Building a Resilient Digital Health Ecosystem in India

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Technology now permeates every facet of human existence. From communication and transportation to healthcare and entertainment, technology has redefined how we live, work, and interact. Its omnipresence is reshaping societal norms, revolutionising various sectors, and propelling us into the future.

Through improvements in diagnostics, treatment, and patient care, technological advancements have had a profound impact on healthcare. Medical devices, telemedicine, electronic health records, and artificial intelligence (AI)-driven diagnostics have transformed healthcare delivery by making it more precise, efficient, and accessible. Wearable devices and health apps have empowered individuals to monitor and manage their well-being proactively. Technology has also played a crucial role in advancing medical research, discovering new treatments, and improving overall healthcare outcomes. In response to the COVID-19 pandemic, the world witnessed the exponential growth of digital health.

Digital Health Landscape in India

Given India's massive population, providing equitable access to healthcare services to all is an important agenda. By harnessing the power of technology, digital health can effectively address these challenges and ensure that healthcare services are accessible even in the remote regions. Patients can use digital platforms for convenient access to care. Digital platforms therefore bridge gaps and improve healthcare delivery across the nation.

In line with the 'Digital India' initiative and the vision to create interoperable and standardised electronic health records across the country, the Indian government notified the Electronic Health Record[1] standards in 2016. The National Health Policy[2] (2017) envisages the creation of a digital health technology ecosystem that serves the needs of all stakeholders and improves efficiency, transparency, and citizens' experiences across public and private healthcare.

Over the recent years, India has made progress in digital healthcare delivery, as demonstrated in national health programmes such as the Hospital Management Information System, Online Registration System, the national tuberculosis elimination (Ni-kshay) programme, Mother and Child Tracking System, *Mera Aspataal* (My Hospital, a patient feedback system), the Health Management Information System, the Integrated Health Information Platform, and Non-Communicable Diseases screening application—which have benefitted patients through the timely delivery of services and by making government healthcare more affordable and accessible.[3]

The need for a future-ready digital health system has become even more urgent with the announcement of the Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB-PMJAY)[4] in 2018, India's flagship programme that would herald an infrastructural transformation of the nation's health system. This mission envisions the following:

I. Operationalising 1.5 lakh health and wellness centres that offer preventive and primary care, including telemedicine consultation services; and

II. Providing financial protection of up to INR 500,000 per family annually for secondary and tertiary care hospitalisation to the over 120 million crore poor and vulnerable families that comprise the bottom 40 percent of the Indian population.

These initiatives aim to scale up a wellness-oriented approach instead of an illness-focused one—a key step towards achieving universal health coverage (UHC) through patient data portability across primary, secondary, and tertiary levels. This essentially translates into an environment where all people can obtain health services anywhere in the country without suffering financial hardship or excessive indirect costs.

Achieving such scale requires us to rethink the core technology backbone of our system and leverage cutting-edge digital solutions to tackle the challenge. However, it is also felt that all these efforts need to converge into a single framework to achieve interoperability of data, which would benefit both policymakers for decision-making and patients with effective services at the time of need. In response, the government developed the National Digital Health Blueprint as a framework for the efficient implementation of digital health treatments.

The Ayushman Bharat Digital Mission[5]

To implement the principles of the blueprint, the National Digital Health Mission, now known as the Ayushman Bharat Digital Mission (ABDM), was launched in six union territories in August 2020. It was proposed to be carried out via six key components—i.e, the digital health ID card, Digi-Doctor, Health Facility Registry, Personal Health Records, e-pharmacy, and telemedicine. India launched the nationwide implementation the ABDM in September 2021. The ABDM intends to create the framework needed to enable an integrated digital health infrastructure in India. Additionally, it will bridge the existing gap amongst different stakeholders of the healthcare ecosystem through digital highways.

Under the ABDM, every citizen will be provided a 14-digit Ayushman Bharat Account (ABHA) number, which is a unique health identifier. With the patient's informed consent, the ABHAs will be used to identify and

authenticate people's health records across various systems and stakeholders. As of July 2023, over 435 million ABHA[a] numbers have been created, and 214,396 health facilities and 207,274 doctors have been registered under the ABDM ecosystem.

