Confederation of Indian Industry

Chaos to coherence

Distilling insights from information in healthcare, powered by GenAI

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EY Parthenon

Building a better working world

Foreword

In the dynamic landscape of healthcare, the infusion of technology stands as a cornerstone for progress and innovation. This report, "Chaos to coherence: distilling insights from information in healthcare, powered by GenAI," encapsulates the transformative potential of Generative AI in revolutionizing healthcare systems.

Gen AI is not just a buzzword; it is pivotal in shaping the future of healthcare. This technology streamlines processes, enhances diagnostic accuracy and personalises patient care. The insights derived from vast data repositories, when distilled through Gen AI, translate into actionable intelligence, thus driving efficiency and efficacy in healthcare delivery.

This report aligns perfectly with the theme of the Summit, "**Enriching Core While Embracing New in Indian Healthcare.**" It underscores the importance of blending foundational healthcare principles with cutting-edge technological advancements. As we navigate this journey, our goal remains steadfast: to enrich the core of healthcare delivery while embracing innovative solutions that enhance patient outcomes.

I believe this report will serve as a valuable resource, guiding us from chaos to coherence in our quest for excellence in healthcare. It underscores the commitment of CII Northern Regional Committee on Healthcare to drive innovation and excellence in the sector. As we continue to navigate this dynamic landscape, our collective efforts will undoubtedly lead to a more coherent, efficient and patient-centric healthcare system.

Dr. Dharminder Nagar

Summit Chairman & Chairman,
CII Regional Committee on Healthcare
and Managing Director, Paras Health

Preface

Amid India's current healthcare challenges—marked by rising costs and the need for personalized care, a scarcity of trained professionals, and an escalating disease burden—the integration of AI technologies stands out as a transformative beacon of hope. As we navigate the evolving landscape of healthcare, the role of technology becomes increasingly significant. Among these technological advancements, Artificial Intelligence (AI) and Generative Artificial Intelligence (GenAI) hold remarkable potential to revolutionize healthcare as we know it.

This report, "Chaos to coherence: distilling insights from information in healthcare, powered by GenAI" delves into the transformative power of AI in healthcare, a force that promises to enhance patient outcomes and redefine care delivery. It is within the context of rising costs and the complexities of delivering personalized care at scale that AI and GenAI emerge as unprecedented opportunities for innovation and advancement.

GenAI, with its ability to generate insights from existing datasets, opens doors to a multitude of applications within healthcare. From predictive analytics to drug discovery, GenAI may enable healthcare organizations to unlock the full potential of their data, leading to more informed decision-making and improved patient outcomes.

Furthermore, GenAI is paving the way for personalized medicine by tailoring treatment plans to individual patient needs. Through the analysis of vast amounts of patient data, including genetic information and medical history, AI-driven algorithms can identify optimal treatment strategies with a level of precision that was previously unimaginable.

The healthcare sector has been relatively conservative in adopting digital technology. GenAI may change that with its ability to reduce the demand-supply imbalance caused by an acute shortage of clinical and non-clinical talent in the Indian healthcare system. As per an EY report, "The *AI*dea of India: Generative AI's potential to accelerate India's digital transformation", introducing GenAI applications in the health and life sciences industry could potentially contribute an incremental US$64 billion to India's GDP by 2030. This underscores the far-reaching potential of GenAI in reshaping the healthcare industry. The same report also highlights how the technology leaders see GenAI in their respective hospitals. With more than 60% of the CIOs keen to introduce GenAI in the next six to 12 months following their 25% peers who had the head start, the role of GenAI in hospitals looks promising.

However, the adoption of GenAI in healthcare is not without its challenges. Privacy concerns, data security, and regulatory compliance are significant hurdles that must be addressed to realize the full potential of this technology. With proactive measures and strategic partnerships, these challenges can be overcome, paving the way for a future where GenAI becomes an indispensable tool in the healthcare arsenal.

As leaders in the healthcare industry, it is imperative that we embrace innovation and leverage the power of GenAI to drive positive change and improve patient outcomes. This report explores various dimensions of GenAI application, addressing both its potential and the complexities involved in its adoption. It also highlights the role of different stakeholders in the healthcare ecosystem, such as start-ups, technology firms, large hospitals, healthcare providers, government bodies, NGOs and collaborative platforms.

We invite you to explore this report further and join us on this journey towards a brighter and healthier future.

Srimayee Chakraborty
Partner, Healthcare Strategy,
EY Parthenon India

Ankur Dhandharia
Partner, Healthcare Strategy,
EY Parthenon India

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01 Introduction

Digital transformation in healthcare delivery systems is not a new topic, but the COVID-19 pandemic exposed health systems' reliance on in-person care delivery and sparked a deep vein of innovation. It triggered a re-evaluation of what it takes to 'become digital' and why is it necessary to have a 'digital-first approach' to care and operations.

While the pandemic forced all stakeholders (healthcare providers, doctors, and patients) to adopt technologies as alternatives to in-person care models, such as online appointments, tele-consultation, EMR and remote monitoring, there has since been a clear mindset shift towards increasing use of technology in the sector to drive better efficiency, clinical outcomes and experience for all stakeholders.

From the point of view of providers, the COVID-19 pandemic also exposed them to an acute uncertain period during the lockdowns, where they were forced to adopt cost-cutting measures to keep enterprises afloat in the absence of patient flow. For many of them, it was a wake-up call to reassess their processes and systems and adopt technology for bringing in operational efficiencies and improving the productivity of resources.

At the other end, rising consumerism and instant gratification are leading to patients demanding a vastly different way of thinking about healthcare, sick care and how it is delivered. They are coming to expect health care providers to deliver what they have in other areas of their lives: connectivity, mobility, agility, immediacy and the tools for self-direction.

Consumer demand on one side and rising competition on the other, along with factors such as capacity/ footprint expansion, adequate funding, the need to differentiate, and desire to grow fast and sustainably, are pushing the healthcare providers to assess their future readiness and design their digital strategy. This transition towards digital is being enabled by easy access to advanced technology coupled with 4G/ 5G powered communications, which are making it easier for patients to engage with the health system in completely different ways and support a suite of new solutions around well-being, remote care, smart homes and communities.

Adoption of technology-enabled operations by healthcare providers

With base systems like HMIS (Hospital Management Information System), EMR (Electronic Medical Records), PACS (Picture Archiving and Communication System), LIS (lab Information System) and ERP (Enterprise Resource Planning) becoming standard across sizeable healthcare players, there is a clear shift happening from traditional hospitals (with paper processes) towards digitized hospitals (with technology-enabled operations).

However, most players still do not have systems which are fully integrated and connected in a seamless ecosystem. Many of them still struggle with underlying issues, such as unstructured data across systems, lack of a single source of truth, and other factors, which lead to inefficient reporting systems and delayed data availability. This, in turn, restricts access to relevant business insights needed for running operations efficiently. Consequently, a lot of time is still spent on data creation and reconciliation instead of brainstorming actions for the advancement of patient care and enterprise goals.

Given that base systems are still maturing, the use of advanced technologies like AI has lagged in healthcare compared to other industries. Furthermore, unstructured and sensitive healthcare data in various disparate systems has made the adoption of AI more difficult, especially in operations and patient-facing areas. However, on the positive side, there has been an increasing focus on the use of AI in recent years in certain areas, such as decision support, medical imaging, precision medicine, and more.

This is where Generative AI is expected to be a game changer, accelerating the adoption of AI in healthcare, particularly in bringing efficiencies across the value chain and improving stakeholder experience and patient journey.

