



EDITORIAL

Universal Health Coverage & Digital Healthcare in Tier-2 & Tier-3 Cities

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Urban areas are rapidly expanding — by 2030, nearly **60% of the world's population** will live in cities. Health systems in these dense, complex environments face challenges such as:

- Rising non-communicable diseases (NCDs)
- Infectious disease outbreaks
- Air pollution and environmental stressors
- Fragmented care and poor data integration

Digital health offers the backbone for coordinated, efficient, and equitable urban health management.

These challenges could be met by establishing an **integrated, citywide digital health ecosystem** that ensures:

- Real-time health intelligence
- Interoperable patient records
- Predictive analytics for disease surveillance
- Accessible, inclusive digital services for all citizens

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- The next phase of India's digital health transformation will be led by Tier-2 and Tier-3 cities, where demand for accessible, affordable, and high-quality healthcare is at an all-time high.
- With the right mix of policy support, technological innovation, and strategic partnerships, India's digital health revolution will continue to break barriers and redefine healthcare for millions beyond metro regions.
- As digital health solutions gain momentum, the true impact will be measured in numbers and in lives transformed, ensuring healthcare is no longer a privilege but a right for every Indian, regardless of location.

Expected Outcomes

- Improved continuity of care through interoperable digital records.
- Equitable access to specialist care via telemedicine.
- Early detection and response to local outbreaks.
- Strengthened urban health resilience and digital inclusion.

Universal health coverage (UHC) is the principle that all people have access to the full range of quality health services they need, when and where they need them, without facing financial hardship. This includes health promotion, prevention, treatment, rehabilitation, and palliative care. UHC is built on three pillars: ensuring everyone is included (population coverage), providing a comprehensive range of quality services (service coverage), and minimizing out-of-pocket costs to prevent financial hardship (financial protection).

Key aspects of UHC

- **Comprehensive services:** UHC aims to cover the full spectrum of essential health services, from promoting health to providing palliative care.
- **Accessibility:** Services should be available to everyone, regardless of their location, and barriers to access, such as non-financial barriers, should be removed.
- **Financial protection:** It's crucial to protect people from the financial consequences of seeking healthcare.

This means ensuring that paying for needed services doesn't lead to poverty, forcing them to sell assets or go into debt.

- **Quality and workforce:** The delivery of services relies on a workforce with the right skills who are well-supported and equipped with quality-assured products.
- **Equity:** UHC seeks to prioritise those who are most vulnerable or left behind to ensure equitable access to care.

Importance of UHC:

- **Sustainable Development Goals:** Achieving UHC is one of the targets set by the United Nations for the 2030 Sustainable Development Goals.
- **Poverty reduction:** By preventing people from falling into poverty due to healthcare costs, UHC is key to boosting prosperity and ending extreme poverty.
- **Health outcomes:** It leads to better health outcomes by ensuring people can access the care they need without delay.



Figure 1. Ayushman Bharat Pradhan Mantri Jan Arogya Yojna

Universal health coverage (UHC) in India

India is working toward UHC primarily through the Ayushman Bharat program (Figure 1), which includes the Pradhan Mantri Jan Arogya Yojana (PMJAY) and the transformation of sub-health centres into Ayushman Arogya Mandirs (AAMs). PMJAY offers health insurance up to ₹5,00,000 per family annually for secondary and tertiary care, while AAMs provide comprehensive primary healthcare services, including preventive, promotive, and basic curative care. These initiatives aim to achieve the goal of affordable, accessible, and quality healthcare for all citizens.

Achieving Universal Health Coverage is one of the targets the nations of the world set when adopting the SDGs in 2015. Countries reaffirmed this commitment at the United Nations General Assembly High Level Meeting on UHC in 2019. The inclusion of UHC in the SDGs

presents an opportunity to promote a comprehensive and coherent approach to health, focusing on health systems strengthening. Countries that progress towards UHC will make progress towards the other health-related targets, and towards the other goals. Universal health coverage has therefore become a major goal for health reform in many countries and a priority objective of WHO.

Role of wearables in building Digital Health Systems in Cities

Wearable devices play a transformative and essential role in building **Digital Health Systems in Cities** by connecting individual health data with city-wide healthcare infrastructure.

The primary roles of wearables are:

1. Continuous, Real-time Health Data Collection

- **Remote Patient Monitoring (RPM):** Wearables (smartwatches,

fitness trackers, patches, smart jewellery) continuously collect a rich, real-time stream of physiological data (e.g., heart rate, sleep patterns, steps, ECG, blood oxygen, temperature).

