Partnership for Health System Sustainability and Resilience

INDIA

Sustainability and Resilience in the Indian Health System

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Glossary

Accredited Social Health Activists (ASHAs) – serve as facilitators, mobilizers and providers of community level care.

Anganwadi Worker (AWW) – workers in Anganwadi Centres provide supplementary healthcare and nutritional services to children and pregnant women under the Integrated Child Development Services Scheme.

AYUSH – traditional medicine systems. The name is devised from the names of the alternative healthcare systems: Ayurveda, Yoga & Naturopathy, Unani, Siddha, Sowa Rigpa, and Homeopathy.

Ayushman Bharat Yojana (AB) – flagship scheme, set up in 2018 by the Government of India, to achieve Universal Health Coverage, a comprehensive need-based health care service.

Ayushman Bharat-Pradhan Mantri Jan Arogya Yojana (AB-PMJAY) – subsidised insurance scheme set up to provide a health benefit package for the poorest 40% of the population (500 million people). Most regions offer "top-up" coverage so it now covers over 700 million people.

Ayushman Bharat Health and Wellness Centre (AB-HWC) – deliver a range of health care services for: maternal and child health; communicable and non-communicable diseases; elderly and palliative care; free essential medicines and diagnostic services; and health promotion including wellness activities such as Yoga.

Ayushman Bharat Digital Mission (ABDM) – a program launched by the Government of India in 2020 to create a digital health infrastructure to support universal health coverage and provide digital health services to citizens.

Bureau of Pharma Public Sector Undertakings of India (BPPI) – coordinates procurement, supply and marketing of generic drugs through the Janaushadhi Kendras.

Caste – is a predominantly Indian system of social hierarchy. Historically, it determined the livelihood, education, social stature and access to institutions and services of individuals based on the group they were born into. Although it has been widely associated with Hinduism, nearly all Indians identify with a category of the system regardless of their religion.

> **General Castes** – a broad grouping at the top of the caste system. They comprise about 30% of the population.

> **Scheduled Castes (SCs)** – disadvantaged socioeconomic groups also refered to as 'Dalit'. They comprise about 20% of the population.

> **Scheduled Tribes (STs)** – indigenous communities and peoples who live in tribal areas, also refered to as 'Adivasi'. They comprise about 10% of the population.

> **Other Backward Classes (OBC)** – a heterogeneous collection of groups that are not included in Scheduled Castes or Scheduled Tribes. They comprise about 40% of the population.

Employees State Insurance Corporation (ESIC) – statutory social security body under the ownership of Ministry of Labour and Employment. It was initially set up for factory workers but later became applicable to all establishments having 10 or more workers.

Empowered Action Group (EAG) states – eight socioeconomically backward states (Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, Rajasthan, Uttarakhand, and Uttar Pradesh) that contain 45% of the country's population. The group was formed to enable these states to get focused attention for health and family welfare programs.

Janaushadhi Kendra – medicine shop – outlet providing quality generic medicines and surgical products at affordable prices as part of Pradhan Mantri Bhartiya Janaushadhi Pariyojana.

National Health Mission (NHM) – aims to provide accessible, affordable, effective and reliable healthcare facilities in the rural and urban areas of the country, especially to the poor and vulnerable sections of the population. It has two sub-missions: the National Rural Health Mission (NRHM) and the National Urban Health Mission (NUHM).

NITI Aayog – National Institution for Transforming India – set up in 2015 (replacing the Planning Commission) to provide strategic policy input to the Government of India. It also designs long-term programmes and provides technical advice to the Centre and States.

Pradhan Mantri Ayushman Bharat Health Infrastructure Mission (PM-ABHIM) – established in 2021 to strengthen the critical healthcare infrastructure across India. The scheme aims to improve access to public health infrastructure by building facilities for primary and critical care in urban and rural areas.

Pradhan Mantri Bhartiya Janaushadhi Pariyojana (PMBJP) – or people's medicine scheme – provides quality generic medicines and surgical products at affordable prices through outlets known as Janaushadhi Kendras.

Pradhan Mantri Swasthya Suraksha Yojana (PMSSY) – set up in 2006 with the objective of correcting regional imbalances in the availability of affordable and reliable tertiary healthcare, and also to augment facilities for quality medical education across the country.

Union Government – Union – Government of India – Central Government – Centre – are used interchangeably in the context of this report.

Union Territories – federal territories administered by the Union Government of India (unlike states, which have their own governments). There are currently eight union territories: Andaman and Nicobar Islands, Chandigarh, Dadra and Nagar Haveli and Daman and Diu, Delhi, Jammu and Kashmir, Ladakh, Lakshadweep and Puducherry.

Executive summary

Introduction

The COVID-19 pandemic has brought to light the importance of not only improving the resilience of health system to crises but also of ensuring their long-term sustainability.

As part of the Partnership for Health System Resilience and Sustainability (PHSSR), this report evaluates the sustainability and resilience of the Indian health care system according to seven domains:

- Governance
- Financing
- Workforce
- Medicines and technology
- Service delivery
- Population health
- Environmental sustainability

By examining each of these domains, PHSSR seeks to identify strengths and weaknesses of health systems and generate evidence-informed solutions and policy recommendations to improve sustainability and resilience.

PHSSR definitions of health system sustainability and resilience

Health system sustainability	A **sustainable** health system improves population health by continually delivering the key functions of providing services, generating resources, financing and stewardship, incorporating principles of financial fairness, equity in access, responsiveness and efficiency of care, and does so in an environmentally sustainable manner.
Heath system resilience	A **resilient** health system is able to prevent, respond to, manage the health system impact of, and recover and learn from, acute and chronic crises (including, but not limited to, pandemic threats, climate change and economic and technological shocks), minimising their short- and long-term impacts on health, social and economic wellbeing.

To assess the sustainability and resilience of the Indian health system, PHSSR and the Observer Research Foundation conducted research across the seven key domains, with a particular focus on how the health system responded to the COVID-19 pandemic. The report provides preliminary recommendations for the improvement of the sustainability and resilience of the health care system in each domain. It also includes two case studies, examining milestone initiatives in India's journey to universal health coverage: Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB-PMJAY) and Pradhan Mantri Bhartiya Janaushadhi Pariyojana (PMBJP).

Findings: key themes for sustainability and resilience

The report highlights areas of strength for the Indian health system, as well as areas in which there is scope for policy interventions to bolster its sustainability and resilience. Table 1 provides a high-level summary of the strengths and weaknesses identified in each of the seven domains.

Table 1: Sustainability and resilience – summary of findings by key domains

DOMAIN 1	GOVERNANCE	
Strengths	**Sustainability** ⬆ Given that the centre's role in funding and programming is expected to expand, there is an option to shift health to the Concurrent List.	**Resilience** ⬆ Policy changes are planned to improve the resilience of the health system making use of the Fast Track COVID-19 Response Program by the World Bank. ⬆ New guidelines have been developed for the communication of correct information and countering misinformation in the media/social media. ⬆ The Disaster Management Act (2005) enabled the formation of 11 Empowered Groups in early 2020 for fast-track decision-making in during COVID-19.
Weaknesses	**Sustainability** ⬇ Governance structures regarding roles, responsibilities and local-level decision-making powers differ widely, particularly in urban areas. ⬇ Limited accountability mechanisms in health finance, human resources, management information systems, service delivery and compliance. ⬇ Limited accountability mechanisms at municipal and panchayat levels. ⬇ Evaluation of heath policies and programmes varies in frequency, quality and focus. ⬇ Need for a stronger strategic focus to improve and deliver on the key dimensions of transparency. ⬇ Fragmentation of health data collection leads to operational barriers to use of data for policy and decision making ⬇ Evolving public health insurance models require streamlining and better integration.	**Resilience** ⬇ Challenges in coordinating public health services, which are provided by a range of actors at national and state levels, private actors and NGOs. ⬇ Barriers to data sharing impede effective tracking of cases during an infectious disease outbreak.

Table 1 (continued): Sustainability and resilience – summary of findings by key domains

DOMAIN 2	FINANCING	
Strengths	**Sustainability** ⬆ Even in the context of low healthcare spending, there is evidence of universal access reducing health inequity. ⬆ Out-of-pocket expenditure as percentage of total health expenditure has decreased significantly over the last decade. ⬆ Underutilisation of funds at state level is no longer as significant a problem as it used to be.	**Resilience** ⬆ ASHAs play an important role in the health system in improving community level resilience. ⬆ Central government was able to release large amounts of contingency funding for social protection and to scale up healthcare facilities.
Weaknesses	**Sustainability** ⬇ Funding allocation by Central Government amounts to only 55% of projected demand. ⬇ Despite the objective of public health expenditure reaching 2.5% of GDP by 2025, it has remained below 1.35%. ⬇ Despite a declining trend, out-of-pocket expenditure remains high at 47.1% of total health expenditure. ⬇ Underutilisation of funds remains a problem in some states, arising from limited investment, human resource gaps and delays in disbursement. ⬇ National Health Mission funding has not expanded at the required pace.	**Resilience** ⬇ Low surge capacity due to historical underfunding leading to chronic shortages of infrastructure, medicines and human resources.

Table 1 (continued): Sustainability and resilience – summary of findings by key domains

DOMAIN 3	WORKFORCE	
Strengths	**Sustainability** ⬆ Public investment in the health system has improved. ⬆ Between 2014 and mid-2022, 660 new medical training colleges established, a 71% increase. ⬆ Between 2014 and mid-2022, undergraduate medical degree seats rose by 101,043 (97%) and postgraduate by 65,335 (101%). ⬆ The National Nursing and Midwifery Commission Act (2023) introduces a modernised regulatory structure for the nursing and midwifery workforce, aiming to enhance innovation, collaboration, and skills development in the sector.	**Resilience** ⬆ The massive primary healthcare workforce was extremely useful during the COVID-19 pandemic for contact-tracing, vaccinations, etc. ⬆ Task-shifting is widespread at community/primary care levels and across traditional–modern medicine practitioners, increasing workforce flexibility.
Weaknesses	**Sustainability** ⬇ There are staff shortages across general and specialised faculties, rural–tribal–urban areas, and regions. ⬇ Pay, working conditions, international recruitment of Indian healthcare workers and challenges integrating workers returning from abroad highlight importance of a robust retention policy. ⬇ Irregular distribution of medical and nursing staff and training colleges between states. ⬇ A substantial portion of the workforce is unregulated and unlicensed, with a continued popularity of informal/unqualified medical providers.	**Resilience** ⬇ Need for an overarching regulatory framework for task-shifting within the healthcare workforce. ⬇ Imbalances in the skill-mix in the workforce affected emergency care during the COVID-19. ⬇ COVID-19 led to excessive workloads, with uneven adherence to safety standards and limited infection control training.

Table 1 (continued): Sustainability and resilience – summary of findings by key domains

DOMAIN 4	MEDICINES AND TECHNOLOGY	
Strengths	**Sustainability** ⬆ Transformation of the pharmaceutical sector, including medical devices with a strategy to become a dominant global manufacturer. ⬆ Recognition of the need for domestic manufacture of active pharmaceutical ingredients. ⬆ The PMBJP scheme has surpassed annual targets. ⬆ NHDM to address need for uniform standards for personal health records.	**Resilience** ⬆ India's potential in pharmaceutical and technology sectors was demonstrated by the successful COVID-19 vaccination programme and the efficient deployment of the CoWIN app. ⬆ India's manufacturing sector is able to respond quickly, e.g. PPE production. ⬆ COVID-19 accelerated the process of digitisation of healthcare with the establishment of the Ayushman Bharat Digital Mission (ABDM).
Weaknesses	**Sustainability** ⬇ Utilisation of affordable drugs is limited by poor perceptions of effectiveness and quality, with, for many doctors and patients, price remaining a proxy for quality. ⬇ Historical underinvestment by the pharmaceutical industry in R&D. ⬇ Over-reliance on Chinese active pharmaceutical ingredients.	**Resilience** ⬇ Inequitable internet penetration limits the process of digitisation in healthcare. ⬇ Regulatory non-compliance by the pharmaceutical industry results in instances of deficiencies in medicine quality. ⬇ At state level, procurement of medicines requires focus in terms of management, distribution, planning, quality control and transparency.

Table 1 (continued): Sustainability and resilience – summary of findings by key domains

DOMAIN 5	SERVICE DELIVERY	
Strengths	**Sustainability** ⬆ Adequate quality standards in documentation that are in line with international good practice. ⬆ The expansion of Ayushman Bharat Health and Wellness Centres (AB-HWCs) and the AB-PMJAY has immense potential for universal health coverage and comprehensive primary healthcare as a measure to integrate public -private and general -specialist care.	**Resilience** ⬆ Quick population-level adoption of new technologies. ⬆ Establishment of the Integrated Health Information Platform, a real-time surveillance platform covering 33 infectious diseases, expands the scope of Integrated Disease Surveillance Programme (IDSP). ⬆ Pradhan Mantri Swasthya Suraksha Yojana has been strengthened to better distribute infrastructure resources by creating new high quality teaching hospitals.
Weaknesses	**Sustainability** ⬇ Fragmented service delivery across the vertical tiers of the health system and allied services. ⬇ Limited formal referral pathways for patients means tertiary care services are overburdened, particularly in the private sector. ⬇ Poor adherence to quality standards and sporadic/weak monitoring. ⬇ High disparities between private and public services in terms of skilled workforce, quality and costs. ⬇ Limited policy and budgetary focus on long-term care, chronic disease management, elderly, disability, geriatric services and mental health care. ⬇ The National Disease Registry only covers cancer, stroke and rare diseases, leaving out a significant pool of serious illnesses.	**Resilience** ⬇ Health personnel shortages were highlighted during the pandemic when trained professionals were in short supply. ⬇ Inequity in the distribution of medical specialists across rural–urban and regional divides contributed to the spread and clustering of SARS-CoV-2 infections as patients rushed to city centres for advanced treatments.

Table 1 (continued): Sustainability and resilience – summary of findings by key domains

DOMAIN 6	POPULATION HEALTH	
Strengths	**Sustainability** ⬆ Social Determinants of Health are receiving increased attention in the policy realm with initiatives across many sectors.	**Resilience** ⬆ India's New Education Policy 2020 (NEP 2020) emphasises on a holistic school curriculum that includes sports and fitness by incorporating physical activity in teaching.
Weaknesses	**Sustainability** ⬇ Despite the existence of many policies and programmes, India does not yet have an explicit strategy or framework to address social determinants of health. ⬇ An increasing burden of non-communicable diseases is linked with lifestyle changes and the emergence of new pathogens. ⬇ Health inequity contributes to acute health burdens, with pockets of ill health contributing disproportionally. ⬇ Limited health education and awareness contribute to adverse outcomes in health and social well-being.	**Resilience** ⬇ Low levels of population health literacy leading to inadequate health knowledge and communication.
DOMAIN 7	ENVIRONMENTAL SUSTAINABILITY	
Strengths	**Sustainability** ⬆ There is growing awareness in the system about the environmental impact of the health sector, with legislations like The Biomedical Waste Management Rules, 2016.	**Resilience** ⬆ Under the National Programme on Climate Change and Human Health (NPCCHH) , targets are set to reduce the carbon footprint of the health sector.
Weaknesses	**Sustainability** ⬇ Guidelines and regulations for managing healthcare waste, and are targets for reducing the carbon footprint of the health system are poorly implemented and enforced.	**Resilience** ⬇ Only limited success till now in addressing issues like air quality, which put enormous pressure on the healthcare delivery system.

Recommendations

We make 43 recommendations across the seven domains, as shown in Table 2.

Table 2: Recommendations across the seven domains

DOMAIN 1	GOVERNANCE
1A	Given the nature of India's population health governance systems and processes, a multifaceted and multilevel governance response is required to advance its resilience and sustainability. Priority should be given to strengthening mechanisms for communication and coordination between the Central Government on the one hand and state and other local self-government arrangements on the other. Doing so would maximise the efficiency with which health-related decisions are made and policies implemented. It would also make for a more inclusive health landscape in the country.
1B	Enhancing public health capacity is needeed to accommodate resource needs during times of stability as well as during and after crisis. Increasing investment and expenditure on public health is necessary to achieve the above and to build a sustainable health system.
1C	Establish a typology of cities in terms of different urban health governance structures to enhance clarity and consistency in the governance of the health system, given the immense diversity of urban health service delivery systems.
1D	Through consultations with state governments and other stakeholders, a national consensus on shifting health to the Concurrent List should be reached.
1E	Harmonisation and integration of major government initiatives with similar or overlapping objectives should be considered to reduce complexity and duplication and enhance effectiveness.

DOMAIN 2	FINANCING
2A	Despite recent improvements, there is a need to further reduce out-of-pocket spending on health from the current high levels through continued ambitious expansion of public financing.
2B	In the short and medium run, most Indians should be protected under a single risk pool, requiring existing programmes to be expanded, streamlined and consolidated.
2C	An enhanced approach to resource allocation is needed in order for public expenditure as a percentage of GDP to meet the 2.5% target.
2D	India must find resources to ensure regular and reasonable salaries for community health workers, who are pillars of local level health resilience and play a key role given the weak delivery capacity at the grassroots.
2E	With focused investments to address staff and infrastructure gaps, Health and Wellness Centres can play an enhanced role as first points of contact and hubs for any surge capacity requirements in moments of crisis.

| 2F | As a counterbalance against cost escalation in health insurance affecting sustainability, public health facilities in states with weak government capacity should be expanded with focused investments in infrastructure and health workforce. |

DOMAIN 3	WORKFORCE
3A	Develop a dedicated policy to retain the medical workforce through adequate pay, incentives, work–life balance, mental–physical well-being, safety in the workplace, etc.
3B	Conduct a policy revision to reintegrate health workers and graduates returning from abroad (circular migration) or who dropped out previously.
3C	Incentivise medical education in the country through expansion in the number of places and institutions, recognition and accreditation of allied professionals and subsidised and capped tuition fees, especially in the private sector.
3D	Optimally utilise the existing workforce to its full capacity by promoting standardised upskilling, regulated task-shifting and skill-mixing.
3E	Develop a policy for adequate compensation and protection for service during crises, emergencies, in rural-tribal geographies, etc.
3F	An overarching regulatory framework is required to govern the process of task-shifting within the health system.

DOMAIN 4	MEDICINES AND TECHNOLOGY
4A	Indian health policy needs to ensure the quality of medicines, convey to the public the ongoing efforts to improve quality and strengthen procurement systems so that public perception is evidence based.
4B	There is a need to institutionalise HTA in the health system, fostering partnerships with state-level agencies, deepening existing state health system linkages.
4C	Equity in access to health technology needs to be ensured with hub-and-spoke type models, wherever possible, helping overcome infrastructure bottlenecks.
4D	There is a need to strengthen the Indian regulatory system and align it to internationally accepted standards. A roadmap towards membership of the Pharmaceutical Inspection Co-operation Scheme and the International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use could be announced.
4E	India needs to create an ecosystem for innovation to become a leader in drug discovery from being a generic manufacturer/contract manufacturer alone.
4F	A uniform standard for personal health records needs to be introduced across state health systems.