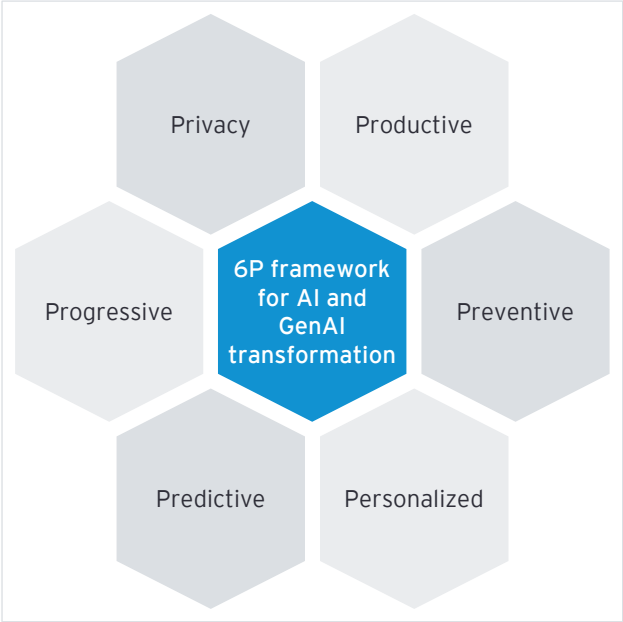
> Generative AI has the potential to offer significant benefits in healthcare delivery – in preventive and predictive aspects of health, personalized therapy and enhancing patient safety, to name a few. However, given the context of the hospitals in terms of vulnerability of the consumers, need for data privacy as well as ethical concerns, we need to be thoughtful and cautious in using this technology and also ensure that guardrails are in place as we go down that path.
>
> *Dilip Jose, Managing Director and CEO, Manipal Hospitals*

02 Defining AI and GenAI in healthcare: the 6P framework for transformation

The introduction of GenAI applications in the health and life sciences industry could potentially contribute an incremental US$64 billion to India's GDP by 2030[1]. However, realizing this potential requires strategic implementation, inclusive policies and sustained investment in AI technologies.

Our **6P framework** illustrates AI and GenAI's potential to transform healthcare delivery across these themes:

1. **Productive**: Streamlining administrative tasks, reducing the workload on healthcare staff, and improving patient care through predictive analytics and automated systems are productive uses of AI in healthcare.
2. **Preventive:** AI can also enable patients to take control of their health by providing real-time insights on personal health data and making relevant (and verified) health information available on-demand.
3. **Personalized**: AI can analyze vast amounts of patient data to offer personalized treatment plans, leading to better healthcare outcomes.
4. **Predictive**: Anticipating public health trends and outbreaks is another application of AI in healthcare, enabling proactive healthcare management and policymaking.



5. **Progressive**: AI can also aid in rapidly upskilling healthcare professionals through advanced training tools and simulation-based learning.
6. **Privacy:** While AI has the potential to transform healthcare in many ways, it is important to prioritize patient privacy and health data security when adopting AI in healthcare.

> Generative AI will revolutionize healthcare across the care spectrum, enhancing outcomes and driving substantial efficiencies. To fully leverage this advancement, we must evolve our business models and adapt to the rapid pace of technological progress. This evolution involves a cultural shift towards embracing new operating models, while also focusing on literacy and skill development in emerging technologies. Additionally, it is imperative to establish robust safeguards that ensure data privacy, uphold ethical standards, and consider environmental impacts. This comprehensive approach will ensure we capitalize on generative AI's transformative potential in healthcare responsibly and effectively.
>
> *Dr. Harsha Rajaram, CEO of Aster Digital Health*

[1] Source: EY report, The *AI*dea of India

03 GenAI to the rescue: overcoming current challenges and exploring opportunities in healthcare

India's healthcare sector is characterized by its vast and varied landscape. The sector has been witnessing a chronic shortage of workforce and infrastructure, a situation that is further strained by ongoing medical demands of a large and diverse population. The need of the hour is to aggressively adopt the latest technologies to optimize and extend the reach of existing resources (including people and data). Here, AI and GenAI emerge as potent tools. By leveraging these technologies, India can enhance its healthcare capabilities, making quality healthcare more accessible and efficient.

There is pertinent need to pivot from reactive 'sick care' to proactive 'true care' with a focus on improving health outcomes. Further, today's patient and partner organizations are expecting greater transparency in processes and care delivery and hence building 'trust' becomes imperative for providers in this new era of healthcare. Healthcare providers are facing rising costs and pressure to improve efficiency in their operations. This is because health insurance providers and the government are expecting more from them. In the past few years, insurance coverage has increased from 10% to 18%, and the government is also covering a large portion of the low-income population through schemes. The goal is to provide affordable care to all.

While the healthcare industry embarked on its journey towards digitization in the last few years, it had limited focus on reducing documentation and administrative tasks to be fulfilled by the healthcare workers. GenAI, with its potential to automate these mundane tasks, can provide relief to stretched healthcare workforce and allow more time towards clinical and value addition functions. It can also plug the gap created due to disparate data structures that have been long crippling the healthcare industry, through its advanced conversational and analytical capabilities. We already see some organizations experimenting and piloting this technology, although in controlled environments, to gain trust and achieve accuracy before rolling it out for real world usage.

As organizations begin focusing on creating a strong foundation of data through EMR and robust HIS, they expect to see GenAI transforming current practices of documentation, data analysis, data summarization and content creation while significantly enhancing the productivity of the workforce in these areas. Across the value chain in healthcare, the opportunities where Generative AI can be used have been identified.

Use cases across the value chain:

Clinical services & operations	1. Clinical documentation support (e.g., Hands free working (voice to text), discharge summaries, prescriptions, history taking, report transcription) 2. Clinical decision support – analyzing clinical trends from multiple sources for quick decision making	3. Medical coding support 4. Personalised care plans recommendations 5. Patient monitoring – On premise and remote 6. Outcome prediction 7. Clinical research & data mining	**Reduce time** on documentation for clinical teams; Provide accurate and relevant clinical info for **better decision making**
Branding & community outreach	1. Targeted marketing & branding (with continuous refinement based on patient response) 2. On the go content creation – branding, clinical, engagement, education 3. Personalized engagement workflow management	4. Footfalls / campaign response insights and recommendations (quantitative and qualitative)	**Hyper personalisation** and faster roll out of campaigns; **Increased engagement** for compliance and better conversions
Customer service & experience	1. Digital front doors for self-scheduling and symptom triage ► Powered chatbots ► Digital human 2. Financial counselling - Provide near accurate bill estimates based on past cases/ bills and patient's history 3. In-hospital engagement	4. Automated case/query management 5. Contact centre assistant (generate real time scripts, reduce training time) 6. Patient feedback insights (qualitative inputs) 7. Prescription/report FAQs	Easy to use **self-service** tools; **reduce TAT** across touchpoints; **build trust** with transparency/ faster response
Non-clinical operations	1. Insurance ► Billing and prior authorization ► Query resolution based on clinical records 2. HR ► Scan resumes to find best match ► Workforce allocation ► Onboarding videos & chatbots for query resolution	3. Revenue cycle management – submission, follow up, query resolution, payment settlement, deduction analysis 4. Supply chain management - draft RFP/contract, vendor responses, create POs, generate KPI's and reports 5. IT: Develop code, cyber-security etc.	**Increased efficiency** for higher productivity across functions; **data-driven** decision making; **improved experience** across stakeholder
Audit & Compliance	1. Identify gaps between compliance requirements and internal controls (e.g., regulatory, contractual, policy, accreditations) 2. Preventive flags in areas with likely failures (based on defined criteria) 3. Digital forensics & fraud detection		**Improved compliance** and ease of maintaining documentation

Potential solutions to address key challenges

This section delves into some of the key challenges and explores how Artificial Intelligence (AI) and Generative AI (GenAI) offer transformative solutions to address these:

1. Shortage in the workforce

Although the doctor-to-population ratio is 1:834, including Ayush doctors, there is no denying that there is an acute shortage of qualified and trained doctors in rural areas and government-run hospitals.[2]

GenAI in administrative assistance

In the face of a workforce shortage, GenAI can play a crucial role in easing the burden on healthcare professionals. Administrative tasks, often time-consuming and repetitive, can be streamlined using AI technologies. For instance:

- **Appointment scheduling and management:** AI can optimize appointment scheduling, reducing wait times and improving patient flow in healthcare facilities. GenAI based 'digital humans' deployed as part of digital front doors for patients - can help in identifying symptoms, selecting specialties and clinicians based on inputs from patients in preferred modes (text, voice, etc.) making it easy to schedule appointments even for less digitally savvy population (like senior citizens).
- **Medical documentation:** AI-enabled voice and text recognition can transcribe consultations and patient interactions, reducing the time doctors and nurses spend on documentation. GenAI tools can also create clinical notes, draft discharge summaries, etc., by extracting relevant clinical information from all data sources like LIMS (Lab Information Management System), RIS (Radiology Information System), HIS (Hospital Information System) etc., thus reducing the administrative workload on the caregivers, enhancing face time with patients, optimizing workforce, and increasing productivity.
- **Efficient health data management:** AI systems can manage and organize vast amounts of patient data, facilitating quicker access and better data analysis for healthcare providers.

