-assisted platforms reduce variability, fatigue and human error while delivering high levels of dexterity and microscale accuracy—enabling surgeons to access intricate anatomies with reduced recovery times and complication rates. AI enhances these capabilities by mapping patient-specific anatomy, guiding precision pathways and offering real-time adjustments during surgery. Applications such as the da Vinci system in urology and gynecology, Mako in orthopedic surgery and CorPath GRX in cardiology exemplify this synergy, alongside emerging micro-robots that enable interventions previously deemed impossible.

Meanwhile, breakthroughs in connectivity and miniaturization are expanding access to care: 5G-enabled, cloud-integrated robotics make cross-border remote surgeries feasible, while microrobots open new frontiers in targeted drug delivery, tumor ablation and cellular-scale procedures. Together, these innovations are transforming interventions into safer, faster and more precise experiences—ushering in an era where geography, anatomy and complexity no longer constrain care delivery.

04

From gaps to governance

Establishing trusted cybersecurity and data governance framework

Ai
AI

Governments and regulators increasingly view cybersecurity and data governance as central to national and sectoral strategies. In healthcare, where large volumes of sensitive patient data are handled each day, protecting digital systems is now a policy priority. Recent frameworks such as the Digital Personal Data Protection (DPDP) Act, Health Insurance Portability and Accountability Act (HIPAA) updates, and healthcare-specific cybersecurity standards outline clear rules on compliance, governance, and accountability. These measures are aimed at building trust, ensuring privacy and safeguarding the integrity of healthcare delivery. By aligning oversight mechanisms, incident reporting, and sector-specific guidance, policymakers are translating intent into measurable action, laying the foundation for a secure and resilient digital healthcare environment. Building on these measures, several key regulatory initiatives introduced in the last few years have shaped the direction of digital healthcare in India.

Key regulatory developments in last four years

Ayushman Bharat Digital Mission (ABDM)

The Ayushman Bharat Digital Mission (ABDM) is gradually being adopted across India's healthcare system, linking healthcare service providers, clinics, laboratories, and patients through secure digital health records. With ABHA numbers and Health Professional and Health Facility Registries in place, patients can search for service providers, book visits, or share reports digitally. Healthcare service providers are using ABDM platforms for scheduling, record management, and insurance claims through the National Health Claims Exchange. The Unified Health Interface (UHI) and consent-based data sharing enable smoother access to consultations, labs, and pharmacies. Pilots show promise in billing and resource management, but wider provider participation is key for nationwide adoption.

Notable ABDM regulatory initiatives

1. **Enhanced cybersecurity framework**

   The biggest regulatory change in 2025 came in August when the Ministry of Health and Family Welfare introduced stricter cybersecurity rules. Under the ABDM, health data can now only be shared with clear patient consent. Digital health applications must pass a Web Application Security Audit (WASA) before integration. They also need to be tested in sandbox environments and comply with CERT-In guidelines to meet the required standards for data protection.[17]

2. **Multi-lingual ABHA portal enhancement**

   In 2025, ABDM made the ABHA portal and government health apps available in more Indian languages and easier to understand. To help people with limited digital skills or poor internet access, new options were added to create ABHA numbers through assisted and offline methods.

3. **Record performance metrics**

   By February 2025, ABDM had recorded 739.8 million ABHA account creations and linked more than 490 million health records. The platform now reaches all states and Union Territories, across 786 districts. Around 159,000 health facilities are using ABDM-supported software.[18]

NABH digital standards

The National Accreditation Board for Hospitals and Healthcare Providers (NABH) Digital Health Standards guide healthcare service providers on using digital tools to improve quality, safety, and efficiency. The Standards cover clinical, admin, and data handling, requiring secure Electronic Health Records (EHR), patient information protection, and reliable systems. Healthcare service providers must define staff roles for digital system management, data access, and error checks. While audits, backups, and downtime plans ensure continuity, training supports accurate data use. Healthcare service providers are required to adopt common data formats, track activity with logs, use strong passwords, two-factor authentication, and undertake regular system updates. Clear rules on sharing, consent, and retention enable meeting legal needs.

[17] https://www.mohfw.gov.in/?q=en/press-info/9106
[18] https://www.mohfw.gov.in/?q=en%2Fpressrelease-209

Key areas of digital health standards

Access, assessment and continuity (AAC)

- Digital registration, easy appointments, smooth handover, online billing, lab updates
- UHID and ABHA numbers to keep records centralized for faster referrals and discharge

Care of patients (COP)

- All interactions, e-prescriptions, consultation notes, emergencies, homecare information stored in Electronic Health Record (EHR) format for complete access

Management of medication (MOM)

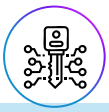
- Digital inventory, prescription, dispensing, allergy/interaction checks of medication; and steps for safe, traceable drug use

Digital infrastructure (DIS)

- Secure hardware, networks, backups, software updates, access controls, and audit logs

Digital operations management (DOM)

- Bed management, scheduling, dashboards for delays, pending tasks



Centralized EHR systems

- Role-based access, patient consent, audit logs, ABDM-compliant secure exchange

Aligning with regulatory changes

- The Indian government launched the ABDM, a nationwide platform for digital health data exchange and interoperability, prompting NABH to align its standards for HIS/EMR systems with ABDM certification and security protocols.[19]
- NABH released the first edition of Digital Health Standards in 2023, introducing objective elements for grading healthcare service providers' digital maturity as Silver, Gold, or Platinum based on compliance and excellence.[20]
- Ongoing updates now require regular surveillance assessments and higher compliance for full reaccreditation every four years, pushing healthcare service providers to continuously upgrade their digital health maturity.[21]

DPDP Act, cybersecurity and data governance

The DPDP Act, 2023 enables healthcare by creating trust in digital health systems. It aims to give patients control through rights to access, correct, erase, and share health records, while requiring providers to obtain clear consent and issue notices on data use and storage. Provisions for encryption, access controls, audits, and breach response strengthen security in healthcare service providers and digital platforms. Significant Data Fiduciaries must appoint data officers and conduct risk checks, ensuring accountability. Together with draft DPDP Rules 2025, the framework supports safer adoption of electronic health records and consent-driven data exchange in healthcare.

