Review Article

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A unified health ecosystem in India: exploring the Ayushman Bharat digital mission

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ABSTRACT

The Ayushman Bharat Digital Mission (ABDM) represents a transformative initiative aimed at revolutionizing healthcare delivery in India through digitizing health records and establishing an integrated digital health infrastructure. This mission addresses critical challenges in the healthcare system by providing a robust information backbone for healthcare providers, which simplifies the processes of tracking, accessing and updating patient data. By eliminating duplication and reducing errors in data collection, ABDM enhances efficiency and improves the quality of care provided to patients. Patients are empowered to create a Health ID, enabling them to share their medical records seamlessly with healthcare providers. This includes comprehensive details such as doctor appointments, diagnoses, treatments, hospitalizations and medications, ensuring that patients have access to high-quality healthcare. The integration of medical records into a single digital system not only simplifies care coordination but also reduces wait times, standardizes treatments and lowers overall healthcare costs. Furthermore, the digitization of health records allows healthcare providers to deliver more personalised and timely care, as instant access to a patient's medical history significantly improves diagnosis accuracy and treatment outcomes. The ABDM holds immense potential for enhancing the effectiveness, efficiency and transparency of health service delivery in India, ultimately promising a future where every citizen can access their health information within a unified digital health ecosystem.

Keywords: Ayushman Bharat digital mission, Digital health infrastructure, Universal health coverage

INTRODUCTION

Healthcare in India is at a pivotal juncture, with technology emerging as a powerful enabler of universal health coverage (UHC). The COVID-19 pandemic accelerated the need for digital transformation, highlighting the potential of digital tools to make healthcare more patient-centric and outcome-oriented.^{1,2} The Ayushman bharat digital mission (ABDM) represents a significant advancement in the Indian healthcare

landscape, aligning with the goals outlined in the National Health Policy. This policy emphasized accessibility, a wellness-centric approach and the integration of digital technologies.³ Subsequent frameworks, including the National Health Stack and the National Digital Health Blueprint, laid the groundwork for ABDM's implementation, which aims to create a cohesive digital health ecosystem across the nation.³ There is a pressing need to review and critically analyse the Ayushman Bharat Digital Mission (ABDM) as it represents a transformative step in India's healthcare journey. As

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ABDM evolves and expands, understanding its framework, potential impact, challenges and opportunities becomes crucial for stakeholders across the healthcare ecosystem. A comprehensive review is essential to highlight how ABDM enhances healthcare delivery, promotes patient empowerment and facilitates coordinated, data-driven clinical care. Furthermore, evaluating its implementation will guide policymakers, healthcare providers and technologists in refining strategies to ensure the creation of an inclusive, efficient and patient-centred digital health ecosystem in India.

DIGITAL PUBLIC GOODS AND INFRASTRUCTURE IN INDIA

India's success in building Digital Public Goods (DPGs) such as Aadhaar and Unified Payments Interface (UPI) underpins its digital transformation. With nearly 1.25 billion wireless connections and over 90% Aadhaar penetration, the infrastructure is primed to support a comprehensive digital health ecosystem.^{4,5}

DIGITAL INNOVATION AMIDST THE CRISIS (COVID-19 PANDEMIC)

The COVID-19 pandemic highlighted the critical role of digital health solutions in managing public health crises. During the COVID-19 crisis the CoWIN portal facilitated the registration of over a billion individuals for vaccination and ensured seamless tracking of vaccine administration.⁶ The Aarogya Setu app delivered real-time COVID-19 updates and conducted risk assessments for individuals.⁶

India is repurposing existing digital platforms to strengthen its healthcare infrastructure. CoWIN is being transformed into an integrated health management information system to assist smaller clinics and nursing homes, enabling them to optimise their operations. Simultaneously, Aarogya Setu is evolving into a comprehensive health and wellness application, emphasising preventive healthcare measures. Such initiatives demonstrate the potential of digital tools to revolutionise healthcare delivery in India. A Boston Consulting Group survey revealed that teleconsultation usage among clinicians increased to 85% during the pandemic, signaling a shift towards digital healthcare.