- **Beyond the Clinic:** This data is collected in the user's natural environment (home, work, commute), providing a much richer picture of their health than sporadic clinical check-ups.
- **Immediate Alerts:** Some devices can detect and alert users and/or emergency contacts to critical events, like falls or irregular heart rhythms.

2. Proactive and Preventive Healthcare

- **Early Detection:** Continuous monitoring allows AI and machine learning algorithms to analyse trends and subtle changes in vital signs, potentially identifying early warning signs of developing health issues (e.g., infections, atrial fibrillation) before they become severe.
- **Lifestyle Interventions:** By tracking activity and sleep, wearables empower city dwellers to take charge of their well-being, promoting proactive health management and reducing the future burden on city hospitals.

3. Personalised Medicine and Chronic Disease Management

- **Tailored Treatment:** The vast, personalised data collected by wearables can be integrated with Electronic Health Records (EHRs) to allow healthcare providers to create and adjust treatment plans

that are highly customised to an individual's specific needs and daily life.

- **Chronic Condition Support:** For residents with chronic diseases (like diabetes or hypertension), specialised wearables (e.g., continuous glucose monitors, wearable blood pressure cuffs) enable continuous tracking, helping them manage their condition and allowing remote supervision by city health services.

4. Public Health and Epidemiological Insights

- **Population Health Dynamics:** Aggregate, anonymised data from thousands of wearable users across a city can provide health officials with a snapshot of population health, including general activity levels, sleep quality, and even the spread of contagious illnesses (by monitoring fever or resting heart rate changes).
- **Resource Planning:** This data can inform city health planning, helping to allocate resources, predict outbreaks, and design effective public health campaigns tailored to the needs of different neighbourhoods or demographics.

5. Increased Patient Engagement

- **Empowerment:** Wearables provide users with direct, understandable feedback and data visualization about their own health metrics, motivating them to adopt healthier behaviors and become active participants in their own care journey.

- **Adherence:** Features like medication reminders and personalized goal setting can significantly improve patient adherence to treatment and exercise plans.

In essence, wearables act as the **sensor layer** of a city's digital health ecosystem, collecting the granular, individual data that feeds the larger system, shifting the focus from reactive, episodic care to proactive, continuous, and personalized well-being for all urban residents.

The Digital Health development in Tier-2 & Tier-3 cities (Figure 2)

Recent data highlights the rapid pace at which digital health infrastructure evolves beyond urban centers. Rural India now accounts for 53% of the country's internet users, with over 442 million smartphone users, making mobile health solutions more accessible. The telemedicine market is projected to grow at a CAGR of 20.7%, reaching \$15.1 billion by 2030. These numbers underscore the potential of digital health solutions in bridging the urban-rural healthcare divide.