[19] https://portal.nabh.co/Announcement/Draft%20NABH%20Standards%20for%20HIS%20and%20EMR%20Systems%20-%2023rd%20July%202024.pdf

[20] https://www.koitafoundation.org/src/pdf/nabh-digital-health-standards-for-hospital.pdf

[21] https://portal.nabh.co/Announcement/Draft%20NABH%20Standards%20for%20HIS%20and%20EMR%20Systems%20-%2023rd%20July%202024.pdf

Notable regulatory provisions

The DPDP Act establishes national rules for digital personal data, with enforcement by the Data Protection Board. Sector standards in health are aligning with the requirements of the DPDP Act (consent flows, access controls, interoperability, security).[22]

Draft DPDP Rules 2025 propose detailed obligations (notices, duties of consent managers and Significant Data Fiduciaries). Practitioners should track final notifications for healthcare-specific operationalization alongside ABDM security and consent frameworks.

National Critical Information Infrastructure Protection Centre (NCIIPC)

Healthcare has been designated as Critical Information Infrastructure (CII), as disruptions can affect national security, the economy and public safety. The National Critical Information Infrastructure Protection Centre (NCIIPC) safeguards such systems under National Technical Research Organisation (NTRO) and Section 70A of the IT Act. Earlier focused on power, telecom, finance, transport, and government, its scope now includes healthcare. NCIIPC identifies vital health systems like national data exchanges or healthcare service provider networks, monitors threats, issues alerts, coordinates with CERT-In and the health ministry during cyber incidents and conducts drills. With expanding digital health adoption, its role in protecting assets is expected to grow further.

Key regulatory framework

Government notification and rules affirm NCIIPC's mandate under Section 70A of the IT Act. They also prescribe Information Security Practices and Procedures for Protected Systems, which include appointment of Chief Information Security Officer, establishment and operations of Cyber Crisis Management Plan, and controls for operators of Critical Information Infrastructure.

[22] https://www.pib.gov.in/PressReleasePage.aspx?PRID=2090048

Elements to consider for strategic approach

Access control and security

Protecting health information is core to daily operations in healthcare service providers, clinics, and labs. Systems holding patient data must allow access only to the right people. Key practices include role-based access control (RBAC) based on job duties, multi-factor authentication, and Joiner-Mover-Leaver (JML) checks to manage accounts. Policies outline approvals and emergencies, while networks for clinical, admin, and guests stay separate. Admin systems require virtual private network (VPN) and multi-factor authentication, with monitoring through security information and event management (SIEM). Vendor accounts can be temporary while mobile devices can be encrypted using mobile device management (MDM). Regular RBAC reviews, use of multi-factor authentication, and log monitoring help safeguard privacy and meet the requirements of DPDP rules. Most importantly, access control and security measures help provide uninterrupted care.

Data protection and encryption

In healthcare, keeping patient information secure involves more than just storing it safely. Encryption plays a central role, whether for files stored on healthcare service provider servers, data transmitted between clinics, or information on staff laptops, phones and other devices. Methods such as advanced encryption standard (AES) for storage or transport layer security (TLS) during transfer are common, but they only work if keys are well-managed and backups are also protected. Regular checks matter, as do clear policies under the DPDP Act. Combined with role-based access and multi-factor logins, these steps enable dependable care.