DOMAIN 5	SERVICE DELIVERY

5A	Focus efforts on promoting integration of care for the older population and patients with chronic diseases; insurance and other allied services should also reflect this.
5B	There is a need for better tracking and surveillance systems to ensure epidemiological and population-level data are collected. The large-scale systems built during COVID-19 should be expanded and continued for future outbreaks of infectious diseases. Existing systems such as those for TB can be repurposed.
5C	Enhance and encourage investments in public health facilities to reduce the catastrophic health expenditure for quality services.
5D	Create links with aspects of social protection for better health outcomes to ensure holistic service.
5E	Conduct a structural reorganisation to smooth out internal referral systems for patients in health systems and create alternative pathways for treatment during crisis-like situations.
5F	Incentivise adherence to high quality standards, with need for stricter monitoring of services and penalties when standards are not met. Competency-focused licensing and renewal should be adopted.
5G	The range of diseases covered by the National Disease Registry should be expanded, especially with a focus on long-term monitoring.

DOMAIN 6	POPULATION HEALTH

6A	Building a sustainable health system necessitates acknowledging and accounting for the differences in the health needs of different sections of the population. Changes in the disease burden must be quantified regularly using simple, replicable methods to comprehend the scale, direction and seriousness of health issues before attempting to address them. Using the National Burden Estimates of healthy lives lost in India to quantify the country's disease burden at national and subnational levels can aid policy makers in prioritising initiatives (Menon GR et al., 2019).
6B	The social determinants approach to health requires explicit acknowledgement and should be reflected in health communication. At the level of policy articulation and implementation, programmes must be made more targeted to address the various social determinants of health. A more robust approach would enable the sustainability of the health system, create awareness about rights and promote community mobilisation and self-sufficiency, strengthening local political structures and grassroots-level initiatives.
6C	Adopting a systematic social determinants of health approach would enable the sustainability of the health system, promote a healthy lifestyle, create awareness about rights and promote community mobilisation and self-sufficiency as well as strengthen local political structures and grassroots-level initiatives.
6D	There is a need to have better health communication strategies around noncommunicable disease risks, physical activity, healthy food habits, etc.

DOMAIN 7   ENVIRONMENTAL SUSTAINABILITY

7A   Strengthen data collection and research to assess the environmental costs and benefits of health system activities to inform policy and decision-making.

7B   Develop and implement a comprehensive strategy with incentives to reduce the environmental impact of the health system, including waste, emissions and resource consumption.

7C   Conduct a thorough assessment of the health system's carbon footprint and develop policies to reduce it, such as promoting energy efficiency, investing in renewable energy and promoting sustainable transportation.

7D   Improve waste management practices in healthcare facilities, including the development of policies to reduce waste and promote good practices in hospital and health facility waste disposal.

7E   Strengthen regulations and enforcement to improve air quality and protect respiratory health, such as implementing measures to reduce vehicular emissions, promoting the use of clean energy sources and reducing the use of fossil fuels.

7F   Develop and implement mitigation plans to address country-specific environmental risks to health, such as climate change, including promoting energy efficiency and renewable energy and supporting vulnerable communities to adapt to the impacts of climate change.

7G   Integrate environmental sustainability into the design and implementation of major policy initiatives, such as the National Health Stack, to promote sustainable healthcare practices and reduce environmental impacts.

Introduction

The COVID-19 pandemic has brought to light the importance of not only improving the resilience of health system to crises but also of ensuring their long-term sustainability. The Partnership for Health System Sustainability and Resilience (PHSSR) was established in 2020 with the goal of building more sustainable and resilient health systems around the world.

One of the key objectives of PHSSR is to build knowledge, understanding and consensus on the dimensions of health system sustainability and resilience, and how they can be improved. To achieve this goal, PHSSR focuses on seven key domains:

Governance: the wide range of steering and rule-making related functions carried out by governments and decision makers as they seek to achieve national health policy objectives

Financing: how health systems generate, pool and allocate financial resources and pay for health services

Workforce: how health systems plan for, train, recruit, reward, and deploy their workforce, and shape the conditions in which health professionals work

Medicines and technology: how health systems make use of medicines and (information) technologies in the delivery of health services

Service delivery: how health services are organised and delivered, including ambulatory and hospital care, and public health

Population health: how health systems address the social determinants of health and meet the needs and demand of the population

Environmental sustainability: how health systems prevent and minimise their carbon footprint and the impacts of pollution on the population's health

By examining each of these domains, PHSSR seeks to identify strengths, weaknesses, opportunities and threats to health systems and to generate evidence-informed solutions and policy recommendations to improve sustainability and resilience.

A sustainable health system improves population health by continually delivering the key functions of providing services, generating resources, financing and stewardship, incorporating principles of financial fairness, equity in access, responsiveness and efficiency of care, and does so in an environmentally sustainable manner.

A resilient health system is able to prevent, respond to, manage the health system impact of, and recover and learn from, acute and chronic crises (including, but not limited to, pandemic threats, climate change and economic and technological shocks), minimising their short- and long-term impacts on health, social and economic wellbeing.

The COVID-19 pandemic has undeniably tested the Indian health system, presenting unprecedented challenges and highlighting opportunities for growth. PHSSR and Observer Research Foundation's research across seven key domains provides an holistic assessment of the system's response to the pandemic and its underlying strengths and weaknesses, pinpointing areas for improvement to bolster long-term sustainability and resilience, including preliminary recommendations for reform and policy focus. The report draws on recent data, health policy literature and interviews with diverse stakeholders, aiming to provide a balanced and constructive assessment.

India's health system has historically been characterised by a strong private sector, which has made significant advancements in healthcare provision by comparison to the relatively under-developed public sector. However, this has also resulted in high out-of-pocket payments, necessitating a focus on affordability and accessibility. In response, the last decade has witnessed an encouraging shift towards public provision, with significant initiatives aimed at ensuring quality care and reducing the

cost of medicines. This evolution reflects the system's capacity for adaptation and progress.

In the domain of governance, the report notes that the Indian health system has a complex and decentralised structure, with varying levels of capacity and coordination across different states and territories. While the complexity of India's health systm creates challenges of coordination at a national level, it also allows for innovation and experimentation at the local level.

Financially, the country has made notable strides in enhancing protection for the economically disadvantaged and reducing out-of-pocket expenditure. Continued public investment and efficient resource utilisation are crucial in maintaining this positive momentum towards financial inclusivity in healthcare.

The chapter on India's healthcare workforce acknowledges the critical need for more skilled health workers, especially in underserved rural areas. Enhancing training and support for frontline workers is paramount in strengthening the backbone of India's healthcare.

In terms of medicines and technology, the focus remains on enhancing regulation and quality control to ensure the availability and affordability of essential medicines and the safety of medical devices, while underlining the undoubted strength of India's pharmaceuticals and medical technology sectors. Similarly, the chapter on service delivery notes remarkable progress in access to quality care in recent times, while calling for sustained focus on addressing gaps, particularly for those in rural settings and marginalised communities.

The population health domain describes a multitude of initiatives to protect and uphold public health, but highlights the need for a more comprehensive and joined-up approach, including greater investment in disease prevention and health promotion.

The report also explores environmental sustainability, highlighting the importance of ensuring that India's health system is sustainable in the face of climate change and other environmental challenges. This includes reducing the environmental impact of healthcare practices, ensuring that health services adapt to changing needs and also addressing social determinants of health that increase people's exposure and vulnerability to environmental risks.

Finally, the report includes two detailed case studies, focussing on two key health schemes in India's journey to universal health coverage: Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB-PMJAY) and Pradhan Mantri Bhartiya Janaushadhi Pariyojana (PMBJP). These case studies underscore significant progress in addressing critical gaps in public health insurance coverage, and ensuring access to medicines and technologies, respectively. Such major initiatives highlight the potential for positive change when ambitions are met with careful policy design and implementation, commensurate resources, and sustained political will.

Governance

India's National Health Policies have been the country's guiding approach to the health sector, with policy action in all sectors to progressively achieve universal health coverage through both preventive and promotive healthcare approaches in all development policies. Over time, its primary goal has been to "inform, clarify, strengthen and prioritise the role of the government in shaping health systems in all its dimensions – investments in health, organisation of healthcare services, prevention of diseases and promotion of good health." (Ministry of Health & Family Welfare, 2017a) The National Health Policy also recognises the importance of achieving the Sustainable Development Goals (SDG) and their impact on preventing and promoting health. It calls for a holistic approach to the determinants of health, including "air pollution, better solid waste management, water quality, occupational safety, road safety, housing, vector control, and reduction of violence and urban stress." (Singh SK, 2017). Furthermore, it identifies certain quantitative targets to be achieved by 2025 in a plethora of dimensions, such as health service coverage, health finance, health infrastructure and human resource and health management information. For instance, specific goals include increasing public health facility utilisation to 50% and government health expenditure to 2.5% of GDP by 2025 (Ministry of Health & Family Welfare, 2017b).

Unlocking the required investment and attaining such ambitious targets will require sustained political commitment. To illustrate the scale of the challenge, despite major policy initiatives and funding commitments such as AB-PMJAY (see case study 1), health expenditure has remained within 1.02–1.35% of GDP according to latest available data (2019–2020). COVID-19 saw the release of significant additional funds to the health system, but whether there is a change to the underlying, longer-term trend is as yet uncertain. In light of the uneven nature of progress, the Comptroller and Auditor General of India noted that India still has a "long way to go" to attain its health targets, including those related to the SDGs (Ali S, 2019).

Governance for health system sustainability

Health is considered a 'cross-cutting' issue relevant to all policy areas and a 'policy and system approach' for intersectoral coordination (Lahariya C, 2017). India's healthcare delivery system has progressed over the years since the first National Health Policy was announced in 1983 (Table 3).

Various policies and programmes related to the promotion of health have been implemented over the years, such as the National Nutrition Policy, National Policy for Children, Pulse Polio Programme.

Table 3: National health missions in India

Year	Name of mission
1996	Intellectual Disability-related Schemes (Vikaas, Samarth, Gharaunda, Niramaya, Sahogi, Gyan Prabha, Prena, Sambhav, Bhadte Kadam and Disha)
2002	Sarwa Shiksha Abhiyan
2005	National Rural Health Mission
2008	National Mission on Medicinal Plants
2012	National AYUSH Mission
2013	National Urban Health Mission
2014	Swachh Bharat Mission (Clean India Mission)
2015	Affordable Medicines And Reliable Implants For Treatment
2018	National Health Protection Mission (Ayushman Bharat Yojana/Pradhan Mantri Jan Aroga Yojana)

Source: Grover A & Singh RB, 2020.

The National Health Policy 2017 also outlines certain cross-sectoral targets to be achieved in health by 2025, such as tobacco consumption reduction (Ministry of Health & Family Welfare, 2017c).

The key actors in health system governance are the government, research institutions, academia, industry, public health experts and community and international agencies. While policy makers establish the framework for healthcare provision to the citizenry (patients or beneficiaries), keeping in view the country's financial and other resource constraints, providers are responsible for operationalising healthcare within the policy framework. Payors are responsible for the financial aspects and sustainability, enrolment of patients as beneficiaries and providing reports to the policy makers (or state division) (Ritz D et al., 2014).

India has a three-tier governance structure involving central, state and local bodies (Figure 1). There are three levels of public sector health services in India – primary (Primary Health Centres and Sub Centres, Ayushman Bharat — Health and Wellness Centres), secondary (Community Health Centres, Taluka and district hospitals) and tertiary (medical colleges and teaching hospitals) (Balarajan Y et al., (2011).

Figure 1: Organisation of health: relationships between the union, state and district levels
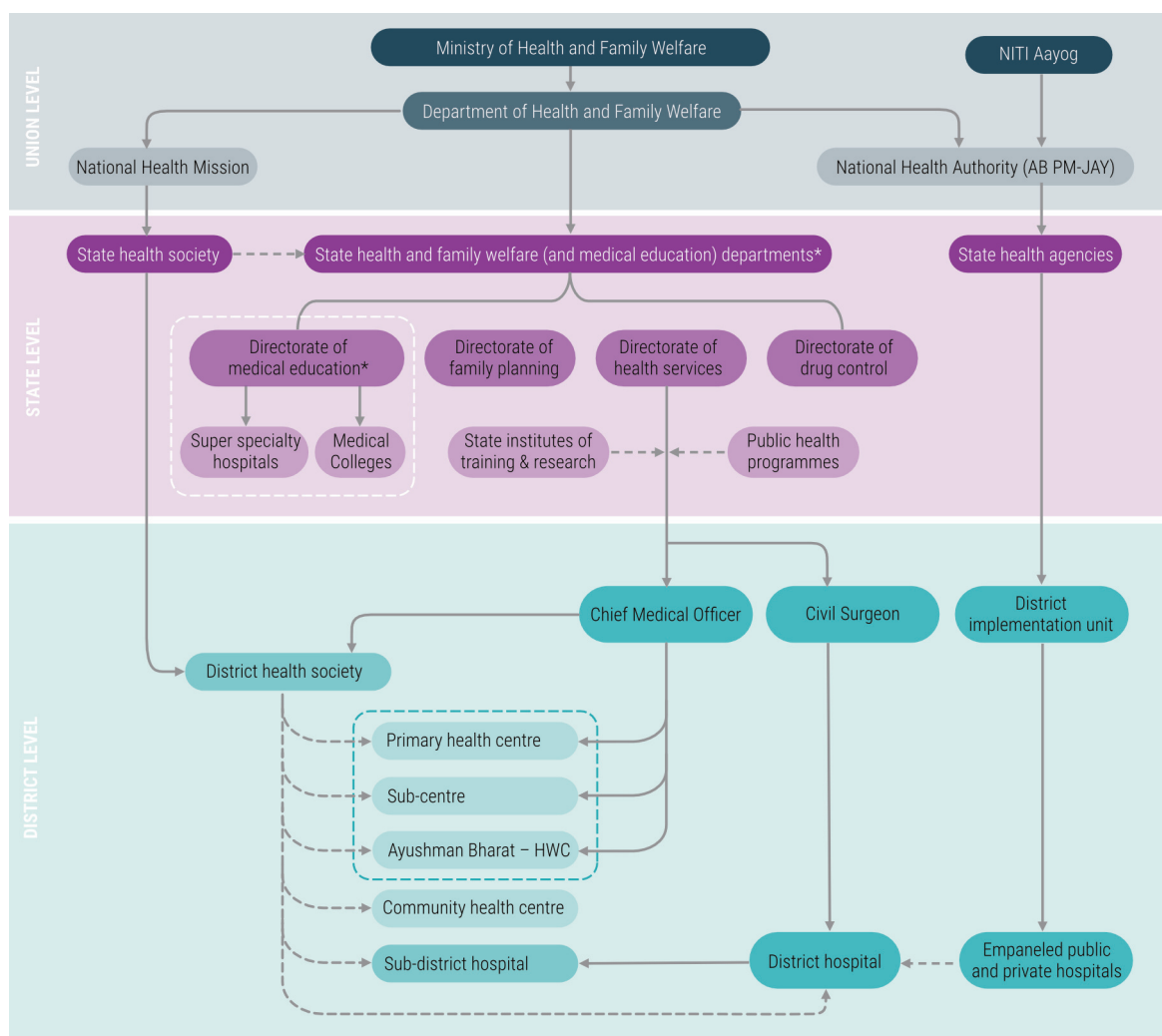
* In some states (about half), 'health and 'medical education' are separate departments. In these states, The Directorate of medical education and its sub-organizations are separate from Health and family welfare

- - - - Newly established health and wellness centres

- - - - Alternative funding

Adapted from: Selvaraj S et al., 2022.

Figure 2: Roles and responsibility of health functionaries at the national level

State Governments	Union Government

Central Council of Health and Family Welfare

Ministry of Health and Family Welfare

Ministry of AYUSH
Ayurveda, Yoga, Naturopathy, Unani, Siddha, Sowa-Rigpa and Homoeopathy

AYUSH systems of medicine in parallel with western medicine systems.

The NHP 2017 also highlights a choice of system of medicine towards pluralistic health system.