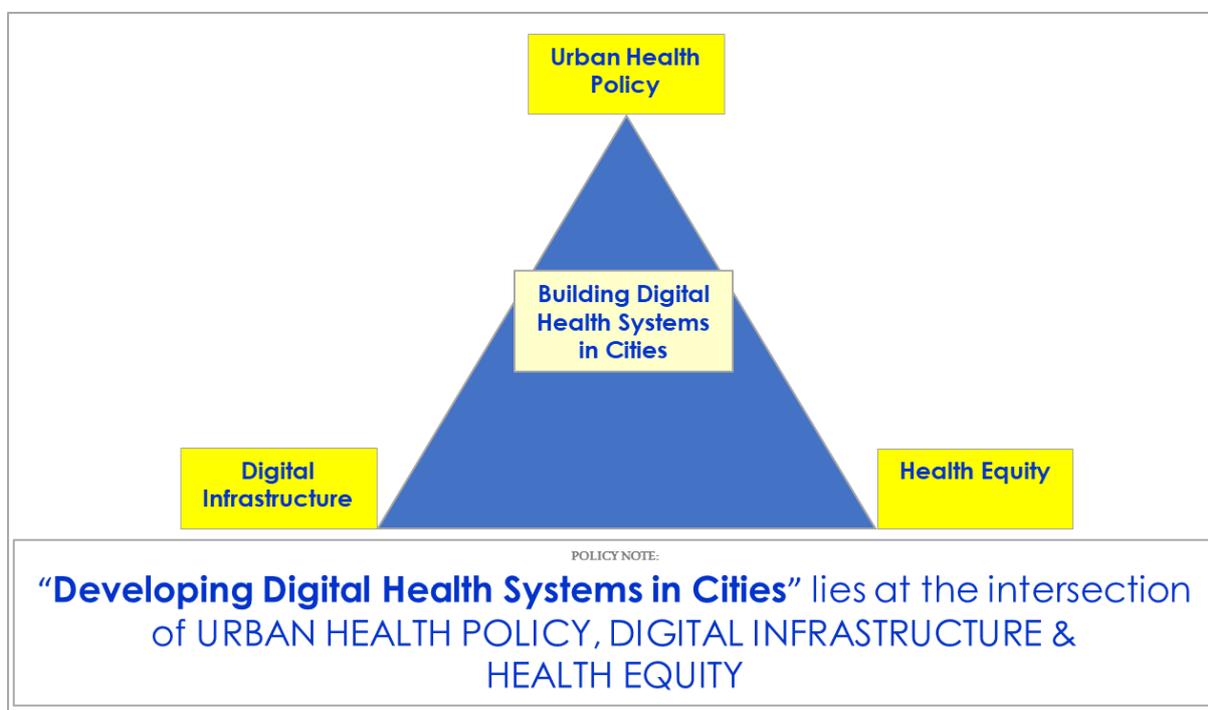


Figure 2. Developing Digital Health Systems in Cities

Key Drivers of Digital Health Expansion

1. Growing Internet & Smartphone Adoption— With increased connectivity, healthcare services are now available to millions in non-metro areas.
2. Telemedicine Expansion— Virtual consultations, tele-ICUs, and digital diagnostics are breaking location barriers and allowing patients to access specialist care remotely.
3. Government Digital Health Initiatives – Programs like *Ayushman Bharat Digital Mission (ABDM)* and eSanjeevani are strengthening telehealth services.
4. Affordable Health Solutions – Cost-effective digital consultations reduce the financial burden of travel and hospital visits.

5. Health Education & Awareness – Digital platforms enhance preventive healthcare through better patient awareness.
6. AI & Data-Driven Healthcare – *Artificial intelligence* streamlines diagnostics, predictive analytics, and personalized treatment plans.
7. Public-Private Collaborations- Healthcare providers and tech firms are collaborating to scale digital solutions in smaller cities and rural areas.

The Aarogya Setu app (Figure 3)

The Aarogya Setu app has been pivotal in developing India's digital health system by acting as an initial mass-adoption platform for digital health services and later integrating into the broader **Ayushman Bharat Digital Mission (ABDM)** national health infrastructure. Its role has evolved from a pandemic response tool to a comprehensive digital health hub for citizens in cities and rural areas.