Regulatory compliance

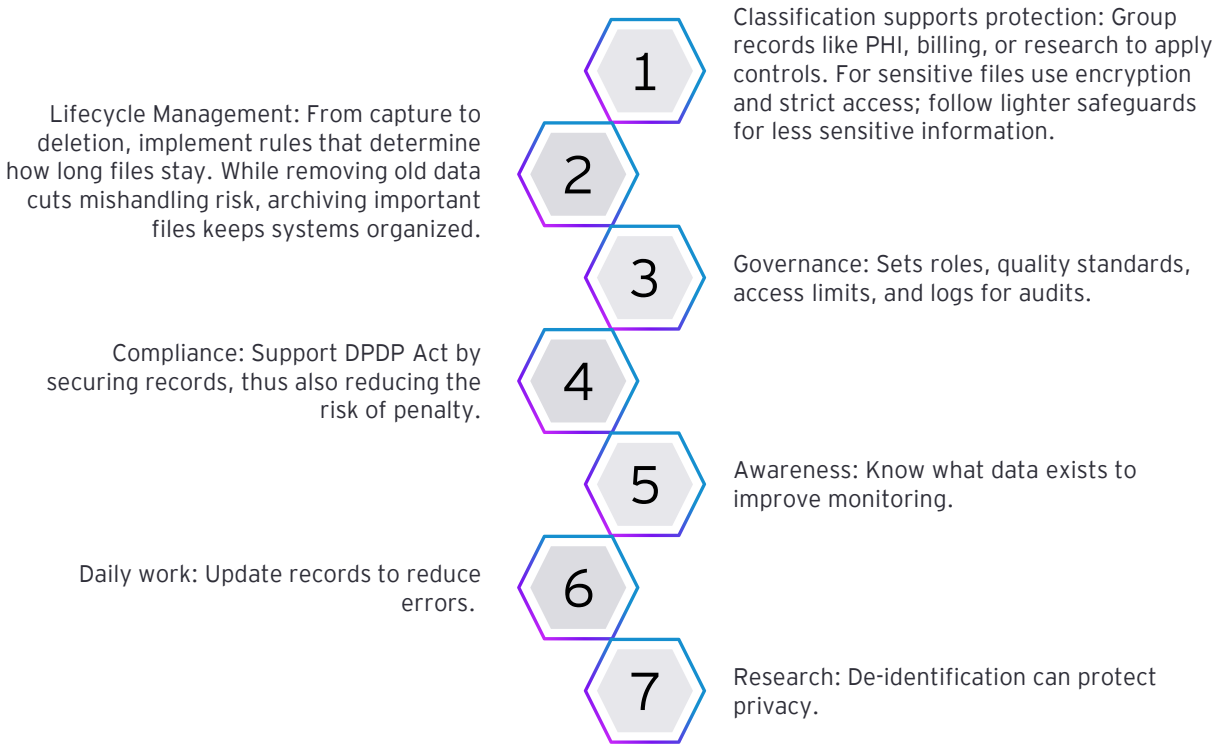
Regulatory compliance entails following the laws and rules that apply to how data is handled. In healthcare and cybersecurity, compliance is important to keep information safe and meet legal requirements. However, as rules change and evolve, regular reviews are needed for continued compliance. Adhering to regulatory requirements helps healthcare service providers avoid legal issues and keep the trust of patients, customers, partners and other stakeholders. This includes having clear steps for collection, storage, sharing, and removal of data, while protecting privacy. Regular checks, such as audits, help find problems early. Addressing the issues allows organizations to stay in line with the current regulations and also supports safe handling of information across the board.

Strategic advantages of ensuring cybersecurity and data governance

Data classification and lifecycle management

In healthcare, strong cybersecurity and clear Data Governance (DG) give real benefits in managing Data Classification (DC) and Lifecycle Management (LM). When data is labelled correctly and handled with set rules from the time it is created until it is no longer needed, users are aware of the information's sensitivity, location, access, and when it should be removed. This safeguards data considered Protected Health Information (PHI), lowers risk, and supports smooth work in clinical, administrative, and research areas.

Implementation pathway for healthcare service providers in data governance



Compliance and regulatory alignment like HIPAA (US), GDPR (EU)

When patients share their details with a healthcare service provider, they expect their personal information to remain protected. Adoption of privacy laws in healthcare turns compliance into daily practice, which improves access, data quality, and trust while reducing risk.

HIPAA, for example, drives EHR security, access control, and timely breach response, enabling secure interoperability and payer integrations in US workflows. Similarly, the provisions for consent, Data Protection Impact Assessment (DPIA), and 72-hour breach reporting in GDPR push healthcare service providers to standardize processes, train users, and document controls. It also supports cross-border research and telehealth in the EU. India's DPDP Act is advancing patient-consent flows, encryption, logging, and vendor governance, aligning providers with digital platforms and ABDM-ready record sharing. Shared outcomes are: clearer data flows, faster onboarding, safer exchange, and higher patient confidence.

Data access policies

Data access policies in healthcare define who can view, use, and share patient information, under what conditions, and with what safeguards. They balance care needs with privacy, security, and regulatory requirements by setting rules for authentication, authorization, consent, minimum necessary access, auditing, and breach response. Clear policies lower risk, support interoperability and research, and

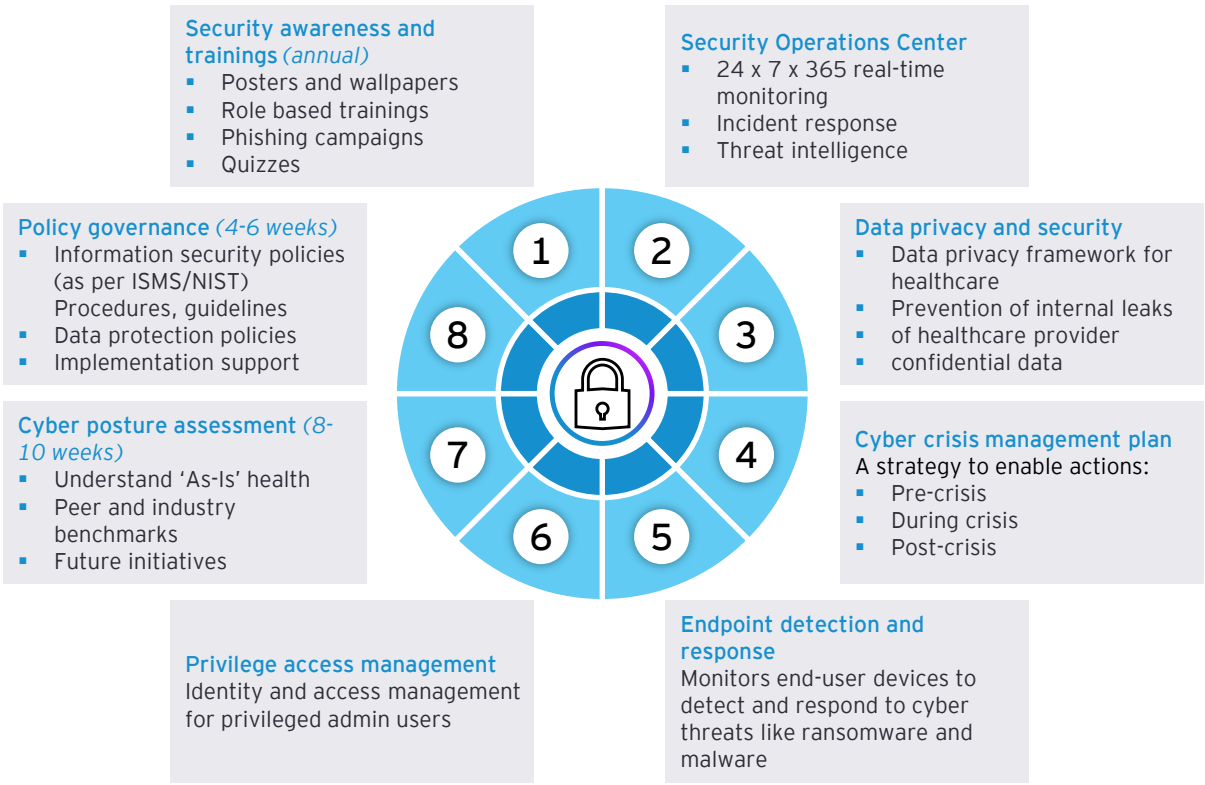
ensure timely, appropriate access for clinicians improving patient safety, data quality, and accountability across the health system. They also enable role-based permissions, emergency break glass access with audit trails, periodic access reviews, and patient portals, helping teams adopt EHRs while maintaining trust.