THE MAKING OF AYUSHMAN BHARAT DIGITAL MISSION

The making of the Ayushman Bharat Digital Mission (ABDM) was a progressive journey rooted in key national health initiatives. It began with the National Health Policy of 2017, which advocated for delivering quality healthcare through the use of affordable technology. This was followed in 2018 by the introduction of the National Health Stack, which envisioned the development of common public digital goods to support healthcare delivery. In 2019, the

National Digital Health Blueprint was released, laying the groundwork for an integrated and interoperable digital health ecosystem. This cumulative effort culminated in the official launch of the Ayushman Bharat Digital Mission in 2021.

Launched in 2021, ABDM incorporates global best practices into a federated, interoperable framework tailored to India's needs.³

Key features of Ayushman Bharat Digital Mission

ABDM facilitates seamless movement of health information between entities, even if they are not directly connected. This creates a win-win for all stakeholders, with patients being the biggest beneficiaries. Through integrated services, ABDM provides doctors and healthcare providers with an information backbone, simplifying the process of tracking, accessing and updating patient data. It eliminates duplication, reduces errors in data collection and improves efficiency. Providers gain access to detailed patient information, leading to better care and lower healthcare costs.

Patients can opt to create a Health ID under this mission, enabling them to share their medical records with healthcare providers. This includes details like doctor appointments, diagnoses, treatments, hospitalisations and medications, ensuring access to high-quality healthcare. Digitising and integrating medical records into a single system simplifies care coordination, reduces wait times, standardises treatments and lowers costs, marking a significant advancement in patient care.

Digital health records empower healthcare providers to offer more personalised and timely care, as instant access to medical histories enhances diagnostic accuracy and improves treatment outcomes. Beyond record digitisation, ABDM establishes a robust infrastructure for the digital health ecosystem, incorporating registries for healthcare facilities and professionals to elevate service quality. By standardising health data, ABDM also stimulates innovation in health technology, allowing startups and established companies to create new tools and services, thereby advancing the digital health revolution. 10,11

IMPROVING PUBLIC HEALTH MANAGEMENT

ABDM equips the government with advanced data analytics tools for effective public health monitoring and management. This supports better policymaking and resource allocation, leading to improved population health outcomes. ^{7,9} With the digitalisation of health records, healthcare providers can offer more personalised and timely medical care. The availability of a patient's medical history at the click of a button can significantly improve diagnosis and treatment outcomes. ^{8,11} Patients can opt to create a Health ID under this mission, enabling them to share their medical records with healthcare

providers. This includes details like doctor appointments, diagnoses, treatments, hospitalisations and medications, ensuring access to high-quality healthcare. Digitising and integrating medical records into a single system simplifies care coordination, reduces wait times, standardises treatments and lowers costs, marking a significant advancement in patient care. Rep.

Key components of the Unified health ecosystem

Unique health identifier

Each citizen is assigned a unique ABHA ID, establishing a reliable identity for managing health records.¹¹

Healthcare professional's registry

This comprehensive repository includes all healthcare professionals across modern and traditional medicine systems, facilitating their integration into India's digital health ecosystem.⁹

Health facility registries

A detailed inventory of health facilities nationwide, encompassing public and private entities such as hospitals, clinics and pharmacies. ¹⁰

Drug registry

A centralised database of approved drugs in India ensures standardisation, aiding in accurate prescriptions and inventory management.¹¹

Health information exchange and consent manager

This feature empowers citizens to securely access and share their health records, ensuring informed consent drives data exchange.⁸

Unified health interface

Streamlines the discovery and delivery of health services, enhancing accessibility to healthcare interactions. ¹⁰

National health claims exchange

This system standardises insurance payments, simplifying and accelerating the claims process.⁹

Data privacy and security

Prioritises the confidentiality and security of personal health information, adhering to the Digital Personal Data Protection Act, 2023.¹¹