Impact

20% to 30% reduction in time spent on administrative tasks by doctors and nurses; significant improvement in patient and doctor experience; long-term potential to improve health outcomes by improving access to relevant data[3]

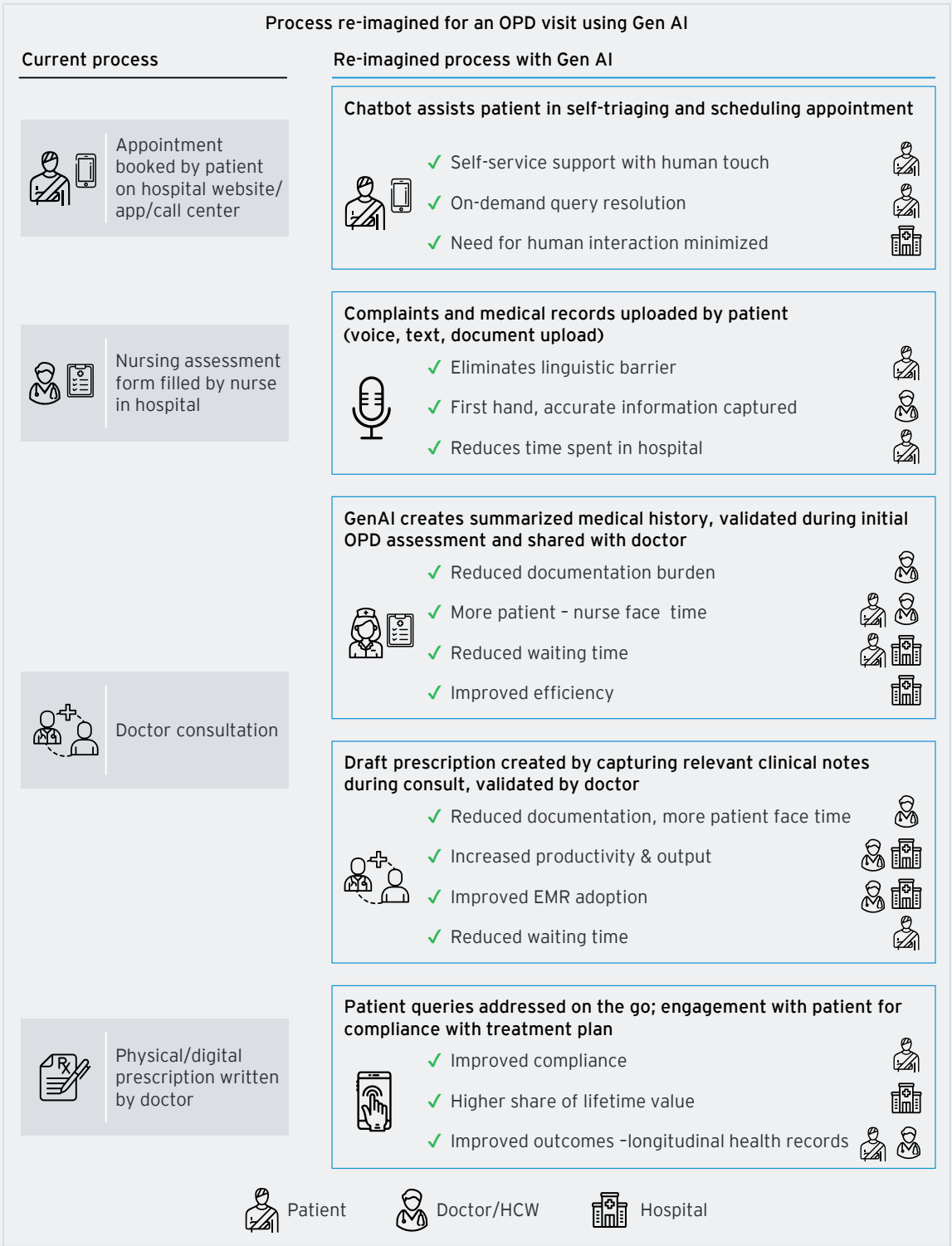
> While AI and related technologies have been around for some time, adoption in healthcare has been slow. Generative AI (GenAI) has the potential to accelerate the adoption of AI for improving efficiency and experience across healthcare functions and stakeholders. However, it is critical to ensure that we move ahead with abundant caution, given the sensitivity of healthcare data and the need for a robust ethical framework.
>
> *Joy Chakraborty, COO - P D Hinduja Hospital*

[2] Source: Press Information Bureau (pib.gov.in)
[3] Source: EY research

Case study: Medical documentation

Ambulatory care settings have multiple opportunities for the organization to roll out GenAI based tools to enhance productivity, engage patients meaningfully, educate them and ensure customer delight. In our conversation with some CIOs, they were open about piloting conversational GenAI tools to automate prescription generation and enhance the adoption of EMR (Electronic Medical Record) in OPD (Outpatient Department) settings, which is currently a big challenge across organizations.

In the case study below, we explore how GenAI tools can bring in increased productivity for the doctor and nurses, enhance the quality of consultation by allowing more physician-patient face time and a detailed language agnostic prescription to the patient. It also helps in improved conversions as adoption of EMR increases and helps trigger automated alerts and reminders for diagnostic, medication prescription and other OPD service prescribed by the doctor.



Expanding care continuum

GenAI can assist and augment healthcare delivery in several other ways:

- **Remote patient monitoring**: AI tools can monitor patient vitals and health status remotely, reducing the need for frequent hospital visits and allowing healthcare providers to focus on critical cases.
- **Virtual health assistants**: AI-powered virtual assistants can handle preliminary patient inquiries, provide health information and guide patients on basic health management, thus freeing up healthcare professionals for more complex tasks.
- **AI-assisted diagnostics**: AI algorithms can assist in diagnosing diseases from medical images and lab results, aiding doctors in making faster and more accurate diagnoses.

Impact

15% to 20% improvement in patient engagement and retention; 30% to 40% time of patient facing workforce (care managers, contact center, etc.) freed up; improved throughput for doctors, faster and accurate diagnosis; long-term potential to improve health outcomes by early detection and treatment compliance through care continuum[4]

Capacity building through GenAI

GenAI can significantly enhance the training and capacity building of healthcare professionals, especially in rapidly changing healthcare landscapes:

- **Customized training modules**: AI systems can create personalized training programs for healthcare professionals based on their expertise and the specific needs of their practice.
- **Simulation-based learning for practical skills**: Using AI-driven simulations, healthcare professionals can gain hands-on experience in a risk-free environment, which is crucial for skill development.
- **Agile response to health crises**: During health crises like the COVID-19 pandemic, AI can quickly disseminate new guidelines and treatment protocols, ensuring that healthcare workers are up to date with the latest information.