Under the prescriptive path, data access policies serve as guardrails across each control:

- Clinicians and other staff members receive recurring training on consent, minimum necessary use, and phishing awareness;
- Security Operation Center (SOC) monitors access patterns around the clock and triggers incident response;
- Data privacy controls define role-based permissions, consent handling, and break-glass access with complete audit trails;
- Endpoint and privileged access tools limit misuse;
- Crisis playbooks guide actions before, during, and after events; and
- Periodic posture assessments inform policy updates.

Together, these steps provide timely and appropriate access to protected health information while improving safety, data quality, interoperability, and demonstrable compliance.

Prescriptive path: Minimum baseline of cybersecurity



ISMS: Information Security Management System | NIST: National Institute of Standards and Technology

Partial ABDM adoption signals need for strategic digital integration

Adoption of ABDM remains uneven. In the CII-EYP Health Tech survey, 50% of healthcare providers report partial implementation, 40% plan future adoption, and 10% have no near-term plans. To some extent, the non-mandatory nature of ABDM has led many hospitals to delay integration. Meanwhile, some HIS providers and digital startups are proactively aligning with both ABDM and DPDP standards, embedding data protection and sandbox compatibility. As healthcare systems expand and consolidate, digital strategy must shift from a support role to a strategic function, making ABDM integration a pressing priority.

05

From aspiration to action

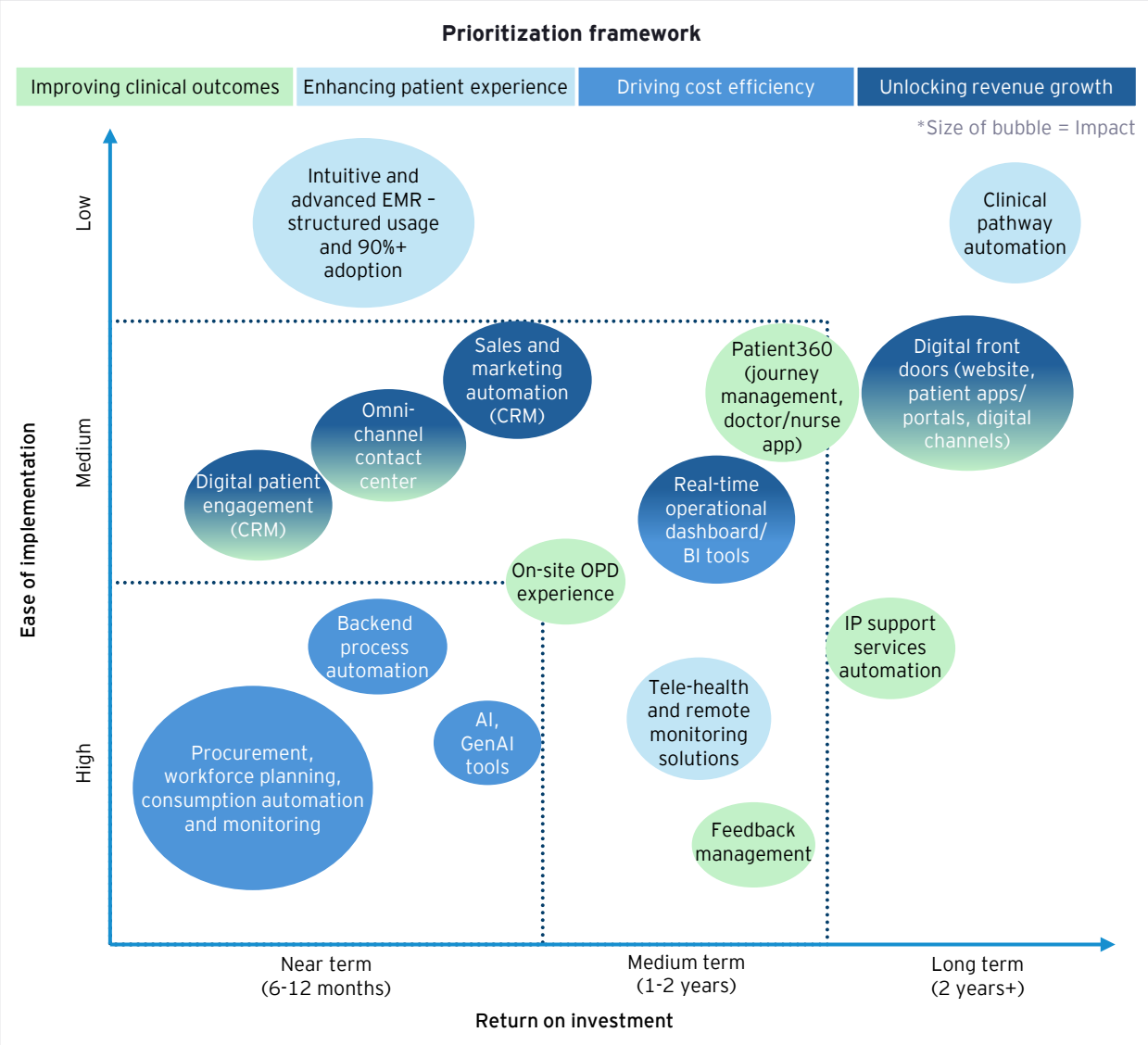
Roadmap for advancing healthcare in the next decade