ABDM has accelerated the participation of various stakeholders of the healthcare ecosystem and ensured deployment of patient-centric policies—resulting in cashless care with improved access to ensure protection for the poor. Given its federal and complex healthcare structure, India demands agility, flexibility and evidence-based smart policymaking for implementation of healthcare initiatives, driving all stakeholders towards health-seeking behaviours with renewed energy.

Digital Health in COVID-19 Management

The COVID-19 pandemic has challenged health systems across the globe. The India government not only focused on the management of the pandemic through various activities but also formulated innovative solutions to ensure the continuity of health services across the spectrum. It has followed a 'whole of government, whole of society' approach to battle the pandemic by engaging subnational and local governments, civil society organisations, the private sector, and local communities in mitigation efforts.

Amid the pandemic, India recognised the need to ease access to digital consultations, and issued the Telemedicine Practice Guidelines in March 2020. India also launched eSanjeevaniOPD,[6] a first of its kind and the world's largest national telemedicine service to facilitate online health facilities to patients in the confines of their home at no cost to ensure continuum of care. The eSanjeevani initiative has been instrumental in bridging the digital divide in India, particularly in rural areas where access to healthcare is often limited. This initiative has completed 142 million consultations[b] in record time and is currently serving around 400,000 patients every day as of 27 July 2023.

a https://dashboard.abdm.gov.in/abdm/

b https://esanjeevani.mohfw.gov.in/#/

India developed another state-of-the-art digital health system, CoWIN,[7] a digital platform that helped more than a billion beneficiaries book COVID-19 vaccinations in less than three months. In less than 18 months, CoWIN had helped administer two billion COVID-19 vaccination doses, immunising over 90 percent of all eligible adults.

The establishment of digitally-enabled COVID-19 'war rooms' at the central and state levels allowed key stakeholders to undertake data-driven decisions towards infrastructure gap analysis, case projection and management, and to identify problem areas that required specific state-centre coordination. Various other digital health initiatives that have enhanced India's efforts against the COVID-19 crisis are outlined in the following points:

i. the COVID-19 India Portal developed for disease tracking by geography, inventory tracking of essential items, and predicting demands at the national, state, and district levels based on case-loads;

ii. the Aarogya Setu, a mobile tracking app which uses the smartphone's GPS and Bluetooth features to track the coronavirus infection through contact tracing, syndromic mapping, and self-assessment in addition to essential risk communication for our citizens;

iii. the RT-PCR app, a hand-held tool for country-wide sample collection; and

iv. a COVID-19 facility app which allows health system stakeholders up to the district level to track the state and management of patients.

Institutionalising Pandemic Learnings: National Public Health Observatory (NPHO)

India has established the National Public Health Observatory (NPHO) and the Health Emergency Operations Centre (HEOC) for real-time monitoring and analysis of various data points for informed decision-making. The NPHO will ensure comprehensive monitoring of health systems, including overall healthcare service delivery, integration of healthcare programmes, and transformation of the healthcare situation in the country.

Leveraging AI for Improved Healthcare

Across the world, AI is being used in healthcare to support doctors and healthcare workers, improve customer service and patient management, and monitor diseases. The Indian government has established three centres of excellence for AI—at the All India Institutes of Medical Sciences in Delhi and Rishikesh, and at the Post Graduate Institute of Medical Education & Research in Chandigarh—to leverage and identify potential areas for the use of AI in the health sector. The centres are already working on several solutions for healthcare which leverage generative AI, including:

i. a clinical decision support system, a multilingual solution to provide diagnostic and triaging support to doctors;

ii. event-based disease surveillance to scan large volumes of digital media in English as well as 10 Indian languages to monitor events that signal an impending disease outbreak; and

iii. an AI assistant for frontline workers in 11 Indian languages to enable and empower healthcare workers to ask questions and receive responses to enhance their work.