Impact

Two to three times faster training content creation, multi-fold improvement in training compliance[5]

Non-clinical operations of healthcare organizations

Availability of trained resources across functions in a challenge in the healthcare industry and GenAI's application can bring unprecedented efficiencies in various non-clinical areas, releasing available trained healthcare resources for:

- **Revenue cycle management:** GenAI co-pilots can assist in-house insurance/ Third-party Administrator (TPA) departments with pre-authorization approvals, query resolution, and real-time tracking of approval status, enhancing transparency and efficiency.
- **Finance operations:** GenAI tools can empower finance teams with productivity and insights while facilitating a shift from data gathering and execution to contextual supervision and insight mastery, prioritizing the value agenda. Combining the data and visualization capabilities with intelligent automation and advanced analytics, GenAI can truly automate routine jobs (such as vendor invoice processing, complex doctor payout calculation, etc.)
- **Capacity building:** Creativity and conversational tools of GenAI can help HR teams in short-listing candidate profiles based on requirement, onboarding communications and resolving employee queries. GenAI systems can create

[4] Source EY's research
[5] Source EY's research

personalized training programs for healthcare professionals based on their expertise and the specific needs of their practice. Using GenAI-driven simulations, healthcare professionals can gain hands-on experience in a risk-free environment, which is crucial for skill development.

- **Market insights:** GenAI tools can assist in creating market performance summaries from external data sources (e.g., comparative summary of performance of listed players from investor presentations, investor call transcripts, etc.), create comparisons and summarize key insights based on market segments relevant to an organization's strategic planning.
- **Vendor evaluation:** For departments like legal, supply chain, procurement etc., creativity tools can assist in creating RFPs, contracts, vendor responses, etc., along with generating reports/ monitoring KPIs. This can automate mundane tasks, improve productivity, and optimize the workforce in support departments.
- **IT operations automation:** In the IT department, GenAI is already helping developers write codes and create prototypes for quick turnaround. It can also help analyze security logs to identify gaps and raising alarms.
- **Audit and compliance:** Generative AI can help in automated reviewing of documents to identify potential compliance risks. It can develop tools for compliance reporting that provide insights w.r.t adherence to standards, especially for NABH, NABL and JCI compliance. By analyzing large volumes of unstructured data from emails, chats, logs and other sources, Generative AI can detect patterns of fraudulent activities. It can emulate events through the analysis of audit trails and system logs for security breaches, if any.

Impact

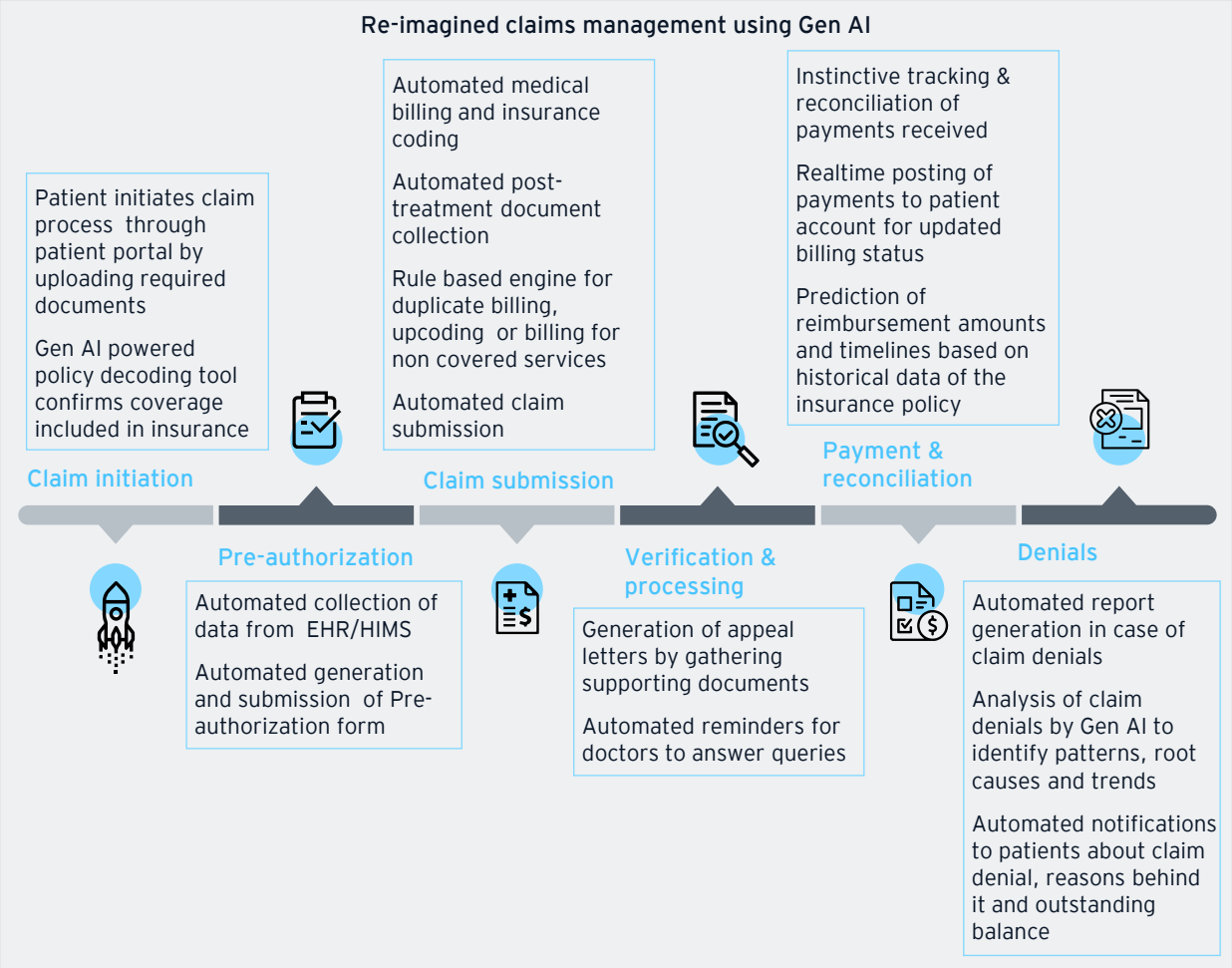
40% to 50% lower time to do tasks with 20% to 25% higher quality of output[6]

[6] Source: EY research

Case study: Revenue cycle management

Conversations with various healthcare CIOs and CFOs revealed claims management as a key focus area for automation, given the significant manual nature of work and financial risk involved. Lack of standardized approach to claims submission and evaluation across payors (insurance, corporate and government) causes organizations to struggle with compliance to requirements, manual data collation, data reconciliation, timely insights, etc. This directly impacts revenue efficiency and investment in working capital.

GenAI tools can automate the various manual steps involved in claims management process and create significant efficiencies and visibility. GenAI can help with decoding of payor requirements and eligibility (coverage, out-of-pocket expenses, inclusions, exclusions, etc.), data extraction and collation from various systems, real time claim status monitoring, automated denial management, structured deduction analysis and faster payment reconciliation/settlement.



A study conducted by the National Bureau of economic research indicated that access to conversational GenAI tools helps improve productivity by 14% (measured by issues resolved per hour) having a major impact on low-skilled workers. It also showed that AI assistance improved customer sentiment, reduced managerial escalations, and improves employee retention.

> From automating administrative tasks to providing clinical decision support, and analyzing patterns in medical images, to accelerating new drug development, GenAI will play a transformational role across the board in healthcare gradually.
>
> *Mitesh Daga, Firm Partner, TPG Global*

2. Shortage of infrastructure

There is a marked disparity in healthcare infrastructure across regions. Rural areas, home to a significant portion of India's population, remain underserved, lacking in both medical facilities and advanced medical equipment. Urban centers, while better equipped, are overwhelmed due to high patient influx leading to poor experience among all the stakeholders.

Early disease screening

GenAI's role in early disease screening is vital for reducing the infrastructure burden:

- **Predictive analytics for early intervention**: AI models can analyze patient data to identify early signs of chronic diseases, allowing for timely intervention and reducing the need for extensive hospital treatment.
- **Population health management**: AI can analyze data across populations to identify at-risk groups, guiding targeted screening and preventive measures.
- **Medical research and coding:** GenAI can automate medical coding accurately and anonymize personal data for use in medical research.