87.2102
51.2362
69.23021
51.2362
99.8575
12.3652
87.2102

Providers – High level roadmap for transformation

As healthcare providers map their digital strategy, CIOs must undertake a prioritization activity based on three critical dimensions: ROI, impact of the initiative and ease of implementation.

The framework presented here provides a structured approach to decision-making. It maps digital initiatives across a timeline—from near-term (6-12 months) to medium-term (1-2 years) and long-term (2-plus years)—while weighing their relative ease of deployment and expected outcomes. Each initiative is further evaluated through four lenses: enhancing patient experience, improving clinical outcomes, driving cost efficiency and unlocking revenue growth. In the chart, the bubble size indicates overall impact, helping CIOs quickly identify high-value, high-feasibility opportunities.



This prioritization matrix can enable CIOs to move beyond ad-hoc adoption and build a clear, phased roadmap for digital transformation. By systematically aligning technology choices with strategic outcomes, healthcare providers can maximize ROI, ensure organizational readiness and deliver sustainable improvements in quality, efficiency and patient trust.

Over the next decade, healthcare is expected to become more personalized, proactive, predictive and participatory due to advancements in technology, data utilization, and human-centric design. The distinction between physical and digital care will continue to diminish, allowing for healthcare that can be accessed at various times and locations.

From traditional to future-ready hospitals: Key shifts

Healthcare service providers are moving beyond siloed IT systems and toward integrated digital ecosystems where information flows seamlessly across physical, remote and virtual settings. Electronic Health Records (EHRs) now act as the backbone, linking systems, enabling hybrid care (in-person and remote), and ensuring clinicians and patients access the right data at the right time. This shift reduces silos and emphasizes prevention, prediction, accessibility, efficiency, and quality.

> Technology continues to be a defining force in healthcare. In recent years we have made significant investments in cutting-edge technology including robotics and AI-enabled software for critical care and stroke management. Clinician-friendly dashboards that provide a complete patient history at a single click enable quicker, more accurate diagnosis and ultimately lead to better quality care. These advancements are already improving patient outcomes and shaping the next era of healthcare.
>
> **Abrarali Dalal**
> MD & CEO, Sahyadri Hospital

Future-ready hospitals: Five key dimensions

5S framework for future-ready hospitals

Scalable infrastructure	Seamless patient engagement	Strategic data usage	Strengthened sustainability and compliance	Smart AI and automation
Build scalable cloud infrastructure with modular architecture, integrated applications, and IoT-enabled systems to streamline care delivery and enable seamless expansion	Deliver a continuous, hyper-connected patient journey through telemedicine, digital touchpoints, AI-powered platforms, and unified views across providers	Leverage unified data ecosystems and AI-driven insights to enable predictive diagnostics, automated reporting, and personalized therapies for precision care	Embed privacy-by-design, cyber resilience, and regulatory readiness while driving green operations, value-based care, and long-term financial sustainability	Scale AI and automation across workflows, diagnostics, and surgeries with GenAI tools, robotics, and precision medicine to improve efficiency and outcomes

1. Scalable infrastructure

Future-ready hospitals begin with building a secure, robust, and scalable infrastructure that forms the backbone of connected healthcare. This includes scalable IT infrastructure with servers and private cloud models that provide India data residency, providing both compliance and flexibility. Hospitals must also adopt modular architecture, enabling them to expand seamlessly by adding new units, specialties, or digital services without disrupting existing operations. At the same time, developing integrated applications and ecosystems ensures that HIS, ERP, CRM, and EHR systems work cohesively, supported by open standards such as Open EHR. Physical and digital environments must be designed intelligently to accelerate patient recovery, reduce workforce stress, and minimize waste, while IoT-enabled monitoring and robotics enhance clinical

capabilities. A secure network layer ties this together, allowing safe and real-time collaboration across patients, clinicians, and other partners. By combining scalability, modularity, and interoperability, hospitals lay the groundwork for sustainable innovation and resilient healthcare delivery.

2. Seamless patient engagement

At the heart of a future-ready hospital lies patient engagement, designed around a seamless, continuous journey rather than episodic interactions. With the expansion of telemedicine, wearables, and remote monitoring devices, care delivery shifts towards a hyper-personalized and intelligent experience. Intuitive digital platforms enable patients to stay connected with providers across both physical and virtual care channels, creating collaboration among physicians, pharma companies, MedTech specialists, and caregivers in a unified ecosystem. AI-powered assistants and multilingual touchpoints further enhance accessibility, guiding patients through treatment options and transitions while building trust through transparent, data-driven insights. This evolution means patients are not passive recipients but active participants in their care, driving better outcomes, higher satisfaction, and stronger adherence to treatment pathways.

