Commentary

Navigating Data Governance in Digital Health: Balancing Privacy and Innovation in the Global South

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In recent times, the cases of data breaches in the healthcare sector have increased largely in comparison to other care/service sectors because healthcare data is more in demand in the black market than any other type of data, as it takes more time to discover healthcare fraud, and the stolen data can be used for a longer period in the cases of chronic diseases. The healthcare sector is also vulnerable in terms of immediate breach notification measures, which delay estimating the volume of data compromised in ransomware attacks. The data breach challenges in health systems have revealed that there is an enormous amount of personal patient data lying with various health agencies, which are vulnerable and prone to cyberattacks. This commentary urges that if these health data were collected, stored, analysed, and secured properly, they could help populous countries like India, China, and Brazil to focus on long-term measures to build a resilient health governance system to prevent, prepare, and respond to future health-related challenges, along with maintaining essential health services.

Digital health has evolved rapidly since its inception. In countries like India, China, and Brazil, healthcare data governance is an emerging concept, whereas in the USA, UK, and Japan, it has now advanced in terms of regulatory frameworks, standardized protocols, information technology infrastructure, and semantic models. In developing economies like India, China, Brazil, and Indonesia, the Ministries of Health and other public agencies are working hard to develop policies and regulations to ensure the safe and secure use of healthcare data. The digital health priorities focus on a safe and secure digital environment to manage the handling, storing, and sharing of real-time patient data 24/7 across hospitals and healthcare institutions with clearly defined policies and procedures. The efforts aim to create a national digital health ecosystem, which includes a personal health ID for every citizen, a digital

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repository of health records, and a federated health data architecture to enable secure sharing of data among different stakeholders.

The Data Breach Challenges of the Global South

In 2025, the healthcare data sector in the Global South faced significant cyber threats in terms of cross-border data privacy and a high volume of ransomware attacks. The healthcare sector of India, China, and Brazil faced an all-time high in data breach cases by a 30% surge in ransomware attacks and intensified targeting of hospital infrastructure. The average total organizational cost of a data breach in India reached INR 200 million in 2025, 13% higher than in 2024. Whereas, for Brazil, it reached R$ 7.19 million, a 6.5% increase from the previous year. Interestingly, the healthcare sector in Brazil is the hardest hit, with average data breach costs hitting R$ 11.43 million. The average global breach costs in China increased from $7.42 million to $10 million per incident and have been considered as the costliest among other care/service industries over a decade [1].

The Post-COVID Challenges

The pandemic COVID-19 has taught both the developed and developing economies across the globe that all of us are living in an interdependent world. The challenge is not only to ensure robust data privacy and security but to foster innovation in digital health solutions. The concern is to set high standards for the protection of patient data confidentiality, maintaining the legal and ethical considerations, and to redefine the role of technologies such as artificial intelligence (AI) and machine learning (ML) in mitigating risks and safeguarding sensitive information through strict regulatory compliance [2]. Recent studies observed that many countries, particularly those with diverse healthcare infrastructures like India and China, are navigating these challenges in the wake of COVID-19 through harmonized regulatory frameworks, advanced technological tools, and inter-regional collaboration. They are taking various actionable insights at the policy and governance level to protect sensitive health data, ensure compliance, and foster public trust in digital healthcare systems [3][4]. Some other studies found that the post-Covid challenges in health systems are to explore the potential of the enormous amount of personal patient data available with various health agencies. Their collection, storage, analysis, and security help populous countries like India, China, and Brazil to focus on long-term measures to build a resilient health governance system to prevent, prepare, and respond to future health-related challenges, along with maintaining essential health services [5][6]. The prioritisation of digital health by these countries is

pressing the use of cutting-edge digital tools for healthcare with a more specialized and efficient oversight system to spot irregularities and opportunities in real-time fitting well within the data governance plan. This compels these countries to regulate the efficient and intentional movement of data throughout a healthcare system [4].

Balancing Privacy and Innovation

Data privacy in healthcare is all about protecting sensitive patient information, including diagnostic and treatment records, personal identifiers, and clinical outcomes from unauthorised access, misuse, or disclosure. Sharing of this information needs a warranty from the healthcare agencies to be protected under legal regulations and ethical standards [7]. The World Health Organization (WHO) has clearly defined healthcare data privacy as the implementation of measures that guarantee the confidentiality, integrity, and availability of patient information. Since medical data is directly connected to patient care, it requires robust safeguards and stricter protection.