Interoperability

Ensures seamless communication among various stakeholders within the healthcare ecosystem through secure data exchange.⁷

Transparency

Provides individuals with choices regarding healthcare services while ensuring compliance with established guidelines and pricing transparency.¹⁰

Key initiatives under Ayushman Bharat Digital Mission

Scan and share

A QR-code-based OPD registration system that allows patients to quickly share demographic information, significantly reducing wait times and improving data accuracy. This system minimises long queues at registration counters and reduces the entry of incomplete and inaccurate codes. It has already recorded over 5 crore OPD tokens, reducing waiting times from one hour to half an hour, saving 2.5 crore man-hours. ^{12,13}

Digital health incentive scheme

Introduced on January 1, 2023, this scheme offers financial incentives to encourage participation in the ABDM ecosystem. It allows earning incentives of up to 4 crores and has gained significant traction among private and public players. This scheme encourages the adoption and implementation of digital health practices. ^{14,15}

Microsites for private sector adoption

Successfully operationalised 106 microsites aimed at facilitating ABDM adoption among private sector providers. 16

End-to-end Ayushman Bharat Digital Mission adoption pilot

Aimed at digitising public and private facilities across India, this pilot has selected 131 healthcare facilities as model sites for future digitisation efforts.¹⁶

ACHIEVEMENTS OF AYUSHMAN BHARAT DIGITAL MISSION

As of February 6, 2025, the Ayushman Bharat Digital Mission (ABDM) has made significant strides in establishing a robust digital health ecosystem across India. Key milestones include: A total of 73,98,09,607 ABHA (Ayushman Bharat Health Accounts) have been generated, ensuring extensive coverage across all 36 states and union territories, including rural regions. This widespread adoption highlights the mission's success in reaching diverse populations. ¹⁶

Over 3,63,520 health facilities have been registered, creating a comprehensive national directory of healthcare

providers.¹⁶ A total of 5,64,851 healthcare professionals have enrolled in the HPR (Healthcare Professional Registry), enhancing connectivity and coordination within the healthcare sector. Over 1,59,020 health facilities are now utilising ABDM-enabled digital solutions, improving operational efficiency and accessibility in healthcare delivery.¹⁶

Approximately 49,06,02,540 health records have been linked to ABHA, ensuring seamless access to patient medical histories and enhancing the continuity of care across the country. These accomplishments demonstrate ABDM's progress in building a unified digital health infrastructure that promotes universal health coverage, enhances patient care and improves health data management and accessibility.

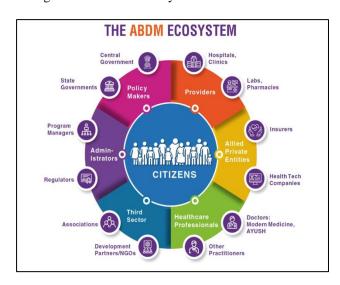


Figure 1: The Ayushman Bharat digital mission ecosystem.

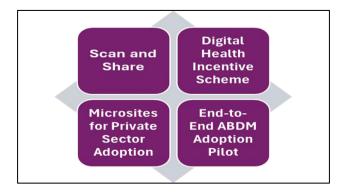


Figure 2: Key initiatives under ABDM.

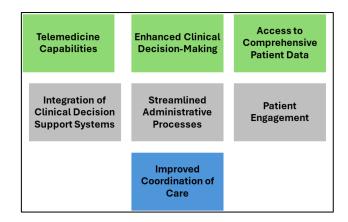


Figure 3: ABDM empowering doctors digitally.

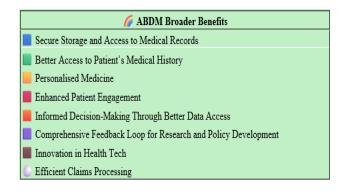


Figure 4: ABDM broader benefits.