3. Strategic data usage

Data serves as the lifeblood of future-ready hospitals, transforming fragmented information into actionable intelligence. By building unified data ecosystems that integrate HIS, ERP, CRM, IoT devices, genomics, lifestyle inputs, and EHRs, providers can unlock real-time insights for proactive care delivery. Shared technical and semantic standards for interoperability enable information to flow seamlessly across systems and stakeholders, breaking down silos and enabling holistic patient views. This data integration allows clinicians to make rapid, evidence-based decisions while predictive analytics and AI tools generate anticipatory insights to identify risks earlier and optimize resource allocation. Over time, healthcare systems evolve into cognitive ecosystems, where every action—clinical, operational, or administrative—is guided by data-backed intelligence. This shift from reactive to predictive and precision-driven care not only improves patient outcomes but also maximizes efficiency and sustainability.

4. Strengthen sustainability and compliance

Sustainability and compliance are not add-ons but central pillars of healthcare transformation. Hospitals must align with evolving regulations while ensuring that their services are clinically effective, financially viable and environmentally responsible. A strong foundation begins by embedding privacy by design into all digital systems, building in compliance with emerging laws such as India's DPDP Act and strengthening readiness for global data protection standards. Simultaneously, the increasing digital attack surface requires robust cybersecurity capabilities, including the establishment of Security Operations Centers (SOCs) for active monitoring and rapid incident response. On the environmental side, integrating energy-efficient systems, green building design, and waste-reduction practices reduces carbon footprint while lowering costs. This dual focus on compliance and sustainability enhances patient trust, secures healthcare ecosystems from cyber risks, and ensures that operations remain resilient and future-proof, even in the face of disruptions such as pandemics, supply chain failures, or climate change.

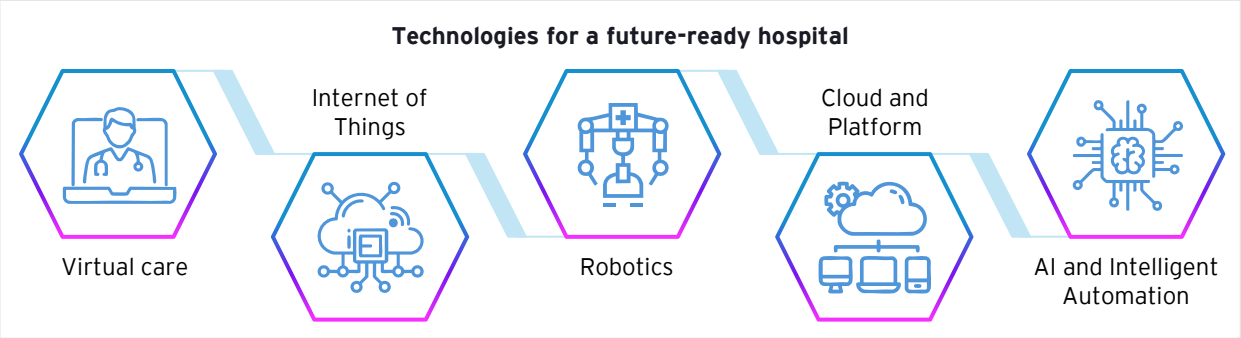
5. Smart AI and automation

The final and perhaps the most transformative lever is the adoption of smart AI and automation across the healthcare ecosystem. Initially piloted in focused use cases, these technologies must be refined and scaled systematically to become enterprise-wide co-pilots for clinicians and administrators alike. AI scribes, ambient intelligence, and virtual assistants reduce the administrative burden on doctors and overall medical professionals, allowing them to dedicate more time to patient care. At the same time, AI-driven workflows automate back-office functions such as scheduling, billing, and supply chain management, driving operational efficiency across the system. Clinically, GenAI-powered tools support real-time diagnostics, radiology and sepsis reporting, and decision-making, while robotics and digital therapeutics enhance precision in complex interventions and surgeries.

As these capabilities mature, they evolve from being supportive tools into core enablers of precision medicine, leading to care that is faster, safer, and more individualized. By embedding AI and automation into every layer of operations, hospitals transform into agile, learning organizations capable of delivering superior patient outcomes and long-term competitiveness.

Prescription for a future-ready hospital - An EY analysis

The journey from a digitally mature hospital to a future ready smart hospital is a transformation process and not a tech project. It encompasses various levels of transformation which can be achieved in phases. According to EY analysis, a complete overhaul from a traditional hospital to a smart, hyperconnected and intelligent hospital will entail following these tenets:



1. **Patient-centric design for better patient experience:** No digital transformation or process improvement could work without keeping the patient at the center. In a broad-based, hyperconnected health ecosystem, clinicians, providers, technicians, pharma companies, MedTech professionals and others all work together, leveraging AI and other technologies to provide bespoke care for every individual.

2. **Adopt technologies that enable fast, flexible and reliable care:** A future-ready hospital not only improves care at the level of the hospital but also connects the hospital to the wider healthcare delivery ecosystem and drives patient centricity from all care environments. Algorithms embedded in care pathways and operations automate processes, optimize resources, predict conditions and support clinical decisions to provide the best individualized care to the patients.

3. **Interconnected platforms for real-time decision-making**: Leveraging real-time data insights, patients can be treated in the right place at the right time. This allows rapid, evidence-based decision-making and results in better outcomes. To unlock this potential, hospitals must adopt **shared technical and semantic standards** for data exchange, allowing seamless integration of diverse data sources including EHRs, partner systems and external datasets.