Impact

Faster development of predictive clinical models; 30% to 50% reduction in data management time/ costs and timely data analytics driven insights for effective public health policies[7]

AI in supply chain and inventory optimization

GenAI's impact on supply chain and inventory management is a game-changer:

- **Demand forecasting**: AI algorithms can predict the future demand for medicines and medical supplies, helping hospitals and clinics optimize their inventory and reduce wastage.
- **Supply chain efficiency**: By analyzing trends and patterns in supply chain data, AI can identify bottlenecks and suggest improvements, ensuring that essential medical supplies are always available where needed.

Impact

15% to 20% reduction in inventory management costs, 50% to 75% reduction in stock outs and bounce rates[8]

[7] Source: EY research
[8] Source: EY research

3. Need to improve clinical outcomes

Lack of credible health data has led to episodic and reactive care in most healthcare settings instead of using a holistic data driven approach with a focus on improving long-term health and clinical outcomes. Population health and early screening have been on the Indian government's priority list as India reaches closer to becoming the leader in non-communicable diseases like diabetes, cancer and cardiovascular diseases in the world.

Data-driven decision making for better care

GenAI's ability to bring together disparate data sets from various systems and synthesize the same contextually in a longitudinal record can give a significant push towards value-based care with a focus on improvement in overall health outcomes.

- **Patient data management:** Conversational GenAI tools can help summarize large pieces of information generated across care settings in a structured format, which can be used to create and analyze longitudinal health records for clinicians to take more informed medical calls.
- **Personalized care:** Using patient data, medical knowledge, and the latest research, GenAI can also draft personalized care plans, acting as a co-pilot for the clinicians and bringing in efficiency into the system. This can also result in more clarity for patients and better long-term outcomes for patients with data driven hyper personalized treatment plans.

Impact

Significant increase in availability of medical data and relevant synthesis for informed medical decisions and improving clinical outcomes[9]

4. Need to make healthcare trusted

There is a growing need for educating today's patient and their caregivers on their options and healthcare choices being made by their doctors along with transparency in functions like billing, medication used and safe procedures. Even today's doctors expect the technology to provide accurate and relevant clinical and non-clinical information timely. Providers with large networks, therefore, need to adopt automation and digital tools to eliminate errors, enhance transparency, and increase trust in their institutions.

Personalized engagement and on-demand services

GenAI can also help enhance transparency and build trust by providing more accurate and bill estimates (based on the previous patient data set and medical history of each patient) and providing regular updates during the treatment.

- **Branding and community outreach:** Creativity tools in GenAI will be a game changer for the branding and community outreach functions in hospitals as it can help in creating personalized medical content (videos/ multilingual/ personalized) used for branding, patient education and patient-doctor engagement with faster turnaround. It can help deliver the right content at the right time based on a patient's current health needs. For an organization, it can help improve effectiveness of social media engagement by analyzing qualitative comments into actionable themes, gauge engagement of patients and recommend areas to act upon.
- **Customer service (patient touchpoints) and experience:** GenAI can be leveraged for improving patient experience around appointment scheduling, pre-visit questionnaires, self-monitoring and triaging, medication management etc. GenAI powered conversational engine can help connect with linguistically diverse audience while making the process personalized and easy to follow. Virtual assistants and chatbots powered by GenAI can reduce cognitive load, facilitate prompt and suitable treatment guidance and provide timely information, thus improving patient experience across various digital front doors. These virtual assistants can also be trained to identify themes from qualitative feedback shared by patients (during hospital visit or post discharge or on

[9] Source: EY research

social media) and proactively engage for faster resolution of queries/experience recovery.

- **Improved information sharing and transparency:** GenAI can also help enhance transparency and build trust by providing more accurate and bill estimates (based on the previous patient data set and medical history of each patient) and providing regular updates during the treatment.

Impact

Significant improvement in patient experience scores and better retention driven by transparency and trust[10]

> GenAI in healthcare marks a transformative era where the synergy of genetics and AI propels medical advancements, offering personalized solutions that redefine the boundaries of a patient's care and pave the way for a healthier and more resilient future.
>
> *Abrarali Dalal, CEO, Sahyadri Hospitals*

[10] Source: EY research

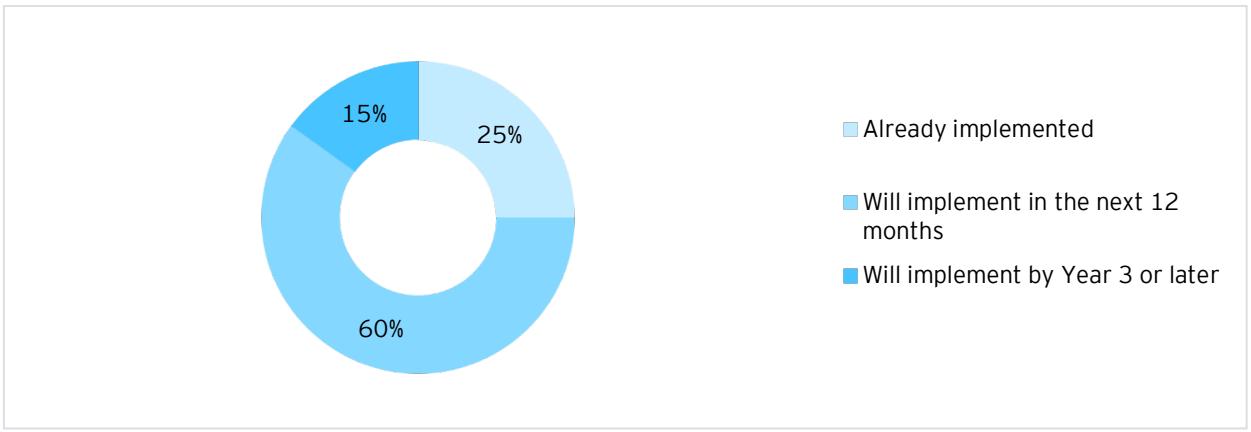

Brain analysis

04 Industry survey: how are some of the technology leaders in Indian healthcare thinking about GenAI?

The recent EY GenAI report, "The *AI*dea of India: Generative AI's potential to accelerate India's digital transformation" surveyed tech leaders in the healthcare space to understand their perspective regarding use and acceptance of GenAI in their organizations. The insights from the survey showed an inclination to pilot, adopt and leverage the benefits of this technology across departments.

25% of the respondents are already using GenAI and 60% have plans to roll it out in the next 12 months *

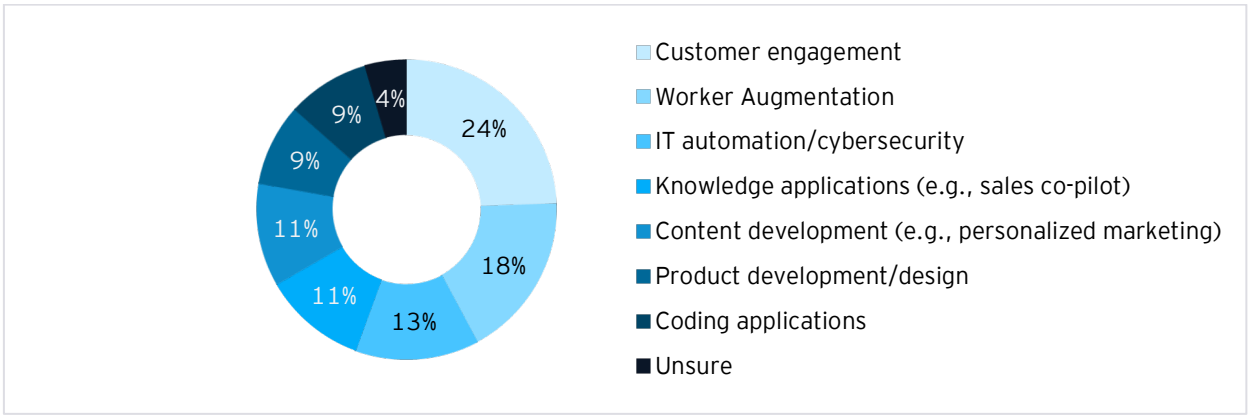
When are you likely to implement your first Generative AI solution?