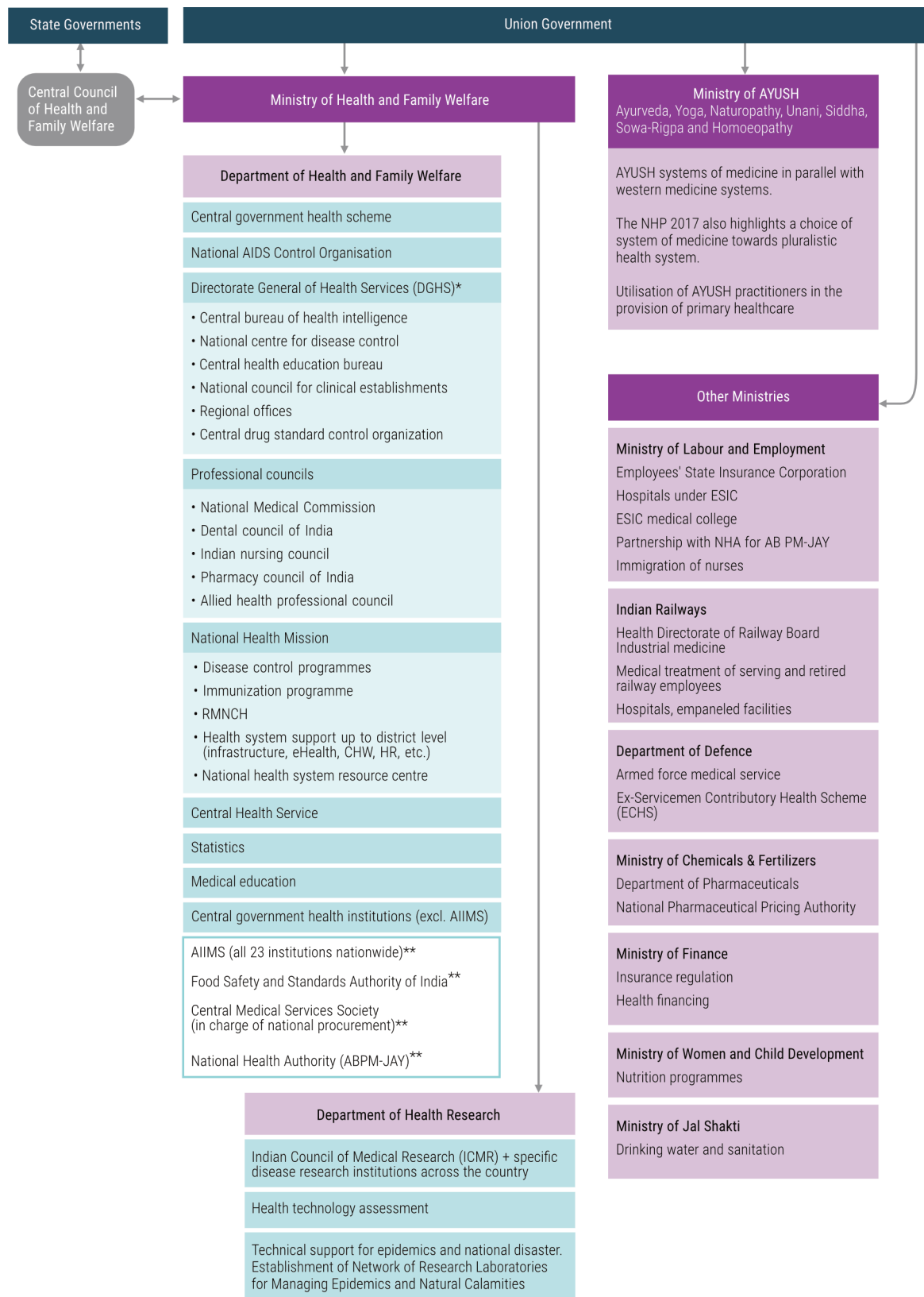Utilisation of AYUSH practitioners in the provision of primary healthcare

Department of Health and Family Welfare

Central government health scheme

National AIDS Control Organisation

Directorate General of Health Services (DGHS)*
- Central bureau of health intelligence
- National centre for disease control
- Central health education bureau
- National council for clinical establishments
- Regional offices
- Central drug standard control organization

Professional councils
- National Medical Commission
- Dental council of India
- Indian nursing council
- Pharmacy council of India
- Allied health professional council

National Health Mission
- Disease control programmes
- Immunization programme
- RMNCH
- Health system support up to district level (infrastructure, eHealth, CHW, HR, etc.)
- National health system resource centre

Central Health Service

Statistics

Medical education

Central government health institutions (excl. AIIMS)

AIIMS (all 23 institutions nationwide)**

Food Safety and Standards Authority of India**

Central Medical Services Society (in charge of national procurement)**

National Health Authority (ABPM-JAY)**

Department of Health Research

Indian Council of Medical Research (ICMR) + specific disease research institutions across the country

Health technology assessment

Technical support for epidemics and national disaster. Establishment of Network of Research Laboratories for Managing Epidemics and Natural Calamities

Other Ministries

Ministry of Labour and Employment
Employees' State Insurance Corporation
Hospitals under ESIC
ESIC medical college
Partnership with NHA for AB PM-JAY
Immigration of nurses

Indian Railways
Health Directorate of Railway Board Industrial medicine
Medical treatment of serving and retired railway employees
Hospitals, empaneled facilities

Department of Defence
Armed force medical service
Ex-Servicemen Contributory Health Scheme (ECHS)

Ministry of Chemicals & Fertilizers
Department of Pharmaceuticals
National Pharmaceutical Pricing Authority

Ministry of Finance
Insurance regulation
Health financing

Ministry of Women and Child Development
Nutrition programmes

Ministry of Jal Shakti
Drinking water and sanitation

* Technical agency for medical and public health, education and care.
** Autonomous body that works closely with MoHFW and may be hosted by the Ministry but has a separate governance structure.

Adapted from: Selvaraj et al., 2022.

The national government oversees all policies and programmes by providing direction and funding. State governments, which combine the roles of providing vision, direction, finance, regulation and healthcare provision, are becoming increasingly important (Figure 2 above).

The National Health Mission (NHM) is jointly governed and financed by the central and state governments, is a comprehensive healthcare initiative that aims to enhance healthcare accessibility, especially in rural and urban underserved areas, and includes a broad spectrum of health-related goals. Both levels of government share responsibilities and financial contributions, with the central government often bearing a significant portion of the expenses.

Within states, public health providers operate at various levels and answer to regional administrative bodies. The Right to Information Act permits the examination of them as well. In India, there is a wide spectrum of private providers, from individual doctors to hospitals, that are governed by different standards and comply with them to varying degrees.

Regarding local governance, rural areas include the district council or zilla parishad, which comprises a cluster of block councils or panchayat samitis, which, in turn, are made up of village councils or gram panchayats (Figure 3). Each village has a village assembly or gram sabha comprising all adults in the village, who have the power to directly elect members of the panchayat.

In urban areas, there are the municipal corporations or mahanagar palikas for areas with a population greater than one million, municipal councils/municipalities or nagar palikas for areas with less than a million people and town councils or nagar panchayats for areas transitioning from rural to urban. Although there are still obstacles, efforts to encourage greater accountability in the delivery and financing of healthcare have recently advanced. States such as Kerala, Tamil Nadu,

Figure 3: Governance structure at district level
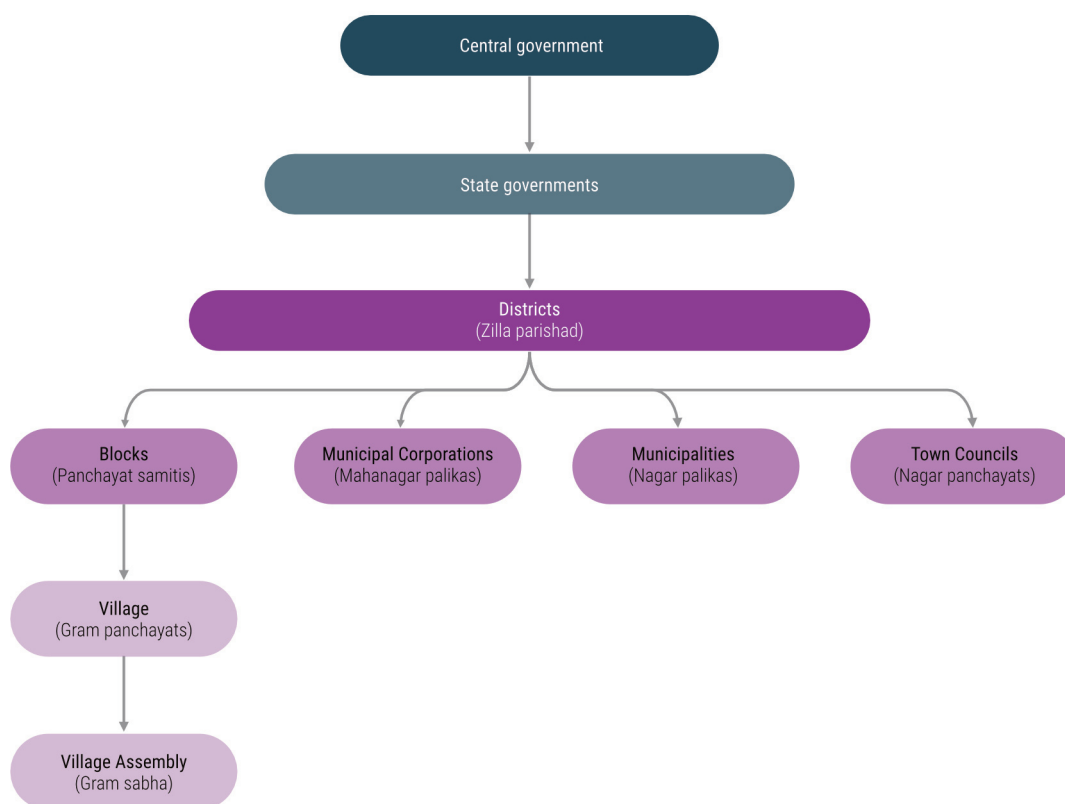
Source: India Development Review, 2020.

Rajasthan and Chhattisgarh have shown the expanding significance of local communities and institutions of local administration in democratic decision-making.

India's private sector has a significant impact on the delivery of healthcare services, including the quantity, variety and cost of in-patient and out-patient treatment, diagnostic services, the pharmaceutical industry and health-related human resources. The private sector in India is structured in a variety of ways, including for-profit and not-for-profit organisations, charitable trusts and religious organisations (India Development Review, 2020).

The Union List, State List and Concurrent List, which outline the division of powers and legislative authority between the Central Government and state governments, serve as the foundation for India's federal polity, as mandated by the Indian Constitution. Health is a 'state subject' under India's federal system, with 'Public Health, Sanitation, Hospitals and Dispensaries' under the purview of the states, while 'Population Control and Family Planning', 'Food Adulteration', 'Control of Infectious and Contagious Diseases Across State Boundaries' and 'Issues Regulating Medical Profession' are listed under the Concurrent List, which is shared by the Central Government and the states (Venkateswaran S, 2022). The High-Level Group on Health constituted under the Fifteenth Finance Commission recommends moving "public health and hospitals under the Concurrent List of the seventh schedule of the constitution from the existing assigned under the state list." (XV Finance Commission, 2020; Get Legal India, 2021). This move would ensure greater flexibility for the centre and freedom to amend regulations and stresses the responsibility of all stakeholders to deliver improved healthcare. It also rationalises and streams the multiple acts and regulations along with providing technical expertise to states.

Centre–State relations in the health context are largely governed by the fiscal component. Although states are responsible for a major share of health spending, the centre transfers considerable sums of funds, through centrally sponsored schemes and other purpose-specific grants, to prioritise certain areas of health intervention and, in the process, enable equity among states in health service delivery. High fiscal deficits in the late 1980s and early 1990s resulted in significant economic reforms in India in the early 1990s. Since then, fiscal responsibility and budget management measures have been implemented through the Fiscal Responsibility and Budget Management (FRBM) Act to reduce both the federal and state governments' budget deficits. Nevertheless, the budget deficit significantly increased in the years following the global recession. According to the FRBM Act, the Government of India is committed to keeping the combined fiscal deficit at 3% of national GDP and 3% of state GDP (Kurian, OC & Suri S, 2022).
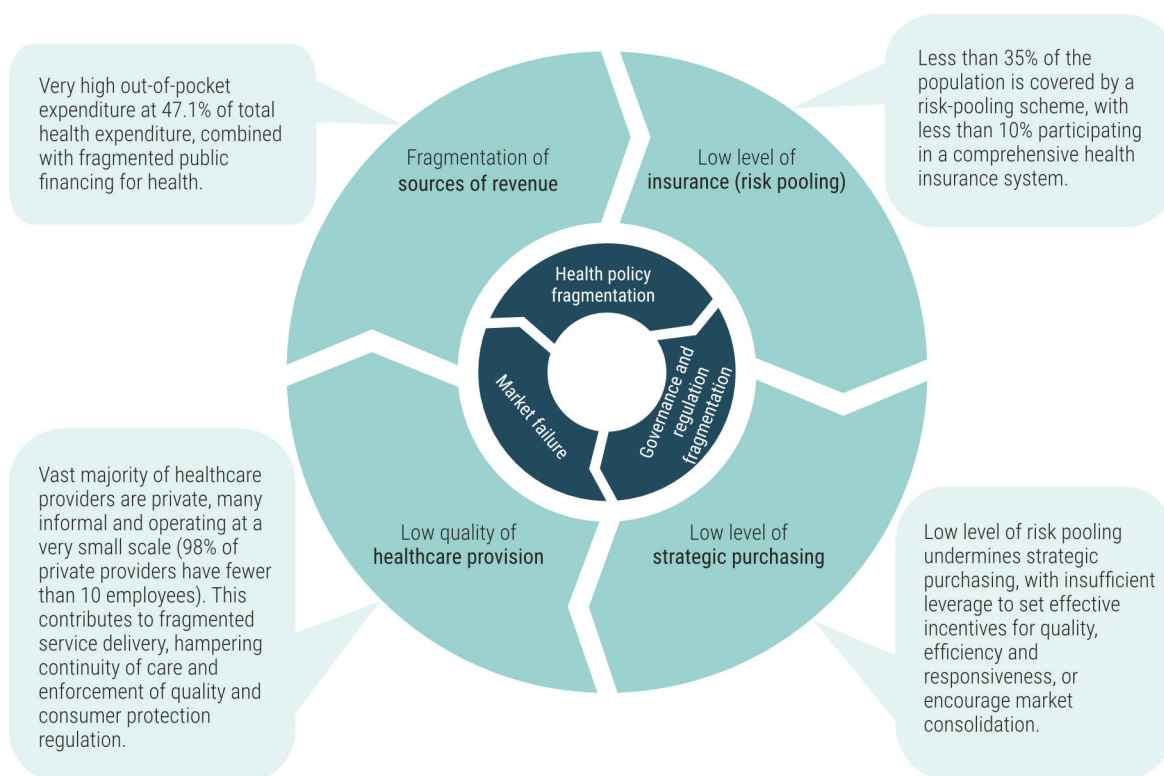
The Ministry of Health & Family Welfare also disburses substantial amounts of money to the states through central schemes like the National Health Mission. In addition, the central agencies offer technical expertise and overall programmatic guidance in the health sector, along with monitoring of outcomes; The NITI Aayog's Health Index regularly ranks Indian states based on their performance (NITI Aayog et al., 2018). This index evaluates the performance of states and Union Territories on a weighted composite score comprising 24 indicators categorised into three domains: 'Key Inputs/Processes', 'Governance and Information' and 'Health Outcomes'. According to importance, weights have been assigned to each domain, with greater scores for outcome indicators.

The 73rd and 74th Amendment Acts of 1992 strengthened local governance by bestowing more power on the aforementioned institutions by assigning certain subjects to them. That said, given that local governance is subsumed under the State List, state governments have the power to decide which subjects are to be devolved to local governments and to what extent in terms of funding and functioning. Consequently, even in the case of health, nutrition and sanitation activities, the extent of decentralisation varies across Indian states. In Kerala and Karnataka, in particular, local governance has been effective in capacity building and health service monitoring. Rogi Kalyan Samitis and hospital development societies, for instance, promote accountability at the local level. Devolution of powers is thus seen as aiding more effective governance. Nevertheless, India's practice of top-down policy-making and decentralised, bottom-up implementation has led to

challenges in planning and management and to a perception of less accountability on the part of state governments, local governments and citizens (Selvaraj S et al., 2022).

According to NITI Aayog, "India's health system reveals a story of multiple fragmentations: a fragmentation of payers and risk pools; deep fragmentation of providers of healthcare services; and also of the digital backbone running it." Fragmentation in India's health system and its implications for health sector performance is shown in Figure 4.

Figure 4: Factors driving health sector performance

Very high out-of-pocket expenditure at 47.1% of total health expenditure, combined with fragmented public financing for health.

Less than 35% of the population is covered by a risk-pooling scheme, with less than 10% participating in a comprehensive health insurance system.

Vast majority of healthcare providers are private, many informal and operating at a very small scale (98% of private providers have fewer than 10 employees). This contributes to fragmented service delivery, hampering continuity of care and enforcement of quality and consumer protection regulation.

Low level of risk pooling undermines strategic purchasing, with insufficient leverage to set effective incentives for quality, efficiency and responsiveness, or encourage market consolidation.

Fragmentation of sources of revenue

Low level of insurance (risk pooling)

Health policy fragmentation

Market failure

Governance and regulation fragmentation

Low quality of healthcare provision

Low level of strategic purchasing

Source: NITI Aayog, 2019.

The state health index 2019/2020 ranks states and union territories according to their performance on health parameters. The index shows a large disparity in access to healthcare across geographical and income differentials. A subnational analysis of how India fares in healthcare calls for the identification of contextualised best models of public health and collaborative efforts to make healthcare affordable and accessible (Kapur K, 2020).

Transparency in healthcare contributes to positive outcomes for both providers and the government. It also helps reduce costs and improve quality and customer satisfaction. Indian healthcare ranks 31 out of 32 countries studied on the transparency index based on the quality of healthcare, finance, governance, personal healthcare data, communication and patient experience. India scored lowest on quality of healthcare, communication of healthcare data and patient experience, although better on governance, finance and personal healthcare data. India needs a strategic approach to align and deliver the key dimensions of transparency (Priyadarshi M & Kumar S, 2020).

Figure 5: Accountability across different administrative levels and components showing entities that are/should be responsible for implementation

	Accountability mechanism indicators*	Flow of accountability			
		Centre	State	Urban local body	Village Panchayat
Governance	Policy and guidance	MOHFW	State Government	Municipal Corporation	Panchayat Raj System
Health finance	Resource allocation	Centre	State Government	Municipal Corporation	Panchayat Raj System
Health management information system	System and data services	Centre	State Government	Municipal Corporation	Panchayat Raj System
Human resource	Recruitment, remuneration, perks, service conditions	Centre	State Government	Municipal Corporation	Panchayat Raj System
Service delivery	Resource surplus mobilisation	MOHFW	State Government	Municipal Corporation	Panchayat Raj System
Compliance	Weekly, monthly and annual report	MOHFW	State Government	Municipal Corporation	Panchayat Raj System

☐ = gaps in formal accountability mechanisms

Note: Accountability mechanism indicators adapted from the Monitoring and Accountability Platform for national governments and global partners developed by the WHO Global Health Workforce Alliance.

Adapted from: Priyadarshi M & Kumar S, 2020.

An analysis of accountability in the health system across the different administrative levels highlights limitations in formal accountability mechanisms (Figure 5). There are particular deficits at municipal and panchayat levels, and in the domains of health finance, management information systems, human resources, service delivery and compliance. This has resulted in calls for improved accountability at all levels of the health system (Ministry of Health & Family Welfare, no date). There are signs of progress in this regard. For example, the Ayushman Bharat Yojana scheme paves the way for higher transparency through health and wellness centres (Ministry of Health & Family Welfare, 2018). Furthermore, schemes such as the National Rural Health Mission aim to improve the involvement of local communities, local NGOs and local governments in health-related decisions and actions, and, ultimately, accountability and intersectoral collaboration. Engagement of civil society organisations and local communities through participatory governance has improved the effectiveness and response of health services (Selvaraj S et al., 2022).

Evaluating health policies and programmes is another area in which there is scope for improvement. Whilst all national programmes have KPI that are regularly reviewed by administrative and health authorities, formal policy evaluation is not yet adopted as routine practice in all ministries and departments. At the national level, there is only one body – the Development Monitoring and Evaluation Office attached to the NITI Aayog – in charge of designing evidence-based policy by monitoring and evaluating existing schemes (Mishra A & Avinandan V, 2020). There are no minimum standards of evaluation for public programmes in India, and there is variation in the quality, frequency and scale of evaluations undertaken. Evaluations are typically used to measure programmes' success, and have potential to play a greater role in policy planning and budgetary allocation.