4. **Partnerships with ecosystem players**: Smart health systems proactively seek out new ways of partnering (especially with technology companies) that blend their healthcare specialization with high-tech skills, connected technologies and deep consumer insights. In so doing, they leverage technologies to take the lead in developing innovations and delivering transformation essential to thrive in the new environment of partnerships, alliances, new locations and consumer orientation.

5. **Smart infrastructure**: Future-ready hospitals will not only use technology for providing care or improving patient experience but integrate technology in every aspect of care giving.

Smart infrastructure

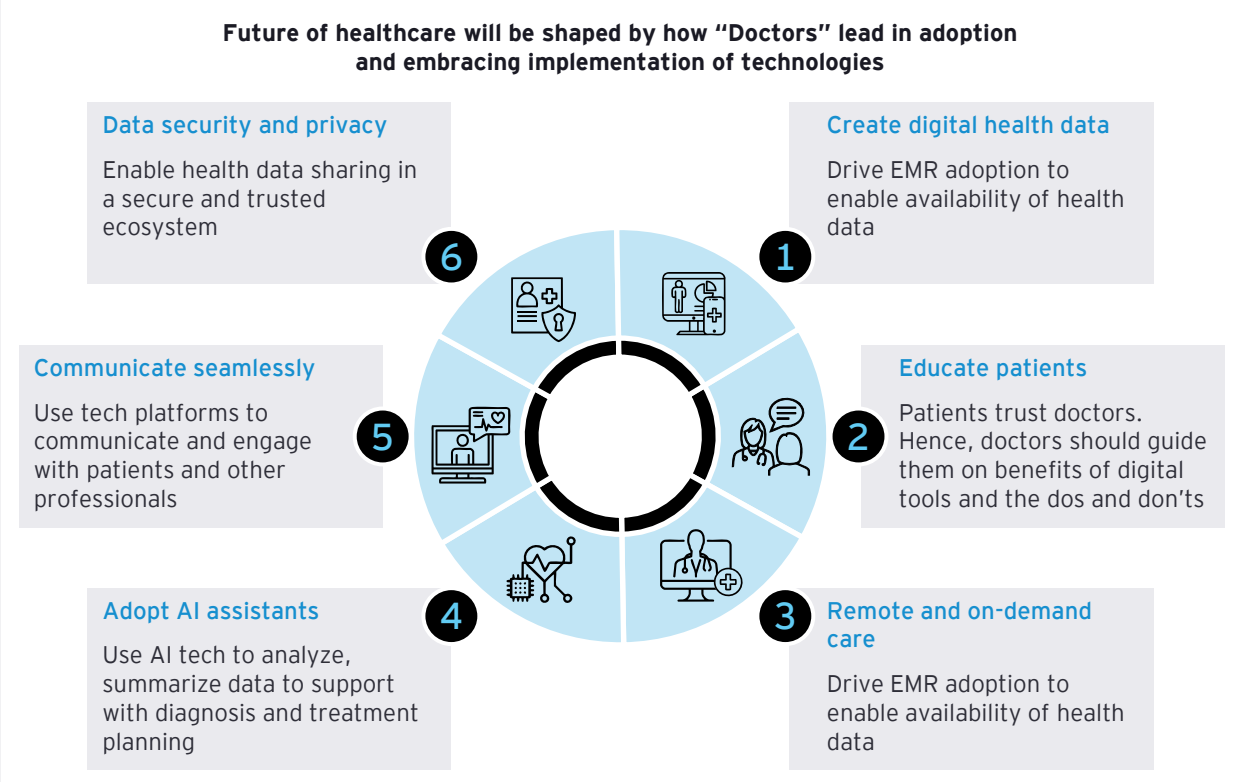
Healing environment	Digital twin	Command center	Data environment	Hospital at home
▪ Design physical and digital spaces that aid faster recovery, support workforce productivity, reduce work stress and minimize waste	▪ Creating digital twins for building management systems ▪ Monitor, adjust and optimize demand management prediction ▪ Clinical applications include health status monitoring and continuous feedback to improve wellbeing and behavioral nudges and support for adherence to treatment programs	▪ AI-powered command centers help track clinical and location data to monitor supply and demand across network in real time ▪ Real-time monitoring of patients enables the hospital to identify patients with deteriorating health status, synchronize care delivery, reduce errors, and predict pressure points and bottlenecks in patient flow	▪ For different platforms to work effectively, smart health systems create an open platform environment to connect and share data at scale, within and between enterprises systems	▪ Leveraging at-home services, using hospital equipment to shift care to home setting and transition care systems will help patients heal in familiar environments ▪ Reduce average length of stay in hospital, bringing in efficiency for providers

Stakeholders – Need for adoption

Doctors – At the center and forefront of healthcare transformation

Doctors are at the forefront of transforming healthcare through digital innovation. By driving the adoption of Electronic Medical Records (EMRs), they help create a strong foundation of digital health data. Their trusted relationship with patients puts them in a position to educate and guide on the use of digital tools, leading to safe and informed usage. Embracing remote and on-demand care technologies allows doctors to extend their reach and provide timely access to healthcare services. AI-powered assistants are becoming valuable allies, helping analyze and summarize data to support accurate diagnosis and treatment planning. Seamless communication through tech platforms enhances collaboration among healthcare professionals and improves patient engagement.