A recent report published by the Communication Networks, Content and Technology DC Connect, at the European Commission, argued that many countries of the Global North, like the United States, Spain, Belgium, France, Germany, Japan, and South Korea, emphasize explicit consent, data minimization, and comprehensive technical and system safeguards while sharing patent data [8]. Vadisetty et al. (2025 in their study observed that the countries from the Global South, like India, China, Brazil, Indonesia, and South Africa, emphasize interoperable and culturally tailored privacy protection mechanisms [9]. The study further finds that the diverse regulatory approaches show how Global South and Global North countries interact and negotiate with digital healthcare systems and cybersecurity infrastructures to protect patient healthcare data. The study urges that the US, Japan, and South Korea, with established regulations, were somehow successful in safeguarding sensitive patient information through regulatory frameworks mandating measures to access restrictions to patient data, encryption protocols, and immediate breach notification while sharing electronically protected health information. Despite efforts to expand the integration of Electronic Health Records (EHRs) in an increasingly digitalized healthcare landscape, the healthcare systems of countries like India, China, and Singapore is still vulnerable to the risk of data breaches and unauthorized access [10]. They are facing the challenges related to inadequate encryption and resource constraints.

Pragmatic Strategies – Toward a harmonized future

While looking at the legal, ethical, and technical dimensions of data privacy, it was observed that there are diverse regulatory frameworks adaptable to regional nuances and system requirements. The technological solutions like blockchain and AI can help to safeguard data integrity and transparency by enabling real-time breach detection, predicting risk assessment, and by automating compliance monitoring. But technological innovations need to be aligned well with stringent privacy protection to bridge the current security gaps [5]. The recent reports published by the National Health Informatics Center, Ministry of Health, Vietnam, and Asia eHealth Information Network (AeHIN) advocated that a detailed analysis of regulatory policies and frameworks of both the Global South and Global North could certainly help healthcare providers and data experts to understand the diversity in data compliance and enforcement in the context of governing healthcare data privacy in different geographical regions. It will be useful to understand the barriers to system innovation to work on strategies for overcoming resistance. The identification of system vulnerabilities and the loopholes of cybersecurity in countries like India, China and Brazil are useful in exploring the potential of AI, ML and blockchain to mitigate these vulnerabilities and to design customized solutions through policy recommendations [2]. This further helps in finding regionally adaptable regulatory approaches to manage data privacy among healthcare stakeholders.

The only understanding of technological dimensions of data privacy challenges is not enough to negotiate and maintain patient trust in digital health environments. The critical role of healthcare institutions and social mechanisms shall also be considered to examine how and on what basis patient share their sensitive health information. Preserving the confidentiality and trust of the patient, the ethical decision-making, the patient-provider relationship dynamics, and respecting patient rights are foremost important in an era of pervasive digital connectivity [6][7]. A comprehensive understanding of regulatory frameworks, cross-border collaboration, integration of technologies, trust-building, and ethical decision-making would be useful to adapt a harmonized data protection strategy for countries like India, China, and Brazil to reinforce trust, accountability, and data protection to sustain and strengthen their digital health innovations in an interconnected world [5].

Moving Forward

In an evolving data-driven era, effective health data management in terms of ensuring data privacy and compliance is a growing concern for developing countries that are still struggling to deal with the complexities of modern digital healthcare. The healthcare system reforms in countries like India, China, and Brazil needs continuous improvement and adaptation to proactively embrace and refine their data governance models, regulatory capacities, and AI infrastructures to better position themselves at the forefront of patient care, innovation, and operational excellence. The countries of the Global South have to prepare their digital healthcare systems to adapt comprehensive data governance strategies to foster a culture of trust and transparency to maintain ethical, efficient, and patient-centric healthcare delivery while safeguarding patient rights.

About the Author

Pradeep Nair is a Senior Research Fellow in Earth System Governance Project, Department of Earth Sciences, Uppsala University, Sweden and is affiliated as an Expert with Sabin Center for Climate Change Law, Columbia Climate School, Columbia University in the city of New York. He is a Senior Fellow and Project Lead in Environmental Policy Lab of Indo Pacific Studies Center, Sydney, Australia for the priority impact area – human development and climate change – in the areas of expertise – climate change, capacity development, governance and science to policy. He is a Senior Professor & Director Research at Central University of Himachal Pradesh, India.

His study focuses on advancing scientific understanding of climate change impacts, coastal ecosystems, sustainability science, and adaptation strategies through evidence-based regionally grounded policy engagement. Nair mainly works in close partnership with indigenous people, local communities, development agencies and practitioners for enhancing public knowledge about coastal sustainability, climate change, and ecosystem restoration through mitigation, adaptation, and nature-based solutions. His expertise in this area stems from his ability to work on the ground in meaningful ways with partners in government, industry, local communities and NGOs, to identify challenges, co-produce knowledge, empower marginalized groups, and increase transparency in decision-making and to connect that work to influence global policy, market and finance to advance work at scale. While working with intellectual groups and think-tanks he convenes regularly with diverse line-ministries and stakeholders to provide

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