Several sets of data pertaining to health are collected by different government units in India: the Ministry of Home Affairs publishes data related to live births and deaths through the population census; and the Central Bureau of Health Intelligence collects and circulates National Health Profiles for all states and Union Territories, providing state- and district-wide data for communicable and noncommunicable diseases. The Annual Health Surveys, District-level Household Surveys, National Family Health Surveys and Coverage Evaluation Surveys are collected periodically to help monitor and assess the performance of the government's health programmes. This includes data on maternal, reproductive and child health, health systems and health outcome indicators. However, the use of such data for policy and decision-making is subject to operational barriers, including access to data, reliability of data, gaps in capacity to manage and analyse data and so on. The government also faces challenges in collecting data from the private sector and effectively using it for policy making (Selvaraj S et al., 2022).

Governance for health system resilience

The COVID-19 pandemic has highlighted widespread limitations in countries' capacity to respond to health emergencies, and India is no exeption to this. Prior to COVID-19, the Global Health Security Index 2019 ranked India 57th out of 195 countries with a score of 46.5, indicating room for improvement reflected in the country's experience of the pandemic. However, it is important to recognise the context of India's response. Despite facing immense challenges during the second wave, India's efforts in reducing death rates and achieving extensive vaccination coverage compare favorably with several developed nations. In absolute terms, the numbers were indeed high, but it is crucial to consider these achievements and the scale of the challenge when evaluating the country's preparedness (Sharma NC, 2020).

Regarding disease surveillance, the National Surveillance Programme for Communicable Diseases, initiated in 1997, was significantly bolstered by the Integrated Disease Surveillance Project launched post the 2004 SARS outbreak. However, the effectiveness of surveillance varied across states. For instance, Kerala and Maharashtra had more robust detection rates compared to states like Uttar Pradesh and Bihar (Lahariya C, 2021). Recent initiatives such as the Integrated Health Information Platform (IHIP) for disease surveillance, INSACOG for genomic surveillance, and the CO-WIN portal for vaccination tracking demonstrate India's commitment to enhancing its surveillance capabilities. Additionally, the National Centre for Disease Control and the role of ICMR/NITI Aayog have been pivotal in shaping these efforts.

The Health and Wellness Centres under the Ayushman Bharat initiative are instrumental in bolstering community-based surveillance. They enable frontline health personnel to perform syndromic reporting and screening for various diseases. Moreover, the integration of data from the Pradhan Mantri Bhartiya Janaushadhi Pariyojana (PMBJP) and other insurance schemes contributes to a more comprehensive surveillance of hospitalisation episodes (NITI Aayog, 2020). To further strengthen this infrastructure, recent sanctions under the PM-ABHIM aim to establish an integrated network of public health laboratories, and the ECRP-II initiative aims to further enhance India's health surveillance and response capabilities.

There remain opportunities for India to refine and expand its surveillance system. Adopting a One Health Surveillance System, as suggested by recent reviews, could enable early detection and containment of future diseases, but would require mechanisms to ensure coordination between ministries and joint reporting (Yasobant S et al., 2020). Additionally, community-centric strategies in places like Chennai have shown promise in controlling COVID-19 in densely populated areas (Jagadeesan M al., 2022). However, the underreporting of cases remains a concern, highlighting the need for more responsible and transparent data reporting. This will be crucial in strengthening India's surveillance strategies and ensuring a robust response to future health crises (Kurian, 2020; Deshmukh Y at al., 2021; Shewade HD et al., 2021).

Figure 6: The Way Forward: Public Health Surveillance in India
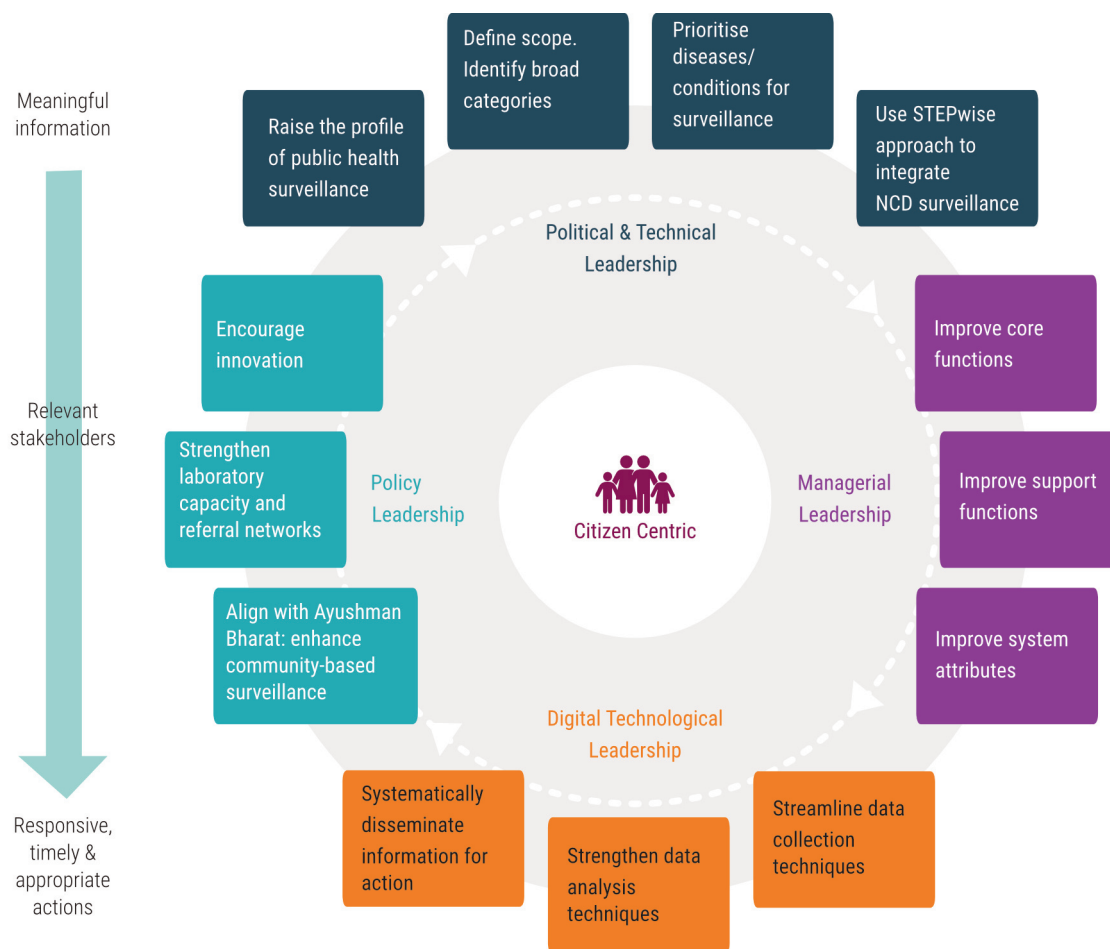
Adapted from: NITI Aayog, 2020.

Public health services in India, such as disease surveillance, vaccination and family planning services, are provided by a range of government actors at the national and state levels, private actors and NGOs, rather than a single public health body. While at the national level, these services are subsumed under national health programmes under the supervision of the National Centre for Disease Control under the Ministry of Health and Family Welfare, state health departments are responsible for the former's implementation. Funding and spending on public health, however, have remained low overall. For nearly 15 years, the public health budget has remained at just over 1% of GDP, despite the government articulating commitments to increase this number in both 2004 and 2017 (Tiwari S, 2022).

The Ministry of Health and Family Welfare has trained frontline workers (Auxiliary Nurse Midwives, Accredited Social Health Activists, Anganwadi Workers, and Community Health Officers at AB–HWCs) on COVID-19 response and containment measures (Ministry of Health & Family Welfare, 2020a). The training programme includes sessions on communication for response and containment measures; prevention involving safe practices in the community and community surveillance; supportive public health services including community households, stigma and discrimination; and communication, personal safety for health/ICDS personnel and how to meet special communication needs in urban areas. The Ministry has also developed 'Guidelines on Operationalisation of COVID Care Services for Children & Adolescents' (Ministry of Health & Family Welfare, 2021a). The guidelines suggest the use of appropriate information, educational and

communication campaigns for communication of correct information and countering misinformation campaigns on media and social media.

India's response to the COVID-19 pandemic was a dynamic interplay between centralised decision-making and localised innovation, a reflection of the nation's vast size and the intricate nature of its governance. The Central Government's declaration of a national lockdown in April 2020 was swift and decisive, although the decision was made with limited consultation with the states. This approach sparked discussions regarding preparation and adherence to constitutional norms, as health policies are generally within the purview of state authorities (Shringare A & Fernandes S, 2020). Additionally, the centralised directive regarding the procurement of safety kits presented logistical challenges, underscoring the complexity of managing resources in India's diverse federal structure (Shringare A & Fernandes S, 2020).

Despite these challenges, there were several areas in which India's response indicated a high level of resilience. The nation's vaccination drive was one of the largest and most rapid in the world, showcasing the capacity to mobilise resources at scale. Ayushman Bharat Health and Wellness Centres (AB-HWCs) were instrumental in delivering healthcare services to the last mile, particularly in rural areas. Teleconsultation services like e-Sanjeevani bridged the gap between healthcare providers and patients during lockdowns, facilitating over millions of consultations. Additionally, robust data monitoring and contact tracing efforts were vital in managing the pandemic's spread.

Throughout the pandemic, the government was proactive in issuing a series of detailed guidelines addressing various aspects of crisis management. These included protocols for transporting suspected or confirmed COVID-19 cases (Directorate of Health Services, 2020), reopening schools with social distancing measures (Ministry of Home Affairs, 2020), managing the spread of COVID-19 in offices (Ministry of Health & Family Welfare, 2021b), and comprehensive strategies for contact tracing, specimen collection, and transport (National Centre for Disease Control, 2020). Additionally, care services for children and adolescents were also addressed (Ministry of Health & Family Welfare, 2021c). The initial 21-day national lockdown was announced with a short lead time, which presented logistical challenges, especially in implementing mitigation measures for vulnerable groups. This situation highlighted the need for robust and proactive communications planning in times of crisis (Abraham T, 2020). The government's engagement with the Supreme Court to ensure responsible media reporting during the pandemic reflects an effort to balance public information needs with the necessity of accurate and verified news dissemination, which is a vital aspect of media strategy in crisis situations (Mehra C, 2020).

Several states and districts effectively leveraged community mobilisation, decentralisation, and institutional reform in mounting their response. For instance, in Mumbai, the Brihanmumbai Municipal Corporation (BMC) delegated powers to the municipal commissioner to make COVID-19-related decisions, which facilitated swift and decisive action. The creation of a live dashboard for tracking hospital beds, ICU availability, and oxygen cylinders by BMC is an example of effective resource management and care provision (Mariwala V & Shah K, 2021). These instances highlight the contribution that empowered local authorities can make to crisis response.

In response to the devastating second wave in May 2021, the system demonstrated capacity for learning and course correction. The Indian Council of Medical Research developed a web-based modeling simulator to aid health officials and policymakers in tracking trends and preparing for potential third-wave scenarios (Press Trust of India, 2022). States began expanding their health infrastructure to address shortages of essential equipment, drugs, and ICU beds. Special initiatives, like the formation of a pediatric task force in Delhi and the establishment of extra beds for children in states like Jharkhand and Maharashtra, were implemented in anticipation of increased vulnerabilities among children (Krishnan M, 2021).

Policy changes are also being planned to improve the resilience of India's health system. The Fast Track COVID-19 Response Programme is a global initiative to help countries, particularly developing ones, support health systems and emergency response capacity (World Bank, 2020). As part of this

initiative, the World Bank's India COVID-19 Emergency Response and Health Systems Preparedness Project is a four-year project aimed at strengthening national systems for public health preparedness (Ministry of Health & Family Welfare (2020b). This includes initiatives such as revamping hospitals for airborne infection control, upgrading laboratory testing systems, assessing and upgrading national protocols and surveillance systems for health infections and strengthening public structures, including the Ministry of Health & Family Welfare and states, for financial management and monitoring and evaluation (World Bank, 2020b).

Key findings

- Governance structures in healthcare differ widely, particularly in urban health, regarding roles, responsibilities and local-level decision-making power.

- Gaps in health infrastructure and capacity of frontline/healthcare workers affect governance practices and capacity.

- Limited transparency and data sharing remain a barrier to healthcare integration and effective tracking of cases in infectious disease outbreaks.

- Public healthcare and insurance models require streamlining and better integration.

- Given that the centre's role in funding and programming is expected to expand, there is an option to shift health to the Concurrent List.

Recommendations

RECOMMENDATION 1A
Given the nature of India's population health governance systems and processes, a multifaceted and multilevel governance response is required to advance its resilience and sustainability. Priority should be given to strengthening mechanisms for communication and coordination between the Central Government on the one hand and state and other local self-government arrangements on the other. Doing so would maximise the efficiency with which health-related decisions are made and policies implemented. It would also make for a more inclusive health landscape in the country.

RECOMMENDATION 1B
Enhancing public health capacity is needeed to accommodate resource needs during times of stability as well as during and after crisis. Increasing investment and expenditure on public health is necessary to achieve the above and to build a sustainable health system.

RECOMMENDATION 1C
Establish a typology of cities in terms of different urban health governance structures to enhance clarity and consistency in the governance of the health system, given the immense diversity of urban health service delivery systems.

RECOMMENDATION 1F
Through consultations with state governments and other stakeholders, a national consensus on shifting health to the Concurrent List should be reached.

RECOMMENDATION 1G
Harmonisation and integration of major government initiatives with similar or overlapping objectives should be considered to reduce complexity and duplication and enhance effectiveness.

Financing

Over the last two decades, India's health outcome indicators have shown gradual but consistent improvement. The last decade also saw a rapid and healthy movement away from out-of-pocket health spending. While the COVID-19 pandemic pushed health policy to the forefront of public policy, it has historically been a relatively neglected area of state intervention. There is an acknowledgment that the United Nations Sustainable Development Goals – to which healthcare is fundamental – cannot be achieved if India fails to meet them (Kurian OC, 2021). The current ruling dispensation has been able to put healthcare at the heart of central- and state-level politics. At the same time, India's healthcare challenges are rapidly changing.

Financing for health system sustainability

The proportion of elderly in the Indian population is increasing rapidly. In 2011, 8.6% of the population was above 60 years of age, by 2021, it was estimated this had risen to 10.1%, and it is expected to surpass 13.1% by 2031. In real terms, this is an increase of nearly 34 million older people between 2011 and 2021 (Ministry of Statistics and Programme Implementation, 2021). The ongoing demographic, nutritional and epidemiological transitions in India are putting immense pressure on subnational health systems to reorient towards the changing needs at the population level (Kurian OC & Suri S, 2019). Research in 2022 showed that as much as 91% of India's workforce, 475 million people, lack social insurance (health being an exception here, with a large health assurance scheme covering the low-income population, explored as a separate case study in this report) as they work in informal settings (Mehrotra SK, 2022). The degree of informality has not changed greatly over the last decade and India is considered an outlier among lower-middle income countries, with 85% of non-agricultural labour being informal (Mehrotra SK, 2019).

The transitions outlined above provide the context of the rapid changes in the healthcare delivery system, as the last two decades of financing data demonstrate. When the National Health Policy 2017 set a target of reaching 2.5% of GDP in government expenditure on health by 2025, most analysts considered that it was highly ambitious. In 2021, India still appeared to be far from achieving the target (see Figure 7) despite the global COVID-19 pandemic resulting in increased Central Government spending.

Figure 7: India's path to government spending of 2.5% GDP on health
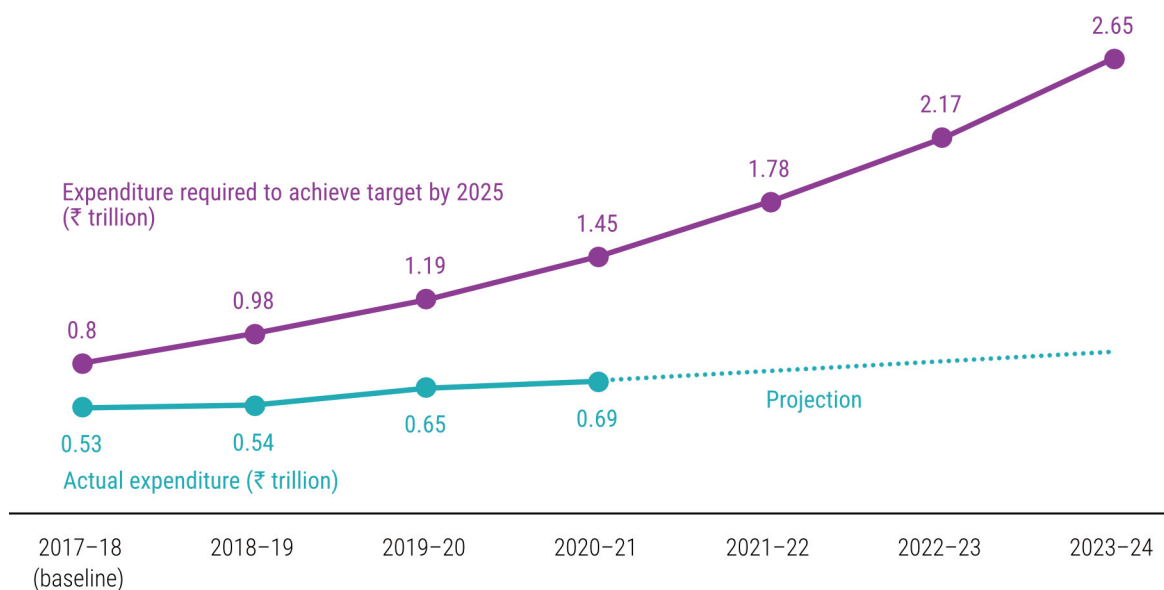
Source: Kurian OC, 2021.

The past decade has shown a substantial reduction in the proportion of out-of-pocket spending in overall health spending (Table 6). Total health spending as a percentage of GDP has decreased, but the change in the composition has been dramatic, with a sharp decline of out-of-pocket spending from almost 70% in 2004/05 to 47.1% in 2019/20, the latest year for which central and state spending data are available. The distributional impact of the decline is understudied, partly because the most recent national household survey available that allows such analysis is for 2017/18, before the Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB-PMJAY) health insurance scheme was launched. Another interesting trend is the movement away from donor funding.

Table 6: Health financing in India in the 21st-century: a look at available National Health Accounts rounds

	2013–14	2014–15	2015–16	2016–17	2017–18	2018–19	2019–20
Total Health Expenditure (THE)							
as percentage of GDP	4.0	3.9	3.8	3.8	3.3	3.2	3.3
per capita (₹) at current prices	3,638	3,826	4,116	4,381	4,297	4,470	4,863
per capita (₹) at constant prices	3,174	3,231	3,405	3,503	3,333	3,314	3,516
Expenditures as percentage of THE							
Current health expenditure	93.0	93.4	93.7	92.8	88.5	90.6	90.5
Government health expenditure	28.6	29.0	30.6	32.4	40.8	40.6	41.4
Out-of-pocket expenditure	64.2	62.6	60.6	58.7	48.8	48.2	47.1
Social Security expenditure on health	6.0	5.7	6.3	7.3	9.0	9.6	9.3
Private Health Insurance expenditure	3.4	3.7	4.2	4.7	5.8	6.6	7.0
External/donor funding for health (as percentage of THE)	0.3	0.7	0.7	0.6	0.5	0.4	0.5

Source: National Health Systems Resource Centre, 2023.