> Generative AI has the transformative potential for healthcare in order to cut down the time for summarizing the healthcare data to have a quick decision making and consequently optimizing clinician's time. We are already piloting the technology across various use cases and expect its usage in real-world situations very soon.
>
> *Prashant Singh, CIO, Max Healthcare*

Customer engagement and productivity augmentation are key GenAI use cases being prioritized by the healthcare industry

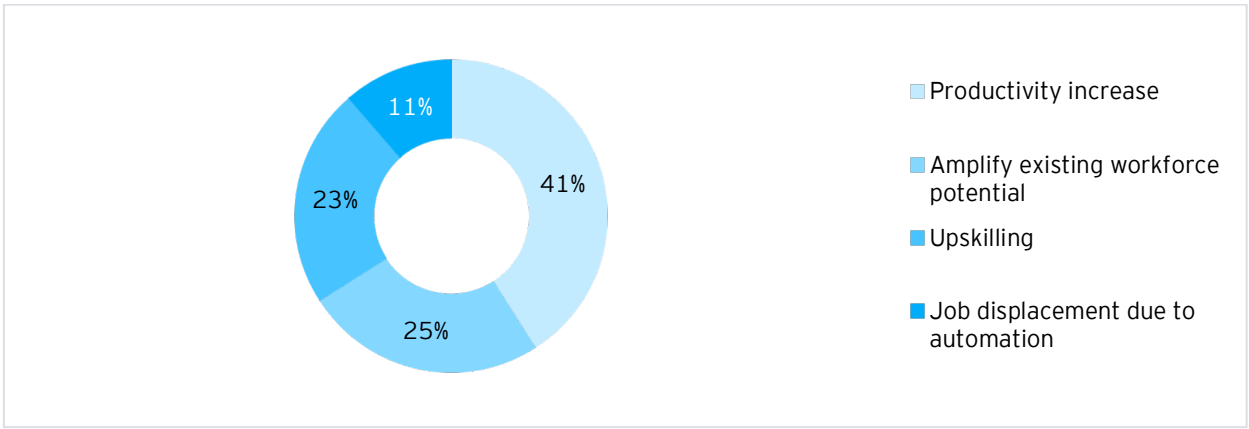
To what extent is your organization likely to adopt the following applications of Generative AI?



> Fundamental to the Generative AI is its capability to create impressive human-like text-based content in the natural language and that base should be leveraged for applying relevant use-cases in healthcare. As a human, the physician is limited by the number of patients it has seen in its lifetime, and it is very difficult to relate to their countless health variables. This is the space where Generative AI can succeed by processing millions of patient encounters having countless health variables of not only this physician, but of other physicians, too. So, to a large extent, hype around it is warranted and technology must be explored.
>
> *Rajiv Sikka, CIO, Medanta-The Medicity*

66% of the respondents believe that GenAI will increase productivity and amplify the workforce

How would Generative AI impact your organization's workforce?



> Generative AI can create new possibilities for healthcare. It is a powerful tool that can augment and enhance the capabilities of human experts, but it also requires careful evaluation, regulation, and ethical oversight. The best way to develop and deploy generative AI in healthcare is to deeply involve the clinical fraternity, from algorithm design to implementation. By doing so, we can ensure that generative AI is aligned with the needs and values of patients, clinicians, and society. It can generate novel data, insights, and solutions that can improve the quality, accessibility, and affordability of care.
>
> *Dr. Ritu Garg, Chief Growth and Innovation Officer, Fortis Healthcare*

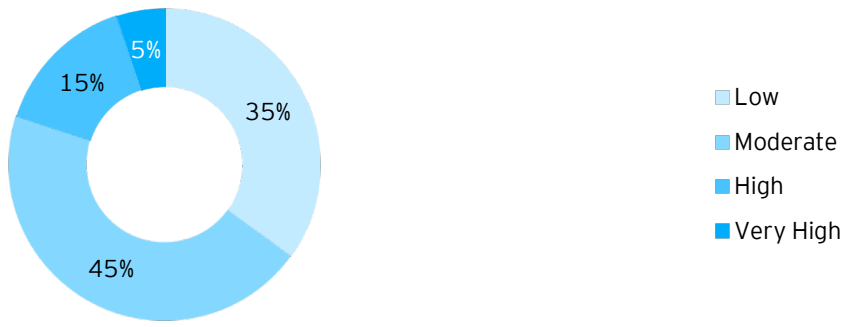
Over 60% of the respondents see the maximum impact on customer experience and driving innovation

What facets of your business would Generative AI impact?

> Generative AI can enhance customer experience and improve TAT through clinical documentation, analyze patient data and optimize workflows.
>
> *Dr. Makarand Sawant, VP-IT, Sahyadri Group of Hospitals*

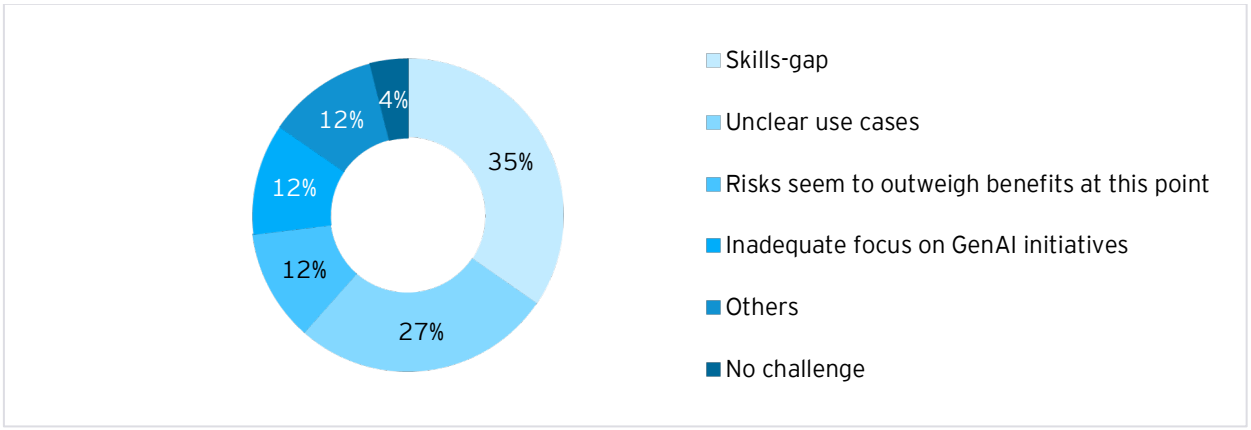
80% of the respondents indicated a low-to-moderate readiness to reap benefits from GenAI

How would you rate your organization's readiness to benefit from Generative AI?

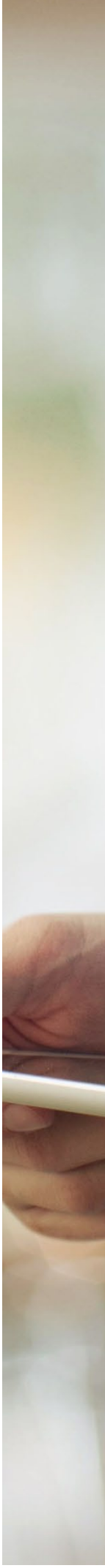


Skills gap and unclear use cases were noted as key challenges for AI adoption

What are the challenges to GenAI's adoption in your organization?



> Generative AI is set to radically transform healthcare very soon. It will do so by disrupting both information collection and information consumption. At every station in a health system, there are information givers, information receivers, a purpose for the interaction and a form or structure to capture the information exchange. All these information exchanges will be moderated and governed by Generative AI bots that capture and store data in its raw form. Every player attached to the health system will be able to query this repository again through a Generative AI bot. Firstly, this will make healthcare extremely efficient by eliminating the significant activity of clinical documentation. Secondly and more interestingly, it will also make healthcare extremely safe, by eliminating information loss at every step, occurring on account of rigid forms.
>
> *Vivek Rajgopal, Group Chief Analytics and AI Officer, Medha Analytics*



05 Integrating GenAI with Ayushman Bharat Digital Mission (ABDM) for a healthy Bharat

The ABDM's infrastructure, designed to support an integrated digital health infrastructure across the country, can significantly aid government-run hospitals in managing the current challenges. Its core components include the Ayushman Bharat Health Account (ABHA) for citizens, Health Professional Registry (HPR), Health Facility Registry (HFR), and the ABHA application.