DRIVING DIGITAL HEALTHCARE TRANSFORMATION IN INDIA

The Ayushman Bharat Digital Mission (ABDM) is advancing healthcare's digital transformation through strategic collaborations and innovative initiatives. It is forging partnerships with institutions such as IIT Kanpur to develop AI-driven digital healthcare solutions, thus promoting the use of cutting-edge technology.¹⁷

Recognising the importance of digital health in medical education, ABDM has signed a memorandum of understanding (MoU) with the Maharashtra University of Health Sciences to integrate digital health education into medical curricula, ensuring future healthcare professionals are equipped with essential digital competencies.¹⁸ To enhance stakeholder engagement and knowledge dissemination, the National Health Authority (NHA) has introduced a WhatsApp chatbot, which facilitates training on ABDM practices. 16 Furthermore, the National Accreditation Board of Hospitals (NABH) has rolled out Digital Health Standards, enabling the seamless integration of digital technologies into mainstream healthcare practices.¹⁶

ABDM also empowers doctors by providing access to a centralised digital repository of patient medical records. With patient consent, healthcare professionals can review comprehensive medical histories, lab results and prescriptions from various providers. This initiative

supports more informed treatment decisions, improves patient care and reduces administrative burdens, revolutionising healthcare services.

DIGITAL EMPOWERMENT OF HEALTHCARE PROVIDERS

Doctors can seamlessly access a patient's full medical history from various healthcare providers, minimising redundancy in tests and eliminating the need for repetitive requests. Holistic access to health records allows doctors to make more accurate diagnoses and develop well-informed treatment plans. ABDM supports teleconsultations, enabling doctors to deliver remote healthcare, particularly benefiting patients in underserved regions. Digital health records significantly reduce paperwork and administrative tasks, allowing doctors to dedicate more time to direct patient care. 21.22

The Ayushman Bharat Digital Mission (ABDM) integrates advanced tools to empower healthcare providers and improve patient care. ^{19,21} By incorporating clinical decision support systems, doctors are equipped with evidence-based treatment options tailored to individual patient data, enhancing the precision of medical decisions. With a unified health record system, doctors can collaborate more effectively with other healthcare providers involved in a patient's treatment. ^{20,21} ABDM facilitates direct sharing of medical information with patients, encouraging patient education and active participation in their healthcare journey. ^{19,20}

ABDM's Broader Benefits: ABDM brings numerous benefits that redefine healthcare accessibility and efficiency. Patients gain secure storage for their medical records, allowing them to share information seamlessly with doctors and other healthcare providers. ^{19,20} This leads to faster and more accurate treatments, while fostering trust through transparency in both private and public healthcare services.

Healthcare professionals also benefit by gaining quick access to patients' medical histories. This ability enables them to provide personalised and effective care, ensuring every treatment is tailored to an individual's unique health needs. ²⁰⁻²² Moreover, digitised claims processes reduce delays, allowing for faster reimbursements and easing administrative burdens.

By unifying health records, doctors can deliver treatment plans specifically catered to a patient's unique medical background. Patients themselves can directly view their health information, enhancing communication with healthcare providers and encouraging proactive management of their health. But the benefits of ABDM extend far beyond individual care. Policymakers gain access to comprehensive data, enabling them to make informed decisions and develop effective health strategies. Researchers can analyse aggregated data to evaluate the success of health.

programs, creating a continuous feedback loop that drives improvements in healthcare services. ABDM also fosters innovation in the health tech industry, allowing startups and tech companies to develop new tools and services that improve the way we manage our health. Standardised data streamlines insurance claims processes, reducing administrative burdens and speeding up reimbursements for healthcare providers. 21,22

CHALLENGES AND FUTURE DIRECTIONS FOR AYUSHMAN BHARAT DIGITAL MISSION

The Ayushman Bharat Digital Mission (ABDM) aims to revolutionise India's healthcare system by digitising health records and creating an integrated digital health infrastructure. However, its implementation faces several challenges that need to be addressed to ensure its success. Limited technological infrastructure, especially in rural areas, hampers the effective implementation of digital health initiatives.²³ Concerns about data security and privacy are significant barriers to the adoption of digital health systems.²⁴ Furthermore, it's essential to improve digital literacy among both healthcare providers and patients, so they can confidently use digital health tools.²⁵