Despite a rapid increase in the proportion of government health spending, private out-of-pocket spending remains the single highest component of India's total spending on health. Curative healthcare is provided predominantly by the private healthcare sector. Healthcare is constitutionally the primary responsibility of the states and the efforts towards tax devolution are expected to trigger large increases in funds for health at the state level. However, fiscal devolution from about 32% of overall tax funds during the 13th Finance Commission award period (2010–2014) to 42% during the 14th Finance Commission award period (2015–2019) does not appear to have translated into higher healthcare spending by state governments (Selvaraj S et al., 2022). Overall, just over one-third of overall government health expenditure comes from the centre and the rest comes from the states.

Despite the financing gaps brought into focus by the pandemic, limitations in funding remain a key concern. The health sector evaluation report by the Government of India's Development Monitoring and Evaluation Office in 2021 found that the allocation by the Central Government amounted only to 55.47% of projected demand, leading to possible difficulties in upscaling various schemes and projects. It also observed that 7% of the Indian population falls below the poverty line due to indebtedness related to health expenses (NITI Aayog, 2021). Earlier, limitations in funding were amplified by the limitations in capacity to utilise the funds that were available. However, a recent

analysis shows that public health facilities have improved their ability to absorb additional funding, although inter-state variation remains (Selvaraj S et al., 2022).

Approximately 2% of Indians pay income tax. There is a range of reasons for this, such as a large share of informal sector employment, lower income for a majority of informal sector workers and the agricultural sector exemption from income tax (Selvaraj S et al.,). These factors limit the scope for progressive sources for government spending in health. However, as the economy is steadily growing, it is expected that allocations to the health sector will substantially improve in the future, further pushing down out-of-pocket spending and the proportion of citizens who fall below the poverty line due to healthcare payments. Selvaraj et al. (2022) found that between 2001/02 and 2019/20, India recorded a twelvefold rise in nominal (total of direct and indirect) tax revenues. In parallel, the tax to GDP ratio during 2019/20 improved to 19% from 14% in 2000/01 and, given the substantially higher national income, this improved the fiscal space for social sectors (Selvaraj S et al., 2022).

As expected, the 2022 budget announced an increase of 35.4% in capital expenditure, from ₹5.54 trillion in 2021 to ₹7.50 trillion. Despite this increase, the health sector was given a low priority and receives only ₹56.38 billion, or 0.75% of the overall capital expenditure (see Table 7).

Despite low levels of funding, through key public sector-led universal initiatives such as childhood vaccination, India has been able to overcome caste inequality in child immunisation access, which

**Table 7: Capital expenditure in 2022 budget**

	₹ billion	% of overall capital expenditure budget
Road transport and highways	1,877.44	25.07
Defence	1,604.19	21.33
Communications	1,371.00	18.27
Railways	550.39	7.34
Housing and urban affairs	273.41	3.64
Space	74.65	0.99
Health	56.38	0.75

Source: Kurian OC, 2022

has been a historical problem (Ministry of Health & Family Welfare, 2022a). Community workers, including the large army of the Accredited Social Health Activists (ASHAs), played a key role in the success and their varied roles in the pandemic are widely acknowledged (Bettampadi D et al., 2019; Rahul P et al., 2021).

Percentages of current health expenditures attributed to primary, secondary and tertiary care in 2013/14 and 2019/20 are shown in Figure 8, along with these expenditures disaggregated into government expenditure and private expenditure. Over the period, there has been a shift in the proportion of government expenditure towards primary and secondary care, with a similar change in proportion of private expenditure on tertiary care.

Figure 8: Current health expenditures for 2013/14 and 2019/20 (percentages)
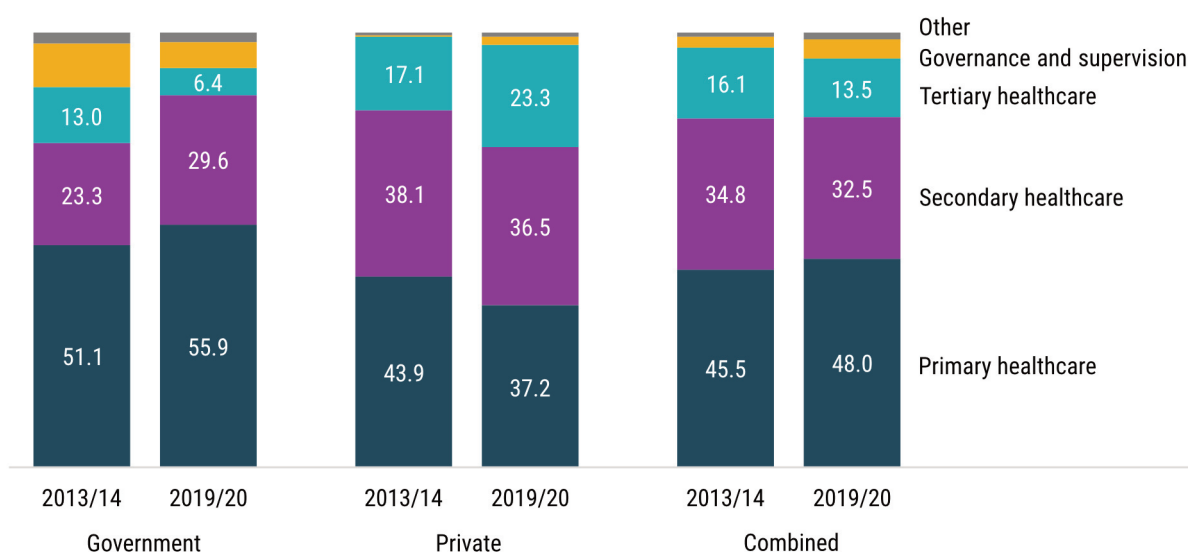
Sources: National Health Systems Resource Centre, 2023; National Health Systems Resource Centre, 2016.

The rate of catastrophic healthcare expenditure remains high in the country. A 2021 study based on a nationally representative sample of 56,722 households for in-patient care, 29,580 households for out-patient care and 6,285 households for both (out- and in-patient care) found that 41.4% and 24.6% of the households faced catastrophic expenditure for in-patient care at the 10% and 20% thresholds, respectively (Yadav J et al. 2021).

Given this context, India's government health insurance scheme Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB-PMJAY), which aims to cover a billion people with the help of top-up coverage offered by the states, seeks to leverage the large network of private providers and catalyse a shift towards value-based care. A policy document published in 2022 by the National Health Authority argues in favour of a system in which payment will be outcome-based and providers will be rewarded according to the quality of the treatment delivered (National Health Authority, 2022). The Government of India has also tried to use the rollout of AB-PMJAY to incentivise regulation in the healthcare sector by offering enhanced rates to hospitals that are accredited under the National Accreditation Board for Hospitals & Healthcare Providers (Chikermane G & Kurian OC (2018). In parallel to AB-PMJAY, the Ayushman Bharat Health and Wellness Centres (AB-HWCs) offer enhanced primary level care to the population and played a major role in India's pandemic response (Sarin E et al., 2021), the details of AB-PMJAY are explored in a case study in the report.

Financing for health system resilience

Public health and disaster risk management in India involve multiple ministries that respond to natural disasters under the terms of the Disaster Management Act (DMA) 2005. The National Disaster Management Authority was formed in 2005 under the Ministry of Home Affairs to manage economic, environmental and developmental issues relating to disasters. At the district level, the efforts are coordinated by the District Magistrate's office (Krishnan S & Patnaik I, 2020). Under the provisions of the DMA, 11 Empowered Groups were formed in early 2020 for fast tracking informed decision-making for COVID-19 management (Government of India, 2022).

A health system with chronic shortages of infrastructure, medicines and human resources could not be expected to have surge capacity, other than in certain urban pockets. However, large amounts of

money were released as contingency funding to scale up healthcare facilities, including for testing and the hugely successful vaccination drive. During 2020/21, ₹82.58 billion funding was released by the Central Government to the states and union territories as part of the India COVID-19 Emergency Response and Health System Preparedness Package. An additional India COVID-19 Emergency Response and Health System Preparedness Package: Phase-II, consisting of ₹231.23 billion, was also approved. With the aim of developing long-term capacities in preparedness for future surges of COVID-19 and other public health emergencies, the Ayushman Bharat Health Infrastructure Mission (PM-ABHIM) has been launched with an outlay of ₹641.80 billion over the next six years (Government of India, 2022).

The Department of Health Research, part of the Ministry of Health and Family Welfare, has created an institutional arrangement called Health Technology Assessment in India (HTAIn) to facilitate transparent, accountable and evidence-informed decision-making in the sector. HTAIn consists of a technical appraisal committee, regional hubs and the HTA Board, whose everyday functioning is coordinated by a secretariat. An early application of the HTA process in India was the price capping of drug-eluting cardiac stents in February 2017 (Dang A et al., 2021). HTAIn has carried out several HTA studies in fields such as such as cataract surgeries, cervical cancer screening, long-acting reversible contraceptives and breast cancer screening, to inform decision-making, including in large insurance schemes (Dang A et al., 2021).

According to research by the International Monetary Fund, in the early stages of the pandemic response, the Government of India's expenditure measures focused primarily on healthcare and social protection. This included in-kind transfers (food, cooking gas) and cash transfers to lower-income households (1.2% of GDP); wage support and employment provision to low-paid workers (0.5% of GDP); insurance coverage for workers in the healthcare sector; and healthcare infrastructure (0.1% of GDP) (International Monetary Fund, 2022). With regular consultations with the states, the Joint Monitoring Group, under the chairmanship of the Director General of Health Services, and the National Task Force on COVID-19, under the Indian Council of Medical Research, assessed the risk and reviewed the preparedness and response mechanisms. These processes informed the financial decision-making (Government of India, 2022).

The pandemic brought to the fore the need for prior surge planning within the health system – essential for health facilities to adequately equip staff and infrastructure for an effective response against such shocks. A 2022 study, based on a national survey of 954 hospitals, developed a hospital preparedness index (HOSPI) to gauge preparedness of hospitals in India to deal with the COVID-19 pandemic. Its aim was to help healthcare facilities and policy-makers identify areas that needed improvement and take the necessary corrective actions. It found that Goa, Maharashtra and Tamil Nadu were relatively more prepared to effectively respond to such pandemics (Duggal B et al., 2022). It is expected that future streamlining of resource utilisation, including trained human resources and infrastructure, will be informed by such efforts. It must be noted that the top three states have performed well within the National Health Mission (NHM) in terms of enhancing public healthcare infrastructure. The lack of enhanced funding to NHM remains a major cause for concern (Selvaraj S et al., 2022), despite initiatives like PM-ABHIM.

The last decade has seen unprecedented growth in the healthcare industry, which has been growing at a compound annual growth rate of approximately 22% since 2016 (Rakesh S et al., 2021). Since there is a need for funds within the health sector, there are ongoing efforts to leverage private sector resources as well. Given the weaknesses of the Indian health system, the Government of India's think tank has suggested that solutions such as blended finance, the strategic use of public and philanthropic resources to mobilise private capital to achieve clearly defined outcomes, may be useful to address healthcare challenges. A 2022 White Paper identified areas such as vaccine supply and delivery systems, healthcare infrastructure, diagnostic products and services, medical devices, training and capacity building, information, education and communication for behaviour change and oxygen supply as potential areas where blended finance could make a difference (NITI Aayog, 2022).

Whilst progress has been made in recent years, health financing remains a significant challenge in need of continued focus from policymakers. Demographic, nutritional and epidemiological changes, particularly with the increase in the older population in India, are putting immense pressure on subnational health systems to reorient and respond to the changing needs of the population. Despite efforts to increase government expenditure in health, private out-of-pocket spending remains the single highest component of total health spending. However, as a steadily growing economy, India's allocations to the health sector are expected to further improve in the future, reducing out-of-pocket spending and the proportion of citizens who fall below the poverty line due to healthcare payments.

Key findings

- Underutilisation of funds in the health sector is no longer as significant a problem as it used to be in most states. However, low utilisation remains a problem in certain states and absorption capacity is limited by gaps in focused investments and human resource gaps, and delays in disbursals.

- There is evidence of universal access reducing health inequity, even within a larger context of low healthcare spending. For example, caste inequality in child immunisation access has almost disappeared.

- Despite a stated objective of taking public health expenditure to 2.5% of GDP by 2025, it has remained within the narrow band of 1.02–1.35% of GDP for most of the past decade.

- Out-of-pocket expenditure in health has come down significantly in the last decade, after a reversal between 2011 and 2013. However, at 47.1% (2019/20), it remains high.

- National Health Mission funding has not expanded at the required pace. Even where the required infrastructure exists, trained human resources have proven to be a binding constraint within the health system.

Recommendations

RECOMMENDATION 2A
Despite recent improvements, there is a need to further reduce out-of-pocket spending on health from the current high levels through continued ambitious expansion of public financing.

RECOMMENDATION 2B
In the short and medium run, most Indians should be protected under a single risk pool, requiring existing programmes to be expanded, streamlined and consolidated.

RECOMMENDATION 2C
An enhanced approach to resource allocation is needed in order for public expenditure as a percentage of GDP to meet the 2.5% target.

RECOMMENDATION 2D
India must find resources to ensure regular and reasonable salaries for community health workers, who are pillars of local level health resilience and play a key role given the weak delivery capacity at the grassroots.

RECOMMENDATION 2E

With focused investments to address staff and infrastructure gaps, Health and Wellness Centres can play an enhanced role as first points of contact and hubs for any surge capacity requirements in moments of crisis

RECOMMENDATION 2F

As a counterbalance against cost escalation in health insurance affecting sustainability, public health facilities in states with weak government capacity should be expanded with focused investments in infrastructure and health workforce.

Workforce

A sustainable and resilient workforce requires not only sufficient numbers of staff, but an appropriate skill mix, long-term retention and satisfaction, geographical spread, accessibility to populations and more. The benefits of a dense and well-distributed workforce have been noted across countries in terms of better health outcomes, fewer COVID-19 deaths and positive economic growth (Liu J & Eggleston K, 2022). In India, health is a state subject, affecting the implementation of health initiatives variedly across states and rural–urban settings. Although the National Health Mission (NHM) provides technical and advisory support from the centre to the states, the responsibility for maintaining a robust health workforce and support staff lies with the state actors. The health workforce is struggling with an acute shortage of skilled staff, both general and specialists, at all levels of services and across states.

In 2015, the healthcare industry was India's fifth largest sector, employing more than 4.7 million people directly and creating at least new 500,000 jobs annually (Sarwal R et al., 2021). The workforce cadre in health can be broadly categorised into doctors of modern medicine, ayurveda, yoga and naturopathy; unani, siddha and homeopathy (AYUSH) doctors[1]; dentists; nurses, auxiliary nurses and midwives; pharmacists; accredited social health activist (ASHA) workers, community health workers, registered medical practitioners and traditional healers. Table 8 shows India's workforce statistics across World Health Organization categories.

Table 8: Key workforce statistics

	Year	Density (per 10,000 population)
Medical doctors	2020	7.27
Pharmacists	2020	8.60
Nursing personnel	2020	17.28
Dentists	2020	1.60
Psychologists	2020	0.03
Community health workers	2020	7.86
Traditional and complementary medicine professionals	2020	4.05
Midwifery personnel	2017	6.02

Source: World Health Organization, National Health Workforce Accounts Data Portal, website.

Workforce for health system sustainability

While recognised professional councils exist for allopathic doctors, AYUSH doctors, dentists, pharmacists and nurses, the numbers recorded are likely an overestimation as there is no provision to discount those who are no longer in practice. Furthermore, a substantial portion of the workforce remains unregulated and unlicensed, making it difficult to estimate on-ground numbers and record their qualifications. Several types of technically unqualified practitioners, such as local pharmacists, traditional healers and assistants to doctors, fill the gaps between the community and primary care. The National Sample Survey (NSS) estimated the size of the health workforce to be about 3.8 million

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[1] Traditional healers, unlike AYUSH Doctors, do not undergo any formal medical training but enjoy community trust in prescribing ayurvedic medicine.

in January 2016, this turned out to be about 1.2 million less than what was registered in documents. Furthermore, about 25% did not meet the prescribed qualifications to practice and 20% were not currently practising (Karan A at al., 2018). As a result, there is a significant gap between registered and self-reported medical practitioners recorded through the NSS and Census surveys (Rao KD, 2014).

Undoubtedly, the human resources in health have expanded in the past two decades; nevertheless, they have not kept pace with the changing population needs or the rapid growth in new health facilities. Table 9 shows the increases in various categories of health care workers over the seven years from 2013/14 to 2020/21.

Table 9: Increases in health workforce from 2013/14 to 2020/21

	Year 2013/14 (at 31 March 2014)	Year 2020/21 (at 31 March 2021)	Percentage growth 2013/14 to 2020/21
Female health workers and auxiliary nurses at SCs & PHCs	217,780	235,757	8.3%
Doctors at PHCs	27,335	38,525	40.9%
Total specialists at CHCs	4,091	5,760	40.8%
Radiographers at CHCs	2,189	2,746	25.4%
Pharmacists at PHCs & CHCs	22,689	33,857	49.2%
Laboratory technicians at PHCs & CHCs	16,679	27,733	66.3%
Nursing staff at PHCs & CHCs	63,938	94,007	47.0%

Note: SC = Sub-Centre, PHC = Primary Health Centre, CHC = Community Health Centre.

Source: Ministry of Health & Family Welfare, 2022b.

Alongside increases in workforce numbers, there is more focus and public investment needed in scaling of competencies in innovative technologies, quality education, policy and biostatistics/informatics. In addition, despite the massive pool of applicants for medical training places every year, the highly competitive and sought-after profession remains deficient in numbers. In 2021, there were 1.6 million applicants for about 89,800 medical and surgery undergraduate places (Ministry of Health & Family Welfare, 2022c). While the top-grade candidates enter the top government institutes in the country, mid-grade candidates who cannot afford the high tuition fees for private colleges, often opt to study abroad. The difference in the fees between public and private colleges is ₹1 million or more. This is a significant factor that drives students to countries like China, Ukraine, Russia, the Philippines and others in eastern European countries where education is not only comparatively cheaper but also less competitive (Deol T, 2022).