Stimulating Advanced Knowledge for Sustainable Health Management (SAKSHAM) Portal

The inclusive capacity building of health professionals is an important component to ensure the efficient delivery of healthcare services across the country. Tele-education has benefitted all fields of education including medical education, especially for students in remote areas with limited access to schools and qualified teachers. Online platforms, video conferencing, and pre-recorded lectures have facilitated learning for students who were previously deprived of quality education due to their geographical location.

Keeping this vision in mind, the government has developed a unified and dedicated online learning and training platform, SAKSHAM,[8] to enable health professionals to receive advanced training without any disruption in their regular jobs. The portal hosts more than 200 courses on public health and 150 on clinical practices.

With such developments in digital health, India has leapfrogged in terms of the adoption of digital health in the public sector. This will arguably lead to the creation of a national digital health ecosystem through wide-scale adoption of digital tools across the continuum of care, both in the private and public sectors.

Promoting the Digital Health Agenda Globally

India has emerged as a frontrunner in championing digital health and in positioning it as a critical agenda at the global level. Recognising the transformative potential of technology in healthcare, India has taken proactive steps to harness digital innovations, promote healthcare accessibility, and drive advancements in the field globally.

India tabled the Digital Health Resolution in the 71st World Health Assembly in May 2018 at Geneva, which was unanimously adopted by all the member states of the World Health Organization (WHO). The resolution highlighted global attention to the potential challenges and opportunities related to digital health technology and need for close collaboration on the issue globally. As a follow-up action, WHO has prioritised digital health agenda by establishing the Department for Digital Health and Innovation in April 2019 and published the *Global Strategy on Digital Health 2020-2025* to promote healthy lives and well-being for all.

India served as Chair of the Global Digital Health Partnership (GDHP, between 2019 and 2021), which is the world's largest intergovernmental and multilateral forum on the issue of digital health. Under India's leadership, the GDHP's membership grew from 14 to 33, including three international organisations (WHO, Organisation for Economic Co-operation and Development, and the International Digital Health and AI Research Collaborative).

India's G20 Leadership Catalysing Global Health Initiatives

India's G20 presidency set ambitious goals to address the 21st century's greatest challenges such as climate change, food insecurity, the threat of

future pandemics, and other health emergencies by building international co-operation and strengthening global systems. The pandemic experience has taught us that preventing and preparing for a health emergency must always be a top priority at a global level, because when it comes to health, "no one is safe until everyone is safe."

Drawing from the lessons from the pandemic, the G20 Health Working Group set out to catalyse and enervate global health initiatives. Through four meetings, culminating in the health ministers' meeting, three main priorities were discussed:

i. prevention, preparedness, and response to health emergencies with focus on anti-microbial resistance and 'One Health';

ii. strengthening cooperation in the pharmaceutical sector with focus on availability and access to safe, effective, quality, and affordable medical countermeasures, namely vaccines, therapeutics, and diagnostics; and

iii. digital health innovations and solutions to aid universal health coverage and improve healthcare services delivery.

Digital health, the third priority under India's G20 presidency aims to leverage the country's acumen and achievements along with other global initiatives in the digital health space, and develop innovative digital health solutions that can be applied across the world. A number of programmes and projects seeking to develop digital health products are being initiated independently. These projects are cumulatively spending billions of dollars while working on similar aspects.

India's G20 presidency has aimed to bring them all under the umbrella of the Global Initiative on Digital Health (GIDH), a network managed by WHO. The GIDH is an opportunity to create a globally connected digital health ecosystem, converging worldwide efforts in scaling up commitments and investments of relevant stakeholders and promotion of digital health solutions as digital public goods. This will be achieved through coordinated engagements and implementation aligned with WHO norms, standards, and

guidelines, while increasing transparency of resources being allocated to digital transformation and identifying important gaps in support.

Conclusion

Adopting digital health is no longer a choice. The pandemic has undoubtedly paved the way for the quick adoption of digital health. Digital health is propelling the world towards more integrated health systems that are focused on delivering patient-centred care, improving health outcomes, and making the best use of healthcare resources. India's digital health initiatives such as the ABDM, CoWIN, and eSanjeevani have provided a stimulus to act in conformity with a globally progressive commitment to health equity. They have also enabled the country to work towards creating a movement to enable integration of technology-informed models for universal health coverage.

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