Overcoming resistance to change, particularly among smaller healthcare facilities and effectively engaging private healthcare providers and state governments in a unified system are also vital.²⁶ To realise ABDM's transformative potential, we must focus on strengthening digital infrastructure and enhancing data security and privacy.²⁷ Developing interoperable frameworks will facilitate the smooth exchange of health information.²⁷ Training and capacity building can improve digital literacy across the board. Providing incentives and addressing concerns will encourage healthcare facilities to adopt digital systems.²⁸ Finally, establishing strong legal and regulatory frameworks is necessary to protect data and ensure privacy in the digital health space.²⁶ By tackling these challenges head-on and focusing on these key areas, ABDM can achieve its goal of creating an integrated digital health ecosystem in India.

To ensure the success of ABDM and build a truly integrated digital health ecosystem in India, it is essential to focus on strengthening the technological infrastructure that supports these digital health initiatives.²⁷ By prioritising data security and privacy, trust among users of these systems can be established and sustained. Seamless sharing of health information can become a reality through the creation of interoperable systems and open protocols that allow smooth exchange across platforms.²⁷ Education campaigns and improved accessibility can empower both healthcare providers and patients with digital literacy, ensuring they can effectively use these systems. Offering incentives and addressing concerns, particularly in smaller cities, can encourage broader adoption of digital health solutions, making them more inclusive and accessible.²⁸ Collaboration between private players and state governments will be key to

successfully implementing unified health records that benefit all stakeholders. Moreover, continuous feedback from all those involved will play a vital role in identifying challenges and improving the system over time.²⁸ By tackling these areas with determination and a collaborative spirit, ABDM can achieve its vision of revolutionising healthcare in India through digital innovation.

KEY INNOVATIONS AND TRANSFORMATIONS IN DIGITAL HEALTH DUE TO AYUSHMAN BHARAT DIGITAL MISSION

The ABDM is revolutionizing India's healthcare system by creating a secure and patient-centric digital infrastructure. By standardising health data, it is driving innovative changes that make healthcare more efficient, transparent and well-informed across all levels of care. With ABDM consolidating medical records, telemedicine and preventive healthcare initiatives are flourishing. Patients can now access their medical histories effortlessly while maintaining full ownership of their data, safeguarding privacy and ensuring seamless care.²⁹ Anonymised health data is enabling cutting-edge advancements in analytics and biomarker research, paving the way for early disease detection and improved health monitoring across demographics and regions. This wealth of information also supports evidence-based policymaking, which enhances public health strategies and ensures targeted interventions.³⁰ The mission is also transforming health financing and insurance processes. By structuring health data, insurers can make more precise risk assessments, while digitised claims processing speeds up reimbursements and reduces administrative hurdles for both patients and providers. Ultimately, ABDM is laying the groundwork for a unified National Digital Health Ecosystem, empowering the entire healthcare community with health IDs and digital repositories that foster an equitable, data-driven future for healthcare in India.³⁰

ABDM serves as the foundation for a National Digital Health Ecosystem, with health IDs and digital repositories marking the first step toward a more integrated, data-driven and equitable healthcare system in India

CONCLUSION

The ABDM represents a pivotal advancement in the transformation of healthcare delivery in India. By significantly enhancing the effectiveness, efficiency and transparency of health services, ABDM is poised to redefine patient care across the country. Through the secure storage and seamless access to electronic health records, the initiative empowers individuals to take greater ownership of their health while equipping healthcare professionals with essential tools for more informed clinical decision-making and coordinated care. As the ABDM framework continues to mature and

expand, it envisions a future where every citizen can easily access comprehensive health information within an integrated and interoperable digital ecosystem. Ultimately, ABDM stands as a landmark initiative with the potential to benefit patients, providers and healthcare organisations alike, laying the foundation for a more connected, efficient and patient-centred healthcare system in India.

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