In 2020, the National Commission for Allied and Healthcare Professionals Bill was introduced to regulate, formalise and systematise the education and practice of allied healthcare professionals (AHP), such as laboratory technicians, radiologists, physiotherapists, health informatics, etc. It sets up professional councils for 53 AHP categories under a National Commission that functions at both the national and subnational levels. This previously only existed for dentists, doctors, pharmacists and nurses. However, these 53 profiles have no standard educational curricula, types or hours of training or recognition granted to these degrees. There are also significant discrepancies in

nomenclature, records, degrees awarded and governing bodies (Department Related Parliamentary Standing Committee on Health & Family Welfare, 2020). Although policy makers realise the tremendous value AHPs add to patient care and service delivery in modern medicine, this Bill is the first to reach a wide consensus.

A key challenge to the sustainability of the workforce in India is the uneven distribution of medical and nursing staff and training colleges, with some states having too many while others have too few. Therefore, there are unnecessary surpluses of crucial human resources in some regions, while others suffer from a deficit. There is also geographical diversity in the mix of skills, resulting in a variation in the competence levels the workforce at subnational level. The deficit in nursing staff is stark, with projections that, by 2024, there will be a national shortage between 1.5 and 2.4 million (ECERIH, 2019). The Empowered Action Group (EAG) states, such as Bihar and Uttar Pradesh, have the country's highest deficit of medical training places for both doctors and nurses. These two states alone will need almost 24,000 new medical places to reach replacement level. The resources in the private sector are also located disproportionately into urban areas, with 48% of the 13,413 recognised private hospitals in the country concentrated into just eight metro cities serving five million people. Table 10 shows the vacancies and deficits in the current healthcare workforce.

Table 10: Shortfall and vacancies at the primary and secondary levels of healthcare, 2020/21

	Shortfall		Vacancy		Requirement
	Rural centres	Urban centres	Rural centres	Urban centres	
Primary-level care					
Female health workers and auxiliary nurses	2.9%	30.8%	21.1%	20.61%	One per SC and PHC
Male health workers	66.1%		41.9%		
Doctors	4.3%	9.87%	21.8%	18.59%	One per PHC
Health assistants (male and female)	72.2%				
Pharmacists	23.43%	23.35%	24.34%	19.77%	One per PHC and CHC
Community-level care					
Specialists (surgeons, obstetricians/gynaecologists, physicians, paediatricians)	79.91%	33.83%	67.96%	39.75%	Four specialists per CHC

Source: Ministry of Health & Family Welfare, 2022d.

These vacancies are alleviated through use of resources from the private sector, where skill sets remain largely unaccredited. However, in states where the deficit in the public sector is most acute, the private sector is also deficient (ECERIH, 2019), so the private sector in unable to supplement in these states. Task-shifting is a widespread alternative used to fill critical gaps, especially at primary/community levels, and is practiced across traditional–modern medicine professionals. ASHAs are a prime example. Cross-practice between allopathic medicine and AYUSH doctors has been well-documented and is a well-known point of contention and conflict due to the complex,

unregulated nature, uncertain quality of the latter and the high cost of mistakes. Studies on task-shifting in the palliative care and community mental health models in Kerala reveal the damaging effects of the unregulated prescription of drugs and psychosocial misinterpretations by volunteers, resulting in unanticipated consequences (Kottai S & Ranganathan S, 2020). Government-sponsored pilot programmes in task-shifting were launched in Assam, Chattisgarh and Gujarat at secondary care centres to provide obstetric, surgical care in under-served areas in the early 2000s. However, they were discontinued due to a lack of adequate stakeholder consensus, logistical problems and poor incentives for specialists (Balsari S et al., 2017). Although there have been some successes, such as in maternal health and pregnancy care coverage (Bhushan H & Bhardwaj A, 2015), there is a need for careful planning for rigorous skill training, quality monitoring and formal task-shifting.

The Human Resources and Infrastructure for Health Sector in India Report (2021) by the Expert Committee on Enhancing Resource Investment in Health (ECERIH) suggests that the country will need 77 to 80 health workers per 10,000 population for coverage of 80% of the population with essential health services. Of this, 45 would constitute core professionals comprising doctors and nurses. This is higher than WHO's 2016 estimate of 44.5, which included doctors, nurses and midwives to cover 80% of essential services.

To address the regional imbalances in affordable tertiary healthcare in terms availability of specialists and the ratio of medical doctors to other healthcare professionals, the Government rolled-out dedicated schemes. Most prominent were the Pradhan Mantri Swasthya Suraksha Yojana (PMSSY) launched in 2006, and the Centrally Sponsored Scheme for 'Establishment of new medical colleges attached with existing district/referral hospitals' in 2014. Under these, the Central and State Governments prioritised under-served districts for the establishment of new medical institutes and upgrade of existing district/referral (tertiary) hospitals in a phased manner. These efforts had a significant impact: by early- to mid-2022, there were 660 medical training colleges, a 71% increase since 2014 (Ministry of Health & Family Welfare, 2022e). Data also shows that, over the same period, MBBS (undergraduate medical degree) and PG (postgraduate medical degree) places rose by 97% (101,043) and 101% (65,335) respectively, with a growing 42% market share held by private colleges (National Medical Commission, website).

Despite a comparable performance with other countries in the South Asian and Southeast Asian countries, for most occupational categories, the number of nursing and medical doctors is lagging behind (Table 11). Furthermore, traditional medicine has a greater presence in India than in other countries in the region.

The outflow of medical personnel from India is a matter of serious concern, especially as the shortage was gravely felt during the pandemic. India is among the world's leading exporters of professional physicians, nurses and allied professionals. According to WHO studies on workforce migration, India is the top country of origin for medical doctors in Australia, the UK, the US, Canada and several other Organisation for Economic Cooperation and Development (OECD) nations (World Health Organization, 2014). These migrations have been largely temporary, but the permanent general skilled migration of specialists is particularly worrisome.

Among medical students, returning can be a more challenging option than remaining to practise in the same country where they studied or choosing a different career option. As Indian regulations require students returning from countries like China, Ukraine, Philippines, Bangladesh and Nepal to take the Foreign Medical Graduates Exam. The data indicate that fewer than 21% of these candidates pass the test (Sharma K & Ghosh A, 2022). However, graduates from the US, the UK, Canada and New Zealand are exempt.

As a developing economy, India faces a dual challenge of creating English-speaking, highly-trained nurses for global supply as well as fulfilling local vacancies (Hawkes M at al., 2009). Countries in the Middle East, such as Saudi Arabia and Oman, are also some of the most significant receivers of Indian nurses and midwives. This growth has been attributed to the fast-growing number of BSc

Table 11: Density (per 10,000 population) of South Asian and Southeast Asian countries, latest available years

	Community health workers	Dentists	Medical doctors	Midwifery personnel	Nursing personnel	Pharmacists	Traditional & complementary medicine professionals
Afghanistan	7.59	0.69	2.54	1.31	2.95	0.28	NA
Bangladesh	8.78	0.68	6.70	1.58	4.55	1.01	0.29
Bhutan	14.79	0.96	5.59	2.38	22.10	0.63	2.69
India	7.86	1.60	7.27	6.02	17.28	8.60	4.05
Indonesia	1.47	1.24	6.95	2.22	8.94	3.11	0.00
Malaysia	NA	2.93	22.28	6.39	33.53	3.17	3.68
Maldives	4.35	0.99	21.19	4.94	48.97	6.84	0.02
Nepal	17.06	1.36	8.67	12.14	22.75	1.71	0.28
Philippines	21.83	2.49	7.86	5.75	41.80	4.70	NA
Sri Lanka	NA	1.05	11.92	4.14	20.25	1.06	1.24
Thailand	5.59	2.55	9.28	0.96	30.71	6.15	0.30

Source: World Health Organization, National Health Workforce Accounts Data Portal, website.

Nursing courses – predominantly led and financed by the private sector (Buchan J et al.,2022) – with almost 87% of all colleges that offer allied nursing courses being owned by private entities (Indian Nursing Council, 2021).

The increasing migration of nurses to overseas opportunities has been influenced by a variety of factors. Historically, nursing professionals have sought improved conditions and prospects, including more balanced work-life situations and better remuneration, which are often more readily available abroad. Nurses' pay in India is generally low by international standards, and they are often employed by temporary contracts, with limited long-term job security and employment benefits. Additionally, there are contrasts in the working environments between nurses and doctors, with nurses experiencing less favorable conditions (Nagarajan R, 2019). On the positive side, those nurses who have worked abroad often report a significant enhancement in their socioeconomic status upon their return, particularly among female health workers (Bourgeault IL et al., 2021). This trend reflects the complex interplay of professional aspirations, economic opportunities, and personal development within the global healthcare sector.

Addressing long-standing challenges in the nursing sector, the Indian government introduced the National Nursing and Midwifery Commission (NNMC) Act of 2023. This major piece of legislation updates the Indian Nursing Council with a contemporary regulatory framework to improve nursing education and practice standards. The Act establishes National and State-level Commissions for overseeing standards and professional conduct, with fixed tenures for members to ensure accountability and impartiality.

The NNMC Act focuses on standardising admission processes in nursing institutions and upholding high professional competence, leveraging advanced technology and industry collaboration for better

education and research. It also prioritises soft skill development and specialized courses for nursing professionals. To enhance the global standing and skills of Indian nurses, the Act facilitates international expert involvement and forms a National Advisory Council for comprehensive guidance in nursing and midwifery. Whilst the reform is too recent to evaluate its impact, it demonstrates a clear intent to develop a more skilled, globally competitive nursing workforce and address the brain drain issue in this essential sector.

Workforce for health system resilience

A rapidly expanding private sector offers both better pay and advanced skills training, especially in hard to reach and remote areas. With the pandemic, monetary benefits were highlighted as a key aspect effecting retention considering the risk to life that was involved. But while the private sector was able to keep up with the compensation demands, public sector compensation, which is often inadequate given average living costs, struggled to inspire long-lasting commitment to work.

During the challenging period of the pandemic and subsequent lockdowns, there were delays in the disbursement of salaries for healthcare workers in the government sector, and additional incentives were introduced as the situation progressed (Jacob N et al., 2020; Purohit J, 2021). Prior to the pandemic, it was observed by urban health experts that in some metropolitan areas, the salaries for healthcare workers sometimes struggled to meet the cost of living. Across different states, the remuneration for ASHA workers during the pandemic varied, with reports indicating compensation was low, at around ₹1,000 for their frontline contributions (Rao B, 2020). These financial challenges likely contributed to some healthcare workers leaving the workforce during the crisis (Mathew J, 2021; Wallen J, 2020).

The widespread decline in the mental health of the population also affected India's workforce. Studies conducted among nurses and medical health workers in August 2020 revealed that stress from COVID-19 resulted in moderate-to-severe levels of burn-out and physical and emotional exhaustion (Jose S et al., (2020). Certain specialists, such as pulmonologists, cardiovascular experts and physicians, were especially effected due to the nature of the virus. Medical residents and associate doctors were also reported to be underprioritised and overburdened with COVID-19 care in addition to their regular duties (Sambodhi and Japan International Cooperation Agency, 2021). Key factors affecting the workforce were excessive workload, poor adherence to safety standards, resource-constrained settings and limited infection control safety training, in some cases even before the pandemic (Behera D et al., 2020). The imbalances in the skill-mix in the workforce further affected emergency care during the crisis.

In response to a question raised in the Lower House of the Indian Parliament, the Health Minister described their strategy going forwards from the pandemic as targeting financing to expand the workforce. This included increasing the number of medical college places, optimising the number of generalists and specialists, motivating doctors to work in remote/rural under-serviced areas, awarding performance-based incentives, providing necessary housing and transport facilities and more.

The government undertook an array of initiatives to protect healthcare staff during the pandemic. These included: Epidemic Diseases (Amendment) Act, passed in September 2020, which made violence against healthcare staff a recognisable and non-bailable offence, punishable by heavy fines and imprisonment (Ministry of Health & Family Welfare, 2021c); the Pradhan Mantri Garib Kalyan Package, launched in March 2020, ensures life insurance of ₹5 million (US$63,401) for COVID-19 or accidental death in COVID-related service. By April 2022, 1,905 beneficiaries had received settlements under this scheme (Ministry of Health & Family Welfare, 2022f).

Despite these general efforts, the on-the-ground realities and safety of workers remained bleak, as occupational safety continued to be compromised. During COVID-19, nurses reported that the distribution of medical equipment, such as PPE kits and N95 masks, was carried out according to

medical hierarchy instead of job needs. Nurses' involvement in strategy and policy remained negligible. There were even cases of several healthcare workers involved in frontline duties, especially females, being cast out from their homes and communities for fear of spreading the virus (Llop-Girones A et al., 2021).

To address workforce shortages and imbalanced skill mix in the long term, Indian experts have urged the government to upgrade experienced nurses or ayurveda practitioners to Mid-level Healthcare Providers through courses in population health to staff the Health and Wellness Centres (HWCs) mandated by the Ayushman Bharat. Although this might provide interim solutions for generalists, the shortage of specialist doctors will require more consideration. With the expansion of AB-PMJAY's state-funded health insurance schemes, service users are shifting towards the private sector. However, this broader trend is not encouraging new private investment into under-served areas. It is only transferring activity to the private sector while demotivating expansion of public sector capacity (ECERIH, 2019).

Therefore, poor compensation, deep public–private sector differences, a poor skills mix, burn-out and dissatisfaction from work are all leading to an unsustainable workforce. These problems are not only affecting service delivery but may also undermine decades of improvements in key health indicators. It is imperative to devise strategies that prioritise employee well-being instead of mere expansion. There is an urgent need to focus policy on retaining the current workforce and work towards ensuring emotional, physical and economic satisfaction. In addition, there is a dire need for upskilling and skill mixing to ensure workers can be flexibly deployed during crises. Personnel planning will require more deliberate efforts in shifting tasks, developing uniform skills, expanding and reintegrating the workforce. The growth of medical education and training places, while steady, has been extremely slow, and would be improved by capping private college fees to attract students. Initiatives should be directed at engaging with medical students to stay and serve in the country or incentivise returning.

The global pursuit of SDG 3 – Good Health and Well-being – is shouldered by a massive workforce that ensures last-mile delivery of health services. Investing in the human element of resources is today more critical than ever.

Key findings

- A massive community-level health workforce, comprising auxiliary nurses and midwives, Anganwadi workers and ASHAs, was extremely useful during the COVID-19 pandemic for contact-tracing, vaccinations, etc.

- Public investment in the health system has improved over the years, increasing funding, medical college places etc. However, the scaling of competencies in quality education, policy, biostatistics and use of technology, among others, is needed.

- The National Nursing and Midwifery Commission Act (2023) introduces a modernised regulatory structure for the nursing and midwifery workforce, aiming to enhance innovation, collaboration, and skills development in the nursing sector.

- Task-shifting is widespread at community/primary levels and across traditional–modern medicine practitioners. An overarching regulatory framework is required to guide the process.

- A skewed skill mix varies across states in the country, with a continued popularity of informal/unqualified medical providers.

- A high attrition rate is fuelled by poor pay, burnout, gaps in retention policy, a desire for a better work–life balance and work safety abroad (out-migration) and difficult integration of returning workforce.

- Staff shortages exist across general and specialised faculties, rural–tribal–urban areas, geographies and national regions. This poses significant concerns about the functioning of the health system and quality of services.

Recommendations

RECOMMENDATION 3A
Develop a dedicated policy to retain the medical workforce through adequate pay, incentives, work–life balance, mental–physical well-being, safety in the workplace, etc.

RECOMMENDATION 3B
Conduct a policy revision to reintegrate health workers and graduates returning from abroad (circular migration) or who dropped out previously.

RECOMMENDATION 3C
Incentivise medical education in the country through expansion in the number of places and institutions, recognition and accreditation of allied professionals and subsidised and capped tuition fees, especially in the private sector.

RECOMMENDATION 3D
Optimally utilise the existing workforce to its full capacity by promoting standardised upskilling, regulated task-shifting and skill-mixing.

RECOMMENDATION 3E
Develop a policy for adequate compensation and protection for service during crises, emergencies, in rural-tribal geographies, etc

RECOMMENDATION 3F
An overarching regulatory framework is required to govern the process of task-shifting within the health system.

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4. DOMAIN 4
Medicines and Technology

Medicines and technology for health system sustainability

The pharmaceutical industry is a major exporter in India, with a current valuation of US$50 billion. According to the Government of India's own estimates, India ranks 3rd worldwide for pharmaceutical production by volume and 14th by value, combining both branded and generic markets (Invest India, 2022). This apparent variance points towards the relatively lower price of Indian pharmaceutical products, mostly generic, and the high demand they enjoy on the global market in both developing and developed countries. A major supplier of affordable low-price drugs across the world, India's role as the 'pharmacy of the world' is widely acknowledged by experts (Kurian OC & Kapur K, 2020). However, its status as a global giant in the manufacturing of affordable generic medicines has not yet fully translated into access to affordable medicines for the Indian population.

India has long faced challenges in meeting the financial, infrastructure and human resource needs of its health system. Despite some impressive recent reductions (discussed in the chapter on financing), India still has one of the highest proportions of out-of-pocket spending in the world. A 2021 Government publication observed that 63.5% of total out-of-pocket health expenditure is for ambulatory care and, of this, 71% is on medicines (Sarwal R et al., 2021). The situation is similar for the health workforce; despite being a major exporter of doctors and nurses, India has staff shortages across its public hospitals. However, with the help of digital technologies, India is trying to leapfrog multiple constraints within the system.

Evidence-based priority setting is a developing field in the public healthcare sector in India. Recent policy documents such as the *Twelfth Five-Year Plan (2012–2017)* and *National Health Policy (2017)* have expressed the Government's commitment towards a transparent, evidence-informed practice for resource allocation through Health Technology Assessments (HTAs) (Prinja S et al., 2020). An HTA capacity assessment conducted by the Department of Health Research (part of the Ministry of Health & Family Welfare) in 2015 tried to identify areas requiring further capacity building through a gap analysis, and identified economic evaluation and decision modelling as areas of deficiency (Downey LE, et al., 2017). The Department of Health Research has established an institutional arrangement called the Health Technology Assessment in India (HTAIn) to facilitate a process of transparent, accountable and evidence-informed decision-making in the sector. HTAIn consists of a technical appraisal committee, regional hubs and the HTA Board, supported by a secretariat that coordinates everyday functioning of these components (Dang A et al., 2021).