Utilization of ABDM's digital platform

The digital health ecosystem created by ABDM supports the continuity of care across various healthcare levels. By enabling the interoperability of health data within the health ecosystem, ABDM facilitates the creation of Electronic Health Records (EHR) for every citizen. This system allows for more efficient patient data management, reducing the administrative burden on healthcare professionals.

AI/GenAI Integration with ABDM

GenAI technologies can be integrated with ABDM to further enhance its capabilities. For instance:

- **Faster adoption of EMR:** GenAI can accelerate adoption of EMR by physicians and clinical support teams by making medical documentation easier (with capabilities like structured EMR creation from voice to text).
- **Data management and analysis**: AI can analyze the vast amounts of data collected through ABDM, providing insights for better resource allocation, disease surveillance, and healthcare planning.
- **Virtual assistance and telemedicine**: AI-powered virtual assistants and telemedicine services, supported by ABDM's infrastructure, can provide remote healthcare services, reducing the physical burden on hospital infrastructure.
- **Training and capacity building**: AI tools can utilize the data and resources available through ABDM to create tailored training programs and simulations for healthcare professionals.

ABDM as a platform for AI accelerators

The ABDM infrastructure offers a robust foundation for future AI accelerators, which can provide healthcare professionals with access to large volumes of patient data. This access can significantly enhance the capabilities of AI tools in diagnostic assistance, treatment planning and personalized patient care.

It will be exciting to see how healthcare organizations take the leap of faith and move towards more innovative use and wider adoption of GenAI across the healthcare landscape to improve accuracy, quality, speed and trust in the new era of digital health.

06 Challenges and pitfalls of using AI in healthcare

In our conversation with healthcare sector CIOs, 80% of them acknowledged that their organizations are not fully ready to embrace this technology. However, they are keen to build supportive infrastructure to provide a solid foundation as they embrace innovative technologies making their way towards the sector. Lack of adequate skill and understanding within the existing ecosystem and reservations with regards to accuracy of results are some of the major challenges envisioned by the leaders. There are also concerns regarding data privacy, cybersecurity and biased responses and there is a need to mitigate those before embarking on this journey.

Data privacy and security

One of the foremost concerns in integrating GenAI into healthcare is ensuring the privacy and security of patient data. GenAI systems require access to vast amounts of sensitive personal health information, and there is a risk of data breaches and unauthorized access. Ensuring compliance with data protection laws and implementing robust cybersecurity measures is hence critical.

Ethical considerations

GenAI applications in healthcare raise several ethical questions, such as:

- **Decision-making authority**: Defining the role of GenAI in supporting healthcare decisions and the extent to which it should influence patient care.
- **Bias and fairness**: Addressing biases in GenAI algorithms that may arise from skewed datasets. These biases can lead to unequal healthcare outcomes among different demographic groups.
- **Transparency and accountability**: Ensuring that GenAI systems are transparent in their functioning and that there is clear accountability for their decisions and outcomes.

Implementation challenges

The successful implementation of GenAI in healthcare faces several hurdles, including:

- **Integration with existing systems**: Seamlessly integrating GenAI tools with existing healthcare infrastructures and workflows
- **Skill gap**: The need for training healthcare professionals to effectively use and interact with GenAI systems
- **Resistance to change**: Overcoming resistance from healthcare providers and patients who may be skeptical or apprehensive about relying on GenAI for healthcare delivery

Technological limitations

Despite its advances, GenAI technology has limitations, such as:

- **Dependence on data quality**: The effectiveness of GenAI is highly dependent on the quality of data it is trained on. Poor quality or insufficient data can lead to inaccurate results.
- **Interoperability**: The challenge of ensuring that GenAI systems can effectively communicate and exchange information with different healthcare systems and technologies.
- **Scalability and sustainability**: Ensuring that GenAI solutions are scalable and sustainable in the long term, especially in diverse and resource-constrained settings, like those in India.

07 Need for comprehensive governance framework

Implementing GenAI in the healthcare sector requires a comprehensive governance framework. This framework should address various aspects, from regulatory compliance to ethical standards, ensuring that GenAI's integration into healthcare is beneficial, equitable and sustainable.

Regulatory frameworks and compliance

Developing robust regulatory frameworks is crucial for overseeing GenAI in healthcare. These frameworks should ensure that GenAI applications comply with legal and ethical standards, focusing on:

- **Patient safety**: Ensuring that GenAI applications do not compromise patient safety and are subject to rigorous testing and validation processes
- **Data protection laws**: Compliance with existing data protection laws, like the Digital Personal Data Protection Act, 2023 in India, focusing on consent, data minimization and purpose limitation
- **Medical ethics**: Ensuring that GenAI applications adhere to the principles of medical ethics, including beneficence, non-maleficence, autonomy and justice

Standardization and interoperability

For GenAI in healthcare to be effective, there needs to be a standardization of protocols and formats. This includes:

- **Data standards**: Establishing uniform data standards to ensure the accuracy and consistency of health data used by GenAI systems
- **Interoperability of systems**: Ensuring that GenAI systems can seamlessly integrate and communicate with existing healthcare IT infrastructures

Data governance

Following strategies reflect an integrated approach, where AI and Generative AI are not just tools but integral components of the data governance framework, particularly tailored for the Indian healthcare context. They emphasize the use of advanced technologies and collaborative efforts across various disciplines to enhance data governance, ensuring that it is effective, efficient and aligned with the unique requirements of the Indian healthcare sector.

Data governance aspect	Implementation strategies with AI/ GenAI in Indian healthcare
Data privacy and security	▸ Implement advanced encryption and anonymization techniques to protect patient data ▸ Use AI algorithms for real-time monitoring and threat detection ▸ GenAI can also be used to summarize content and detect PII or Aadhaar mapped data
Bias mitigation and equity	▸ Utilize AI algorithms to analyze data collection processes and identify biases ▸ Implement corrective algorithms to ensure equity in data representation. ▸ Conduct regular AI audits to ensure ongoing bias mitigation
Regulatory compliance	▸ Deploy AI systems to automate the monitoring of compliance with local regulations like the Digital Personal Data Protection Act, 2023 ▸ Use AI for real-time reporting and to track changes in legislation
Interdisciplinary involvement and training	▸ Provide cross-functional training on AI and data governance tools ▸ Foster collaboration between IT, data science and healthcare professionals for effective AI integration
Automating for efficiency	▸ Implement AI to automate data governance tasks, such as data entry, validation, and categorization ▸ Use AI-driven workflows to streamline data management processes
Use of synthetic data	▸ Generate synthetic datasets using AI to supplement real patient data for training and research ▸ Ensure these datasets are robust and reflective of India's diverse population for accurate AI modeling

Oversight and monitoring

Ongoing oversight and monitoring of AI applications in healthcare are vital to identify and address any emerging issues. This involves:

- **Continuous evaluation**: Regular assessment of GenAI applications for their performance, impact on patient care, and any unintended consequences
- **Adaptive policies**: Developing policies that are adaptable to the evolving nature of GenAI technologies and healthcare needs

Ethical guidelines

Creating ethical guidelines for GenAI in healthcare is essential to guide its development and use. These guidelines should cover:

- **Transparency**: Ensuring that the workings of GenAI systems are transparent and understandable to users
- **Accountability**: Establishing clear accountability for decisions made by or with the support of GenAI systems
- **Equity**: Making sure that GenAI applications do not perpetuate health disparities and are accessible to diverse populations

Collaborative approach

The successful implementation of GenAI in healthcare hinges on a collaborative approach that involves the entire healthcare ecosystem. This includes an array of stakeholders, such as healthcare institutes, start-ups, large hospitals, government bodies, NGOs, and others. Each of these players brings unique perspectives and expertise, making their collaboration essential in shaping a comprehensive and effective governance model.