Ensuring data privacy and security is critical, and doctors play a key role in building a trusted ecosystem for sharing health data. Leading by example, doctors inspire confidence in digital transformation. Their continuous evolution with emerging technologies means that patient-centric care remains at the heart of healthcare innovation. Doctors should champion digital adoption by driving EMR usage, guiding patients in safe use of digital tools, and embracing remote and on-demand care. Leading with trust and adaptability, doctors can help connected care remain patient-centric while harnessing the full potential of emerging technologies.



Patients – The force behind the need for transformation

Patients also play a vital role in improving healthcare services. By adopting digital tools, avoiding unverified sources, and actively sharing their experiences, patients contribute to building a safer, more transparent, and patient-centric healthcare system across India.

In today's healthcare landscape, digital solutions are becoming an integral part of routine care. With the Ayushman Bharat Digital Mission (ABDM), patients can create their own ABHA ID, a secure digital health account that stores all medical records in one place. This allows doctors to access accurate patient history, reducing the need for repeated tests and improving continuity of care.

For safe and reliable health information, the Ministry of Health recommends using official platforms such as the National Health Portal and MyGov Health—especially during public health emergencies or outbreaks. These sources provide verified, up-to-date guidance and help prevent misinformation.

Providers should actively encourage patient adoption of digital health solutions by leveraging strategies such as intuitive UI/UX design, seamless navigation, and targeted incentives for features like appointment booking. Such measures not only enhance patient access to care and improve overall experience but also enable providers to strengthen their digital ecosystem, drive operational efficiency, and create more sustainable models of care delivery.

Regulators – Recommendations to enable an integrated healthcare system

Hospitals and patients should be encouraged to actively participate in ABDM and ABHA as well as comply with the DPDP Act as it will enable creation of seamless, secure, and portable health records that improve continuity of care and empower citizens in managing their health. To achieve this, the government can strengthen capacity building by organizing regular training programs for healthcare workers, doctors, and administrators, to enhance their digital literacy and confidence in using new platforms. Patients need to be made aware of the benefits of digital health IDs through large-scale information, education, and communication (IEC) campaigns, supported by community health workers, media outreach, and multilingual digital tools.

Hospitals can be incentivized with financial and technical assistance to upgrade their digital

infrastructure and integrate smoothly with ABDM. Further, embedding ABDM and DPDP orientation into medical, nursing, and paramedical curricula will bring in long-term awareness and adoption. Clear guidelines on data privacy and security must be provided to build trust among both providers and patients. Additionally, user-friendly apps, helplines, and regional language interfaces can make participation easier for citizens across diverse geographies. Establishing monitoring and evaluation frameworks can help track adoption progress and address gaps quickly. Finally, the government must consider enabling public-private partnerships to scale innovations and create a citizen-friendly digital health ecosystem that strengthens healthcare delivery.

Recommendations for the government

Promote adoption	Strengthen digital literacy	Disseminate information, support stakeholders, streamline co-ordination	Expand offline and assisted modes	Facilitate innovation by supporting health-tech startups
▪ Introduce targeted incentives for small and medium healthcare providers to integrate with ABDM platforms ▪ Recognize and reward providers for accurate and high-quality linkage of health records to ABHA IDs ▪ Facilitate onboarding through localized microsites and support teams to accelerate adoption ▪ Establish monitoring and evaluation frameworks should to track adoption progress and address gaps quickly	▪ Capacity building through training programs for healthcare professionals on ABDM tools and workflows ▪ Compliance training on data privacy, consent protocols, and secure handling of personal health data ▪ Educate citizens and providers on digital rights, including access, correction, and removal of personal data	▪ Appoint dedicated SPOCs to assist healthcare providers with ABDM onboarding and DPDP-related queries ▪ Develop clear guidance for hospitals and patients on managing consent under DPDP regulations ▪ Launch multilingual awareness campaigns to promote ABHA benefits and educate citizens on their data rights ▪ Establish robust co-ordination and escalation protocols between stakeholders	▪ Deploy mobile health units equipped with ABDM-compatible systems to serve remote communities ▪ Empower frontline health workers (ASHAs, ANMs) to assist citizens in ABHA creation and consent-based data sharing	▪ Provide access to ABDM's sandbox environment for testing and validating digital health solutions ▪ Offer fast-track integration pathways for startups to connect with ABDM registries and services ▪ Explore DPDP-friendly compliance frameworks to ease regulatory burdens for early-stage innovators

Conclusion

India's healthcare future is shifting from fragmented IT systems to connected, cognitive ecosystems where intelligence flows seamlessly across physical, remote, and virtual care. Silos will dissolve as integrated platforms harmonize data from EHRs, IoT devices, genomics, and lifestyle trackers, creating real-time, self-learning insights.

Doctors will be driving this change empowered with AI-powered dashboards that simulate outcomes, flag risks, and personalize care pathways, while predictive analytics will optimize demand forecasting, staffing, and supply chains.

For patients, care will increasingly move into homes and communities, with digital tools and verified platforms ensuring safety, continuity, and trust. Regulators will empower this transformation through policies on interoperability, privacy, and equitable access, while healthcare providers design spaces that promote wellbeing as much as treatment.

Together, these shifts signal a healthcare system that is no longer reactive but proactive, preventive, and precision-driven—one where technology, data, and trust converge to deliver personalized, anticipatory care at scale.

> In the evolving landscape of healthcare, technology is not merely an addition but a fundamental enabler of compassionate, precise, and connected care. As we look to embrace AI and digitization, we should aspire to unlock a future where patient experiences are enriched, clinical outcomes are enhanced, and healthcare organizations thrive through strategic innovation and sustainable practices.
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Scan here to experience a patient journey in a **future-ready** hospital

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