A draft HTA Board Bill was proposed in 2019 to institutionalise the structure and function of HTAIn and is currently placed for pre-legislative consultation with the states. Currently, there are 44 completed and 24 ongoing HTA studies across the country (Health Technology Assessment in India, website) on themes varying from syringe safety to health care costing whose findings will inform institutions and processes within the health ecosystem, helping decision-making (Prinja S et al., 2021). According to the Government, once passed, the Act will lead to the constitution of a Board providing evidence related to cost effectiveness, clinical effectiveness and safety of medicines, medical devices, vaccines and various health programmes. Through HTA studies, the Board will evaluate affordability, appropriateness and cost effectiveness of available and new health technologies in India. The broad underlying objectives for the board will be maximising health, reducing out-of-pocket expenditure and reducing inequality (Government of India, 2021). As health is a state subject and a majority of drug procurement takes place through state-level agencies, there is a need for regional hubs to be strengthened (Prinja S et al., 2020). HTAIn has established the National Health System Cost Database for India with technical support from International Decision Support Initiative covering data from Indian states.

India has an independent Standing National Committee on Medicines, which has the responsibility of updating the National List of Essential Medicines (NLEM). This body is engaged in a continuous evaluation of benefits and risks, availability and affordability of medicines, as well as the identification of obsolete medicines. The drugs listed in NLEM are considered scheduled drugs

under Drugs Price Control Order and their prices are regulated by National Pharmaceutical Pricing Authority to ensure affordability (SNCM, 2022). The Government promotes the use of generic drugs through the Pradhan Mantri Bhartiya Janaushadhi Pariyojana (PMBJP) – or people's medicine scheme – aimed at providing quality generic medicines at affordable prices across the country. The scheme is on a rapid expansion path, which is explored as a separate case study in this report (Ministry of Chemicals and Fertilisers, 2022).

In the past, the Ministry of Health & Family Welfare initiated many digital health efforts such as the Hospital Information System, Online Registration System, Nikshay-TB programme, Mother and Child Tracking Programme, Mera Aspataal (a patient feedback system), and Integrated Health Information Platform (Ministry of Health & Family Welfare, 2022g). A National Digital Health Blueprint was released in 2019, which was expected to act as an architectural framework for effective implementation of digital interventions. In November 2019, the government also launched a doctor-to-doctor telemedicine platform called eSanjeevani for implementation at the Ayushman Bharat Health and Wellness Centres. This uses a hub and spoke model with local Primary Health Centres to provide specialist and super-speciality consultations (Ministry of Health & Family Welfare, 2022g).

While COVID-19 brought into focus the many inadequacies of the Indian healthcare system, it also accelerated the process of digitisation of healthcare, even including efforts to meet the needs of people without smartphones or internet (Balasubramaniam P et al., 2022). eSanjeevani's telemedicine platform was reoriented during the pandemic lockdown to address patient demand and 'eSanjeevani OPD' was launched to facilitate online health services to patients at no cost and enabled 15 million online doctor-to-doctor and doctor-to-patient consultations during the pandemic. The National Digital Health Mission was launched in 2020, and renamed in 2021 to the Ayushman Bharat Digital Mission (ABDM), with the aim of developing the backbone necessary to support an integrated digital health infrastructure (Ministry of Health & Family Welfare, 2022g).

ABDM involves a unique health ID for every citizen, registries of healthcare professionals, healthcare facilities and a system of personal health records. Apart from streamlining public healthcare delivery using these tools, ABDM encourages health technology providers to link to this infrastructure and extract insights from patient data to deliver better care. Being a recent initiative, systematic assessments of impact are not yet available (Balasubramaniam P et al., 2022). However, the health system currently lacks uniform standards, and studies have shown that the systems existing across state-level health systems and across different ministries are developed by different vendors using different programming languages and databases (Pai MMM at al., 2021).

While digital health is gaining momentum, equitable internet penetration remains a concern. The National Family Health Survey 2019–2021 points to a wide gender gap in internet usage with only 57.1% of the male population and 33.3% of the female population ever using the internet. According to the *Mobile Gender Gap Report 2021,* 79% of the adult male population and 67% of the adult female population owns a mobile phone. At the same time, when compared to 2015–2016 data, it can be seen that efforts to reduce the digital divide are improving the situation (Chandola B, 2022).

India is a global pharmaceutical manufacturing giant and, specifically, a producer of cost-effective medicines. Expertise has been built up over the decades and the processes have been simplified and streamlined, with companies working on automating plants and expanding manufacturing. However, to move to the next level, India will need to reduce its reliance on imports of active pharmaceutical ingredients (API) as well as patented medicines. As a result, the top levels of policy making, as evidenced by the Department of Pharmaceuticals drafting a *Policy to Catalyse R&D and Innovation in the Pharma-MedTech Sector in India* in November 2021 and sharing it with stakeholders for their inputs, visualise the sector moving up the value chain from 'Make in India' to 'Discover in India'. (Ministry of Chemicals and Fertilizers, 2021).

A 2021 study found that, while the top five firms of the global pharmaceutical industry spent 18–49% of their gross profits on R&D, the top five firms of the Indian pharmaceutical industry spent

only 4.7–13.5% of their gross profits on R&D (Dutta S and Gajbhiye D, 2021). A comprehensive survey in 2017 of proprietary drug discovery and development performed by Indian pharmaceutical companies between 1994 and mid-2016 found that in the last decade, many Indian companies terminated or reduced their internal drug discovery activities (Differding E, 2017). The survey also found that during a significant time period (1994–2016), Zydus Cadila's *Saroglitazar*, launched in 2013, remained the only small molecule drug that was entirely discovered and developed by a major Indian pharmaceutical company. The survey found that biotechnology and start-up companies are doing better in terms of the number of early development stage compounds in the pipeline (Differding E, 2017)

Medicines and technology for health system resilience

During the initial phase of the pandemic, an inadequate supply of essentials such as Personal Protective Equipment (PPE) kits, N95 masks and ventilators due to the global supply chain disruption was felt across the India health system. However, the domestic industry was able to ramp up supply quickly. For example, responding to the pandemic situation, PPE production was increased from zero on 1 March 2020 to almost half a million per day by mid-May 2020. (Lakshmanan R & Nayyar M, 2020). Proving many earlier predictions wrong and remarkably leveraging its domestic manufacturing capacity, India was able to roll out its vaccination effort more quickly than most countries in the developing world, leveraging technology successfully through its CoWIN app. (Mittal R & Kurian OC, 2022a; Purohit N et al., 2022). India's COVID-19 vaccine, Covaxin, developed by Bharat Biotech in collaboration with the Indian Council of Medical Research – National Institute of Virology, was a particularly successful example of public private partnerships during the pandemic (Mittal R and Kurian OC, 2022b).

Despite a strong performance during the pandemic and its established role as the pharmacy of t he world, there have been persistent concerns about India's regulatory capacity and compliance within the pharmaceutical industry. Of particular importance were lapses regarding manufacturing standards such as compliance with Good Manufacturing Practices (GMP). This had delayed the emergency use listing (EUL) for Indian-manufactured Covaxin by the World Health Organization (WHO) and the more recent suspension of the Covaxin supply for UN procurement (World Health Organization, 2022a). A recent review by WHO found that "India's present drug regulatory system at the subnational level is characterised by poor infrastructure, shortages in skilled personnel, confusing legislation and multiple authorities, contributing to the poor implementation of rules and regulations" (Selvaraj S et al., 2022). The multiplicity of regulatory authorities across states has been a particularly difficult policy challenge.

Regulatory non-compliance and resulting slippages of medicine quality have been significant challenges to ensuring medicine access in the country. This was brought into focus by the tragedy in Gambia in September 2022, where contaminated cough syrup allegedly manufactured in India caused the death of children (Ministry of Health & Family Welfare, 2022h). Surprisingly, it is not only the small and medium-sized companies that produce medicines of questionable quality. A national survey by the Ministry of Health & Family Welfare (2014–2016) to estimate the extent of spurious and Not-of-Standard-Quality (NSQ) drugs found more than half the samples from Pfizer India's manufacturing unit were NSQ. Of the 47,012 samples tested across the country, 13 (0.0245%) were spurious and 1,850 samples (3.16%) were NSQ (National Institute of Biologicals, 2016).

State-level procurement of medicines has also been a historical concern. A study in 2021 on how elements of the Indian state purchase drugs found that, apart from Ministry of Health & Family Welfare, several other central ministries, such as the Ministry of Defence, a few autonomous/ independent bodies such as the Employees State Insurance Corporation and the Bureau of Pharma Public Sector Undertakings of India and different states, undertake procurement activities using diverse models. At the state level in particular, the study found the major lacunae to be a lack of documented procurement procedures, a lack of information on criteria for technical and commercial

bids, a lack of timely availability of drugs due to non-scientific demand estimation, inventory management and distribution issues, inadequate quality assurance mechanisms and a lack of transparency (Kaur H et al., 2021). During the pandemic, vaccine procurement was initially carried out at central-level. The subsequent shift of vaccine procurement responsibilities to the states and then the return to central procurement impacted ground-level processes in terms of delays (Mittal R & Kurian OC, 2022a; Purohit N et al., 2022).

Lastly, as the pandemic starkly demonstrated, over reliance on Chinese active pharmaceutical ingredients (APIs) is a weakness of Indian pharma manufacturing, affecting resilience and sustainability. This has been raised multiple times over the last decade. In 2015, to tap into economies of scale, the Katoch committee suggested the development of mega bulk drug parks as an alternative (Kurian OC, 2017) and, in a bid to promote the 'Made in India' initiative, 2015 was declared the year of the 'bulk drugs'. In 2020, a 'Production Linked Incentive' scheme to promote domestic manufacturing of APIs was launched to wean Indian manufacturing away from Chinese bulk drugs. However, a recent analysis shows that the industry is still dependent on Chinese raw materials, which are up to 40% cheaper. Furthermore, China may be routing API exports via Hong Kong, resulting in an underestimation of Indian dependence on China (Joseph RK & Kumar D, 2022).

The 1940 Drugs and Cosmetics Act of India, pre-independence legislation regulating the pharma sector, is now planned to be replaced with a new Drugs, Medical Devices and Cosmetics Bill in 2022, in an effort to keep pace with the changing needs, times and technology (Department of Health & Family Welfare, 2022). If India wants to shift to the next level by becoming a pharma giant in the true sense, value needs to be created along with volume. A perception of quality and value backed by scientific evidence and adherence to global best practices is required to generate demand for the Indian pharmaceutical products of tomorrow.

Key findings

When it comes to generic drugs, government programmes across many developed country health systems rely on India. However, the true scope of affordable drugs in India is limited by perceptions of effectiveness and quality. The pharmaceutical sector, including medical devices, has gone through a transformation in the last couple of decades and India has a strategy to become a dominant global manufacturer. Strengthening the Indian regulatory system and aligning it to internationally accepted standards will further enhance the industry's credibility and acceptance globally. India's successful COVID-19 vaccination drive and the fast and effective deployment of the CoWIN app are examples of India's potential in both pharmaceutical and technology sectors.

The PMBJP scheme initiated by Central Government, has surpassed annual targets. However, for many doctors and patients, price remains a proxy for quality. Given the rewards from adoption and its potential to help the health system leapfrog constraints, health tech will need to grow, but there remains a need to manage risk and improve access. A global drive to cut costs across country health systems and technology together represents an opportunity for India. Despite efforts and improvements over time, the cost of medicines remains a major component of out-of-pocket spending on health in India.

Recommendations

RECOMMENDATION 4A
Indian health policy needs to ensure the quality of medicines, convey to the public the ongoing efforts to improve quality and strengthen procurement systems so that public perception is evidence based.

RECOMMENDATION 4B

There is a need to institutionalise HTA in the health system, fostering partnerships with state-level agencies, deepening existing state health system linkages.

RECOMMENDATION 4C

Equity in access to health technology needs to be ensured with hub-and-spoke type models, wherever possible, helping overcome infrastructure bottlenecks.

RECOMMENDATION 4D

There is a need to strengthen the Indian regulatory system and align it to internationally accepted standards. A roadmap towards membership of the Pharmaceutical Inspection Co-operation Scheme and the International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use could be announced.

RECOMMENDATION 4E

India needs to create an ecosystem for innovation to become a leader in drug discovery from being a generic manufacturer/contract manufacturer alone.

RECOMMENDATION 4F

A uniform standard for personal health records needs to be introduced across state health systems.

5. DOMAIN 5
Service delivery

India's healthcare system has demonstrated significant progress in service delivery while also encountering persistent challenges. The system, characterised by a blend of public and private sectors, has seen the public health systems effectively leading community-level preventative medicine, including crucial areas such as maternal and prenatal care, as well as immunisation programs. On the other hand, the private sector has played a substantial role, predominantly covering curative services and constituting a significant portion of healthcare delivery.

According to Selvaraj S et al. (2022), in 2017/2018, the total outpatient visits and inpatient episodes, encompassing both public and private sectors, stood at 74.64 and 29.00 per 1,000 population, respectively. The private sector delivered almost 90% of pharmaceutical delivery and diagnostic services, 70% of outpatient care, and over 58% of inpatient services. These figures highlight the critical role of the private sector in India's healthcare landscape.

Despite these achievements, several challenges persist in creating a more equitable and efficient healthcare system. India is grappling with health personnel shortages and an unorganised flow of patients within the multi-tiered public health infrastructure, where individuals often bypass primary care for tertiary services. The skewed distribution and ineffective regulation of the private healthcare sector, along with the high cost of treatment and limited coordination between private and public sectors, further contribute to the fragmentation of health systems in India. These issues influence patient care pathways based on region, provider (public or private), affordability, and type of care needed, impacting the resilience and sustainability of the healthcare system.

In response to these challenges, the Ayushman Bharat Yojana was launched in 2018, aiming to enhance the national approach to Universal Health Coverage. This initiative focuses on delivering comprehensive, quality services at all three levels, expanding health infrastructure, and offering a wide array of services across both public and private sectors, complemented by insurance coverage (Ministry of Health & Family Welfare, 2019). The Ayushman Bharat Yojana reflects a commitment to addressing the fragmentation in the healthcare system and ensuring more accessible care for all citizens. Sustained political commitment will be crucial in moving towards a more integrated, accessible, and resilient healthcare system.

Service delivery for health system sustainability

Quality of care

Patient safety and quality of care remain essential components of public health systems. Hence, regular monitoring and evaluation of health facilities is necessary to ensure the standard quality of services across all regions. This is carried out under the National Quality Assurance Programme established in 2013. The National Quality Assurance Standards (NQAS) were later developed taking note of the scientific requirements of the public health facilities across eight areas of concern – service provision, support services, infection control, clinical care, inputs, patient rights, quality management and outcomes. The NQAS further follow the benchmarks set by Insurance Regulatory and Development Authority and International Society for Quality in Healthcare (ISQua). The NHM also supports quality assurance of facilities at all stages – state, district and facility level – in overseeing implementation and adherence to these standards. The National Accreditation Board of Hospitals and Healthcare Providers and the National Accreditation Board of Testing and Calibration Laboratories provide accreditation to healthcare organisations and medical and calibration laboratories respectively.

The Indian Public Health Standards (IPHS) was first introduced in 2007 to ensure high quality and uniformity in services delivered at public institutions, in terms of infrastructure planning, human resources, tools and equipment, and administrative support. Last revised in 2022, the IPHS codifies standard best practices and benchmarks for assessment of Primary Health Centres (PHCs), Sub-Health Centres, Community Health Centres (CHCs), Sub-District Hospitals and District Hospitals.

The Clinical Establishments (Regulation and Registration) Act (2010) also introduced by Central Government to regulate all clinical therapeutic and diagnostic establishments across public and private sectors and all identified systems of medicine. It aimed to prescribe minimum standards of facilities and services provided, while also creating a repository of all providers. However, as health remains a state subject, the adoption and implementation of the law remains fragmented and limited to a few states only.

In addition, *Rogi Kalyan Samitis* (Patient Welfare Committees) have been set up at the facility level to hold hospital management accountable in case of a lapse in ensuring high-quality and equitable services. To seek feedback directly from patients and users of the public health facilities, the government has also created the *Mera Aspataal* (My Hospital) application, in addition to the mandatory grievance redress system in all health facilities.

The *LaQshya* programme was established to tackle neonatal mortality and provide respectful maternity care, and quality improvement within labour rooms, maternity operating theatres and obstetrics intensive care units at public institutions. Similarly, the *MusQan* initiative, aims to reduce child morbidity through strengthening paediatric services for children, urges hospitals to undertake rapid quality improvement cycles. Both these initiatives conduct regular checks based on the NQAS and offer financial incentives to top scoring facilities.

National schemes such as the Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB-PMJAY) further incentivise top rating facilities and only empanel NQAS-certified facilities. As of June 2022, there are 1,639 and 2,922 NQAS certified facilities at national and state levels respectively (NHSRC, 2022).

Assessment mechanisms also exist for monitoring patient safety incidents and unsafe care, but only for very few programmes such as Adverse Events Following Immunization, Pharmacovigilance Programme of India and child death audits.

Nevertheless, despite the these bodies and initiatives, adherence to protocols and prescribed guidelines has not improved at the pace hoped for. Research has found that public perception of government facilities is low – characterised by accessability challenges, long waiting times, unavailability of medicines and diagnostic facilities – resulting in patients paying for treatment in private facilities instead (Aitken M et al., 2013).

Several researchers have noted that the policy focus solely on increasing access and infrastructure will be ineffective if the quality of services is not adequate (Das J et al., 2018). For example, impact assessments of the Janani Suraksha Yojana[1] scheme reveal that, while promoting the uptake of health services and institutional deliveries, it did not necessarily improve neonatal and maternal outcomes. Studies found that neonatal survival rates were determined by the quality of health services, especially in public facilities, rather than as a consequence the widening of access. Hence, the increase in the use of health services promoted by scheme only benefitted women in the higher-quality hospitals, and not those living in districts with lowest-quality care facilities (Lee HY et al., 2022; Powell-Jackson T et al., 2015). A conclusion can be drawn therefore that increasing access can paradoxically worsen inequalities in health outcomes across states.

Between 1995 and 2014, hospitalisation rates increased from 16.6 to 37.0 per 1,000 population (Pandey A et al., 2017). A more granular analysis underscores the caste-class-gender differential vulnerabilities.[2] Access to hospital stays and treatment was higher in the general category castes and those covered by health insurance. There is no evidence of a gender gap in this measure in the

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[1] Janani Suraksha Yojana (JSY) is a safe motherhood intervention under the National Rural Health Mission (NRHM) being implemented with the objective of reducing maternal and neonatal mortality by promoting institutional delivery among poor pregnant women.

[2] Differential vulnerability = differences in the effects of cause(s) of disease across groups (differential effect).

population aged under 60, however, in the 60+ population, men have higher rates, although the gap has gradually decreased over the period. Males aged 60+, particularly from urban regions and more the developed states show the highest rates of hospitalisation. The contribution of NCDs and injuries to total hospitalisations has also increased significantly from 38.6%to 62.2% during this period.