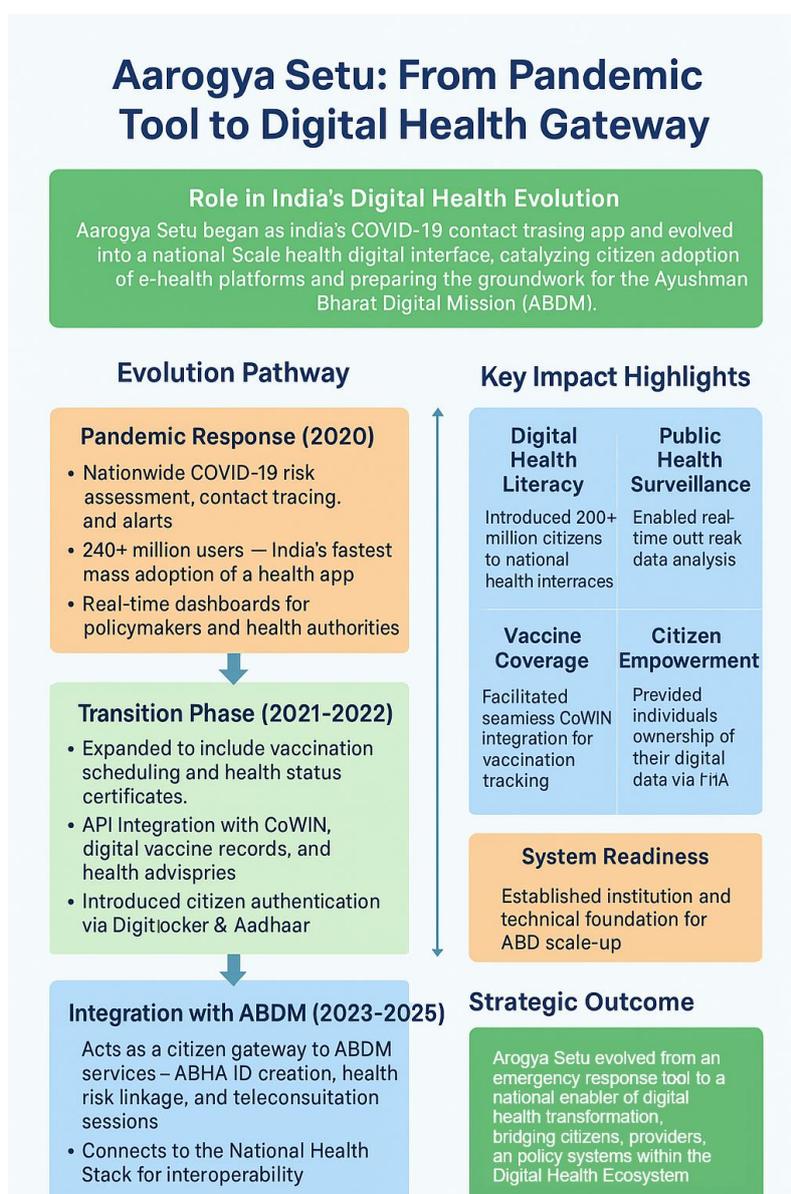


Figure 3. Role of Aarogya Setu in India's Digital Health Evolution

Telemedicine: The Backbone of Healthcare Access in Non-Metro India

Telemedicine is at the heart of India's digital health revolution. In a country where 65% of the population lives in rural areas but 80% of healthcare infrastructure is concentrated in cities, telemedicine is crucial in addressing the doctor-patient ratio gap (1:1,511, below WHO's 1:1000 recommendation).

Impact of Telemedicine:

- 30% cost savings on healthcare expenses.
- 40% reduction in hospital readmissions due to improved remote monitoring.
- 50% lower consultation costs, making quality healthcare more affordable.
- 15-20% decline in ICU mortality rates with remote patient monitoring.
- 160 million+ teleconsultations conducted through eSanjeevani, demonstrating its growing acceptance.

Telemedicine optimizes specialist availability, improves critical care through Tele-ICUs, and reduces hospital infrastructure burdens. Leading healthcare organizations actively invest in these areas to ensure that high-quality specialist care is accessible to remote communities.

Bridging the Urban-Rural Healthcare Divide

Digital health is not just an alternative but necessary for India's rural and semi-urban regions. Limited healthcare infrastructure, fewer skilled professionals, and accessibility challenges have long plagued smaller cities and villages.

Emerging digital health technologies are actively bridging these gaps, including AI-powered diagnostics, IoT-enabled patient monitoring, and seamless Electronic Medical Records (EMR).

Transformative Digital Health Solutions:

- Tele-ICUs and Teleradiology – Critical care services are now available remotely, reducing dependency on physical infrastructure.
- AI-powered Diagnostics – Faster, more accurate diagnosis ensures better treatment outcomes.
- Internet of Things (IoT)-driven Health Monitoring – Continuous tracking of vital signs reduces emergency visits and enhances preventive care.
- Mobile Health Apps – Providing easy access to consultations, prescriptions, and health records.

Overcoming digital healthcare challenges in 2- tier & 3-tier cities in India

Overcoming Digital Healthcare Challenges in Tier-2 & Tier-3 Cities

India's smaller cities and towns (Tier-2 & Tier-3) represent the next frontier for digital health transformation.

While metro cities are advancing rapidly under ABDM and Smart Cities initiatives, smaller urban centers are increasingly overcoming **gaps in digital infrastructure, health workforce capacity, and citizen adoption.**

Strategic Solutions & Steps undertaken: Infrastructure Enablement:

- Expansion of **BharatNet** and **5G Health Zones** for hospitals and PHCs.

- Establishing **City Health Data Centres** interoperable with the **National Digital Health Grid (NDHG)**.
- Promotion of solar-backed data hubs and health kiosks for continuity in low-resource areas.

Capacity Building

- **Digital Health Fellows and Telemedicine Training Programs** for district hospitals.
- **Digital health modules** into nursing and paramedical curricula.
- Provisions for incentivising private sector and startup participation in capacity-building partnerships.

Service Delivery Innovation

- **Telemedicine & e-Clinic Hubs** in district and sub-district hospitals.
- **AI-based triage tools** and remote diagnostics for underserved populations.
- **Mobile health vans** with IoT connectivity for remote consultations and screening.

Data & Analytics Empowerment

- **Regional Health Data Hubs** with predictive analytics for local outbreak monitoring.
- **GIS-based dashboards** for mapping disease hotspots and service coverage.

Citizen Engagement & Trust

- Expanding **ABHA ID registration drives** via Common Service Centres (CSCs).
- Offering **multilingual, voice-based health apps** for low-literacy users.
- Implementing robust **data privacy frameworks** and awareness campaigns.
- Creating a **Tiered Digital Health Mission (TDHM)** focusing on scalable, modular adoption in smaller cities.
- Leveraging **public-private partnerships (PPP)** for telehealth and data analytics infrastructure.
- Providing **performance-linked grants** for cities achieving ABDM integration benchmarks.
- Promoting **inter-state learning networks** to replicate successful Tier-2 city models.