Government bodies

Government agencies are key in setting policies, regulations, and standards. They are responsible for:

- **Regulatory frameworks and funding**: Developing regulatory frameworks and providing funding for GenAI initiatives in healthcare.
- **Policy making and public health strategies**: Incorporating GenAI strategies into broader public health policies and programs.

Involvement of healthcare institutes

Healthcare institutes, including medical colleges and research institutions, play a crucial role in the development and evaluation of GenAI technologies. They can provide:

- **Research and development**: Pioneering research in GenAI applications specific to healthcare needs
- **Clinical trials and validation**: Conducting clinical trials to validate the efficacy and safety of GenAI tools in healthcare settings

Start-ups and technology firms

Start-ups and technology firms are often at the forefront of GenAI innovation. Their role includes:

- **Innovative solutions**: Developing cutting-edge GenAI solutions tailored to healthcare challenges
- **Agility and adaptation**: Quickly adapting and scaling AI solutions in response to emerging healthcare needs

Large hospitals and healthcare providers

Large hospitals and established healthcare providers bring practical insights and experience. They are crucial for:

- **Real-world testing and implementation**: Providing platforms for testing GenAI applications in real-world settings
- **Feedback and iterative improvement**: Offering feedback for the continuous improvement of GenAI tools

Non-Governmental Organizations (NGOs)

NGOs can play a supportive role, especially in outreach and advocacy. They contribute by:

- **Community engagement and education**: Raising awareness about GenAI in healthcare among the public and underserved communities.
- **Advocacy for ethical and equitable use**: Advocating for the ethical and equitable use of GenAI in healthcare.

Collaborative platforms

Establishing platforms where these diverse stakeholders can collaborate is vital. Such platforms can facilitate:

- **Knowledge exchange and best practices**: Sharing knowledge, experiences, and best practices among different stakeholders.
- **Joint projects and partnerships**: Fostering partnerships for joint projects, and research and development.
- **Responsible AI Sandbox for healthcare innovation in India**: The integration of Artificial Intelligence (AI) and Generative AI (GenAI) into healthcare in India necessitates a collaborative approach that brings together various stakeholders within the healthcare ecosystem. This collective effort is pivotal for fostering rapid innovation and ensuring a responsible, effective implementation of AI technologies. A key component in this collaborative framework is the introduction of a "Responsible AI Sandbox". This platform can serve as a foundational tool for ecosystem players to build and integrate their AI/ Generative AI-powered solutions, thus accelerating innovation across the healthcare technology spectrum in India.

Ensuring a unified vision

The collaborative approach between the above-mentioned players must be underpinned by a unified vision that aligns with national healthcare goals and priorities. This vision should focus on enhancing healthcare delivery, improving patient outcomes, and ensuring equitable access to healthcare services through the use of GenAI.

Key highlights

Revolutionizing Indian healthcare with GenAI

The integration of GenAI into the Indian healthcare system represents a ground-breaking shift. This report has explored various dimensions of GenAI application, addressing both its potential and the complexities involved in its adoption.

Addressing workforce and infrastructure shortages

GenAI technologies stand out as key enablers in mitigating the critical shortages in the healthcare workforce and infrastructure. From administrative task automation to advanced diagnostic support, GenAI offers a range of tools to amplify the capabilities of healthcare professionals and optimize the use of existing infrastructure.

AI and GenAI can play a pivotal role in clinical areas such as health data management, efficient diagnostics, treatment planning and non-clinical areas like finance, accounting and IT. Thereby it can free up valuable time of the workforce to engage in building an efficient healthcare organization.

Improving health outcomes and trust

Generative AI stands out for its ability to process structured and unstructured data and create dynamic content based on context. In healthcare, this could translate into generating personalized patient treatment plans, simulating clinical trials, and creating training materials for healthcare professionals. These applications have the potential to significantly improve the long term clinical outcomes based on a medical data driven approach and consequently improve patient trust in healthcare systems.

Leveraging ABDM for a digital health ecosystem

The Ayushman Bharat Digital Mission (ABDM) provides a robust digital backbone that can be effectively leveraged to integrate GenAI solutions into the healthcare system. ABDM's infrastructure, designed for interoperability and efficient data management, can enhance the reach and effectiveness of GenAI applications, bringing about more coordinated and patient-centric healthcare delivery.

Navigating challenges and ensuring ethical governance

The adoption of AI in healthcare, however, comes with its set of challenges. Issues such as data privacy, ethical considerations, the digital divide, and the need for robust regulatory frameworks have been highlighted. Addressing these challenges requires a comprehensive governance model that ensures the ethical, safe, and effective use of GenAI in healthcare.

Collaborative approach for holistic development

A collaborative approach involving all stakeholders in the healthcare ecosystem is fundamental to the successful implementation of AI in healthcare. This collaboration should aim at knowledge exchange, joint innovation and ensuring that AI benefits are accessible and equitable.

What the future holds

As India continues to navigate the complexities of its healthcare challenges, the integration of GenAI emerges as a beacon of hope and innovation. With careful planning, ethical governance, and collaborative efforts, GenAI can significantly enhance the quality and accessibility of healthcare services in India. It is an opportunity to transform the healthcare landscape, making it more resilient, efficient, and inclusive.

In conclusion, the successful integration of GenAI in Indian healthcare requires a balanced approach, addressing both the immense potential of these technologies and the challenges they bring. By working together, healthcare professionals, technologists, policymakers, and other stakeholders can harness the power of GenAI to create a more efficient, accessible, and high-quality healthcare system for India.

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Mahesh Makhija, Partner and Leader – Technology Consulting, EY India
mahesh.makhija@in.ey.com

Anurag Gupta, Partner and Leader, EY-Parthenon India
anurag.gupta2@in.ey.com

Ashish Nanda, Partner and Leader – Consumer and Health Services, EY India
ashish.nanda@in.ey.com

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Dr. Sujoy Kar, Chief Medical Information Officer and VP, Apollo Hospitals

Abrarali Dalal, CEO, Sahyadri Hospitals

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Dr. Ritu Garg, Chief Growth and Innovation Officer, Fortis Healthcare

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Veneeth Purushottam, Group CIO, Aster DM Healthcare

Mahesh Shinde, Director - IT, Hinduja Hospitals

Aravind Ganesan, Group Head – Digital Strategy, Kauvery Hospitals

Rajiv Sikka, CIO, Medanta – The Medicity

Sudeep Dey, CIO, Healthcare Global (HCG)

Sapna Agarwal, AVP – Operations Excellence, Healthcare Global (HCG)

Richard Raphael, CIO, KIMS Health

Vivek Rajgopal, Group Chief Analytics and AI Officer, Medha Analytics

Dr. Makarand Sawant, VP-IT, Sahyadri Group of Hospitals

Core Team

Kaivaan Movdawalla, Partner
kaivaan.movdawalla@parthenon.ey.com

Srimayee Chakraborty, Partner
srimayee.chakraborty@parthenon.ey.com

Rakesh Kaul Punjabi, Partner
rakesh.kaul@in.ey.com

Debopam Raha, Partner
debopam.raha@in.ey.com

Gaurav Goyal, Partner
gaurav.goyal4@in.ey.com

Uday Gupta, Partner
uday.gupta@in.ey.com

Ankur Dhandharia, Partner
ankur.dhandharia@parthenon.ey.com

Parankusha S, Director
parankusha.s@in.ey.com

Srabati Nandy, Director
Srabati.nandy@parthenon.ey.com

Dr. Eisha Anand, Manager
eisha.anand@parthenon.ey.com

Dr. Nisha Sharma, Manager
nisha.sharma4@parthenon.ey.com

Brand, Marketing and Communications

Bhavisha Jogi, Associate Director
bhavisha.jogi@in.ey.com

Arif Jamaal, Assistant Director
arif.jamaal@in.ey.com

Tarannum Khan, Assistant Manager
tarannum.khan@in.ey.com

Shweta Sharma, Senior Associate
shweta.sharma5@in.ey.com

Advitiya Singh, Associate
advitiya.singh@in.ey.com


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