Regional disparities in the use of publicly funded health institutions and resources, along with public costs, also vary significantly, and indicate a strong association with quality (Das J et al., 2022). Assessing regional disparities reveals a nationwide skew towards the choice of private facilities. The more wealthy states, such as Gujarat, Maharashtra, Andhra Pradesh, Telangana and Karnataka, where the NCD burden is comparatively high, showing an almost 70–80% usage of private facilities for treatment of NCDs. The quality of services, public perceptions of facilities and perceived barriers greatly influence the choice between public and private health care. This may explain why, even in those economically disadvantaged states that have relatively low levels of NCDs, such as Bihar, there is a still a high level of private facilities utilisation for the treatment of NCDs (Menon G et al., 2022). In addition to the disparities in the quality of care, the focus on medical specialities and types of care also vary. For example, the policy and budgetary focus on mental health, disability and chronic or long-term care has remained historically low, depriving patients of holistic care.

Focus on prevention and chronic disease

India's demographic and epidemiological composition has changed significantly over the past two decades, with an observable shift from communicable to noncommunicable and lifestyle diseases. According to the Global Burden of Diseases Study (2019), cardiovascular diseases, chronic obstructive pulmonary disease, stroke, tuberculosis (TB) and diabetes are the top causes of death in India (ICMR, PHFI, IHME, 2019). However, instead of supplanting the problems with undernutrition and micronutrient deficiency-related diseases, NCDs and overnutrition are further adding to the burden. In parallel to the widely prevalent, but slowly decreasing, incidence of underweight, stunting and wasting, there is a much faster increase in obesity and lifestyle diseases (Kurian O & Suri S, 2019). This can be seen from the data which shows that between 2005/06 and 2019/20, the incidence of overweight has increased by 62% in women and 89% in men. In contrast, the improvement rates of below-normal Body Mass Index (BMI) was only about 43% for both men and women (National Family Health Survey, no date.).

Chronic illnesses are a vital part of the National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS), which aims to screen, diagnose and treat noncommunicable diseases early (National Health Mission, 2016). Launched in 2008, it began with a pilot in 10 districts across 10 states. Today, it covers all states and union territories with 708 District NCD Clinics, 194 District Cardiac Care Units, 301 District Day Care Centres and 5671 Community Health Centre NCD Clinics across the country (Ministry of Health & Family Welfare, 2023). A population-based approach was later adapted under the recommendation of the National Health Policy 2017, with a dedicated focus on chronic diseases such as hypertension, diabetes and cancers in the oral cavity, breast and cervix. This service is delivered via a combination of a network of Health and Wellness Centres and trained Accredited Social Health Activists (ASHAs), Auxiliary Nurses and Midwifes, Community Health Officers and Medical Officers. There are also dedicated national prevention programmes for TB, AIDS, polio, cancer, mental health and blindness.

While a decentralised Integrated Disease Surveillance Programme (IDSP) was set up in 2004, its focus has remained mainly on communicable, vector-borne, and epidemic-prone diseases (Integrated Disease Surveillance Programme, no date; Integrated Disease Surveillance Programme, website). In terms of monitoring noncommunicable and chronic diseases, only periodic population-level surveys record diagnosed illnesses and risk factors. . One of the few tools that exist for

monitoring NCDs in India is the National Disease Registries maintained by the Indian Council for Medical Research. However, this is available only for cancer, stroke and rare diseases, leaving out a significant pool of serious illnesses. The National Health Policy (2017) (Ministry of Health & Family Welfare, 2017b) set up dedicated targets to lower premature mortality from NCDs such as cardiovascular diseases and respiratory illnesses and reduce the incidence of TB and HIV. The status of these targets is presented in Table 12.

Expert consultations have suggested a revised outlook and design of monitoring systems that instead focus on the leading causes of deaths, while developing community-level indicators for NCDs such as hypertension and heart diseases. This will help prioritise resources and ensure a directed public health approach in high-density settings. Among infants and children, early detection of diseases, developmental disorders and nutrient deficiencies needs to be further strengthened.

Table 12: Status of targets set by National Health Policy (2017)

Parameter	Target value	Target year	Current status
Reduce premature mortality from cardiovascular diseases, cancer, diabetes or chronic respiratory diseases	by 25%	2025	Reduction in premature mortality is 11% from 2012 to 2016
Reduce HIV detection, diagnosis and viral suppression	90%	2020	HIV detection – 74% people living with HIV knew their status (2020) Treatment – 65% people living with HIV are on anti-retroviral therapy (ART) Viral suppression – 61% people living with HIV have suppressed viral loads
Reduce the incidence of TB		2025	Incidence rate reduced from 217 in 2015 to 188 in 2020 (per 100,000 population)

Source: Ministry of Health & Family Welfare, 2017b.

Despite a dedicated government programme (Rashtriya Bal Swasthya Karkyakram[3]) and steady progress, challenges exist in fund utilisation, awareness about medical conditions among parents/caregivers, poor referral follow-ups and greater confidence in the private sector for treatments (Deloitte, Ministry of Health & Family Welfare and UNICEF, 2016; Ministry of Health & Family Welfare, 2022i). Another challenge that emerged in the country's surveillance systems was the multiplicity of data management platforms. Similar patient logs are needed to be entered in separate systems across Ministries, Departments and States, leading to demotivation among health workers in entering data and discrepancies across data systems.

India is placing an increasing emphasis on tackling NCDs, including through population-based screening programmes such as the CHPC NCD programme, but has ground to make up. This is visible in historical public spending analyses, which show that expenditure on NCDs was at a meagre 25% of total health spending in the country in 2015/2016 according to state-level priorities (Gupta I & Ranjan A, 2019). Out-of-pocket expenditure (OOP) for patients suffering from NCDs has

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[3] A screening programme for children from birth to 18 years. It covers 32 common health conditions for early detection, and free treatment and management, including surgical interventions at tertiary level.

increased drastically, especially for low-income households and those more likely to become impoverished in the face of health shocks (Verma VR et al., 2021). Households affected by NCDs incur more than twice the amount in OOP expenditure for health compared to households without NCDs (Pradhan J & Behera S, 2021). Low health insurance coverage and high costs incurred when visiting private-sector providers are found to lead to catastrophic health expenditures for households and this varies across regions.

With no formal referral pathways for patients, tertiary care services remain continually overburdened, notably in the private sector (Development Monitoring and Evaluation Office, NITI Aayog, 2021). Analyses show a fragmented patient pathway with gaps in adherence to quality standards. This not only harms populations due to high OOP expenditure and poorer health outcomes, but also burdens the public health system unevenly and inequitably. Despite existing primary care facilities and a vast and increasing infrastructure, gaps in human resources and trust in the system is driving people away from public centres and rural areas, towards the private sector in the urban areas. A sustainable system can only be built by earning the population's trust and strictly ensuring that the highest quality standards. Both policy and budgetary priorities must reflect this.

As discussed in the previous chapters, there is widespread inequity in the distribution of medical specialists owing to the stark rural–urban and regional divide. This was further highlighted in the disproportionate spread and clustering of SARS-CoV-2 infections with patients rushing to city centres for advanced treatments. To rectify the situation, the Pradhan Mantri Swasthya Suraksha Yojana (PMSSY) was boosted; this is dedicated solely to responsibly distributing infrastructural resources by creating new tertiary healthcare centres and augmenting them with new medical seats and quality training programmes (Mann G, 2018).

Cross-sector coordination of services also remains a major challenge. The expansion of Ayushman Bharat Health and Wellness Centres (AB-HWCs) and the AB-PMJAY have immense potential for universal health coverage and comprehensive primary healthcare as a measure to integrate public–private and general–specialist care. Regulatory focus is needed to ensure adherence to quality and patient safety standards. These standards greatly determine health outcomes, access, and costs. Moreover, the increasing burden of chronic illnesses will require a policy and financing shift to ensure the system can meet changing patterns of need.

Service delivery for health system resilience

Services during crisis

With the surge of COVID-19 cases, service delivery of basic healthcare suffered gravely. India's health system was hit with several disruptions, especially across regular services. These included: a fall in the number of medical interventions performed for maternal health and pregnancy care; delays in child immunisation; reduced diagnostic and laboratory testing for non-COVID cases; diminished access to mental health services; significant barriers to sexual and reproductive health services; and a decline in the number of outpatient treatments for NCDs such as heart diseases, cancers, diabetes, TB and HIV (Parikh N et al., 2022; Rukmini S, 2020; Suri S, 2021). Although the infrastructural capacities were increased rapidly to address the incoming mass of patients with COVID-19, the system lacked suitable alternative pathways and flexibility to manage backlog cases.

As health is a state subject, regional disparities in infrastructure, human resources, services and availability of medical countermeasures were evident. Even before infections and consequent hospitalisations intensified, there was a pre-existing shortfall of 16,472 specialists at CHCs, 2,357 allopathic doctors at PHCs, and 10,202 nurses at PHCs and CHCs (data as of 31st March 2020) (Ministry of Health & Family Welfare, 2021d). The *National Health Profile 2021* states that India has 0.6 beds per 1,000 population, which remains below population needs (Central Bureau of Health

Intelligence, 2021). The isolation bed and ICU bed capacities stood at 10,180 and 2,168 respectively (data as of 23rd March 2020). These capacities were increased to 1,821,420 isolation beds and 121,671 ICU beds by 16th July 2021 (Ministry of Health & Family Welfare, 2021e).

These shortages of specialists, healthcare staff and infrastructural amenities were painfully felt during the pandemic when trained professionals in short supply, and also added to healthcare costs due to travel to distant hospitals. Moreover, the striking variation in the number of infections, deaths and hospitalisations across states indicates significant regional disparities in data reporting mechanisms (Mona, et al. (2022). There is a clear need to build to infrastructural resources that can serve the whole population, with speed and agility to respond to changing needs.

During the pandemic, the Indian health system made efforts to absorb demand shocks. Primary care, including PHCs and CHCs, played a vital role in relieving hospitals by managing non-urgent cases and adopting telemedicine. The private sector, encompassing private hospitals and clinics, was engaged to reduce the burden on the public sector, increasing healthcare capacity. Coordinated care between primary, secondary, and tertiary sectors, including district hospitals and specialised medical institutions such as the All India Institutes of Medical Sciences, has improved, enhancing patient management and resource allocation. However, challenges remain, and future focus should involve strengthening the health system's capacity, infrastructure and coordination to better respond to crises and absorb demand shocks effectively.

Expert consultations indicated that most felt that PHCs are vital both as a first line of defence and contact. During COVID-19, PHCs helped in monitoring local outbreaks, identifying hotspots, triaging and immediately ensuring the right care for patients. Ground-level management of the virus was only possible due to a massive force of 2.5 million Anganwadi and ASHA workers.

Learning and adaptation

The post-COVID-19 era has presented the need to incorporate emerging technologies and innovative digital solutions in health service delivery. Services, such as telemedicine, e-pharmacy, drone vaccine/essential goods supply, wearable devices, mHealth, e-ICU and remote clinical management, saw a notable surge when the society and economy went into a shutdown. The uptake of these services are predicted to grow at a massive rate as investments pour in (Bestsennyy O et al., 2021). India came up with a culture of creating digital public goods, such as *eSanjeevani* (telemedicine platform, 2020); *TeleMANAS* (national Tele Mental Health Programme, 2022); *CoWIN* (open-source real-time COVID-19 vaccine tracking dashboard, 2021); and *Aarogya Setu* (real-time, GPS-enabled contact tracing and monitoring mobile application 2020), which together enabled a digital health ecosystem as the pandemic was raging[4].

At the beginning of the pandemic, the monitoring and surveillance system was fragmented, leading to a limited understanding from the data. Expert panel suggestions include repurposing the existing IDSP or TB network and leveraging it to create an effective database to track infected persons and referring within the system. As outbreaks are often reported by the private sector early, the focus should be shifted towards tracking services in this sector. Understanding this need, as a learning from COVID-19 management , the National Public Health Observatory was established in 2022 within the Ministry of Health & Family Welfare. It is envisioned to become a comprehensive pre-emptive data-first approach-driven health monitoring and emergency operations centre for the future (World Health Organization, 2022b). In addition, the Government established the Integrated Health Information Platform, a real-time, GIS-enabled, surveillance platform that caters for 33 infectious diseases, expanding the scope of the IDSP (Ministry of Health & Family Welfare, 2021f). Plans are now underway to expand and repurpose them for a wider range of functions systems, hinting at a steady growth in the data ecosystem of the country. Digital health emerged as an

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[4] Cross-domain Digital Public Goods like Aadhaar, UPI and DigiLocker also rose to prominence.

accessible and affordable means of maintaining access to care in the country. With adequate regulatory monitoring, digital health is the post-COVID-19 revolution in service delivery for a range of illnesses such as chronic diseases, mental conditions, infectious diseases and out-patient consultations.expanding the scope of the IDSP (Ministry of Health & Family Welfare, 2021f). Plans are now underway to expand and repurpose them for a wider range of functions systems, hinting at a steady growth in the data ecosystem of the country. Digital health emerged as an accessible and affordable means of maintaining access to care in the country. With adequate regulatory monitoring, digital health is the post-COVID-19 revolution in service delivery for a range of illnesses such as chronic diseases, mental conditions, infectious diseases and out-patient consultations.

The COVID-19 pandemic highlighted the need for strengthening public health architecture to tackle future outbreaks at all levels vertically – primary, secondary and tertiary – as well as horizontally across programmes. Persistent inequalities in terms of access to and geographical distribution of essential services also came to fore. It was found that, in the event of an emergency, the health system was not fully equipped to handle the clinical management of a rapidly rising number of cases, laboratory networks remained fragmented, surveillance systems needed urgent integration and strengthening, and the health workforce was untrained in personal safety measures while administering treatments.

In this light, the Ayushman Bharat Health Infrastructure Mission (PM-ABHIM) was launched in October 2021 to build IT-enabled public health and epidemiological intelligence systems, support biomedical research increase capacities and competencies for combatting new infections through a One Health-based approach and improve risk communication and community engagement (Ministry of Health & Family Welfare, 2021g). The programme has a dedicated focus on building the necessary infrastructure in the form of critical care units for high-population districts, expansion of National Centre for Disease Control networks, establishment of a National institute for prevention-first strategies for epidemic preparedness and One Health.

It is key that the continuum of care remains seamless, with alternative pathways in place. The four components of the Ayushman Bharat Yojana – AB-HWCs, AB-PMJAY, ABDM and PM-ABHIM – together hold potential to deliver an agile and resilient health system if the current challenges of inequitable accessibility, availability and affordability can be resolved. There is a need for whole systems approach to tackling fragmentation within and across the health architecture in India, as without effective convergence, service delivery will continue to suffer from gaps in accessibility.

Key findings

- Limited dedicated policy, budgetary focus and interlinkages with long-term care, chronic disease management, elderly, disability, geriatric services and mental healthcare along with broken links with the main system

- Fragmented service delivery across the vertical tiers of the health system and allied services; weak referral system across the primary–secondary–tertiary and general–specialist facilities

- High disparities and limited integration of private and public services in terms of skilled workforce, quality and cost of services

- Adequate quality standards in documentation; in line with international good practice, but limited adherence and sporadic/weak monitoring

- Quick population-level adoption of new technologies; private sector leading innovation in service delivery, while public sector is slow-moving, e.g., telemedicine emerged as a tool for the digital future during COVID-19 pandemic.

- Gaps in leveraging traditional and complementary medicine practitioners to enhance service delivery.

Recommendations

RECOMMENDATION 5A
Focus efforts on promoting integration of care for the older population and patients with chronic diseases; insurance and other allied services should also reflect this.

RECOMMENDATION 5B
There is a need for better tracking and surveillance systems to ensure epidemiological and population-level data are collected. The large-scale systems built during COVID-19 should be expanded and continued for future outbreaks of infectious diseases. Existing systems such as those for TB can be repurposed.

RECOMMENDATION 5C
Enhance and encourage investments in public health facilities to reduce the catastrophic health expenditure for quality services.

RECOMMENDATION 5D
Create links with aspects of social protection for better health outcomes to ensure holistic service.

RECOMMENDATION 5E
Conduct a structural reorganisation to smooth out internal referral systems for patients in health systems and create alternative pathways for treatment during crisis-like situations.

RECOMMENDATION 5F
Incentivise adherence to high quality standards, with need for stricter monitoring of services and penalties when standards are not met. Competency-focused licensing and renewal should be adopted.

RECOMMENDATION 5G
The range of diseases covered by the National Disease Registry should be expanded, especially with a focus on long-term monitoring.

Population health

Indicators of population health

India's population health presents a complex picture, marked by significant achievements and enduring challenges. The nation has seen improvements in average life expectancy and reductions in infant mortality, reflecting the strides made in healthcare access and quality. However, these gains are juxtaposed with persistent issues such as malnutrition and significant disparities in health outcomes influenced by gender, socioeconomic status, and caste. As shown in Table 13, in 2019, the average life expectancy was 70.8 years, while healthy life expectancy – which represents the average number of years a person can expect to live in full health – stood at 60.3 years. Despite improvement, the Infant Mortality Rate (IMR) remains high at 25.5 per 1,000 births in 2021, a reduction of 40% since 2015. The high IMR is also indicative of underlying factors such as malnutrition, with 36% stunting and 19% wasting. India's ranking in the Global Hunger Index is low: 94th out of 107 countries in 2020 and 107th out of 121 countries in 2022 .

In 2022, projected cancer incidence per 100,000 was 95.6 in men and 105.4 in women, with cases increasing at an annual average rate of 1.0−1.2% between 2010 and 2019 (Krishnamurthy R, 2022). Over the period 2008 to 2020, the prevalence of hypertension stood at 39% for men and 33% for women, while obesity – a major risk factor for the former – was 27% for men and 32% for women. According data collated by the World Bank, 27% of all adults (41% men and 13% of women) use

Table 13: Population health indicators

Population health measure prevalence	Overall	Men	Women
Life expectancy at birth (years), 2019[a]	70.8	69.5	72.2
Healthy life expectancy at birth (years), 2019[b]	60.3	60.3	60.4
Infant Mortality Rate (per 1,000 live births), 2021[c]	25.5	25.7	25.3
Low height for age prevalence (stunting), age under 5, 2020[d]	35.5%	36.2%	34.6%
Low weight for height prevalence (wasting), age under 5, 2020[d]	18.7%	19.5%	17.9%
Global Hunger Index (out of 121 countries)[e]	107th		
Cancer incidence (per 100,000), 2022 estimate[f]	100.4	95.6	105.4
Diabetes prevalence, age 20+ years, 2008−2020[g]	11.4%	12.1%	10.7%
Hypertension prevalence, age 20+ years, 2008−2020[g]	35.5%	38.7%	32.6%
Obesity prevalence (BMI ≥25kg/m), age 20+ years, 2008−2020[g]	28.6%	25.4%	31.6%
Smoking prevalence (occasional or daily), 2020[d]	27.2%	41.0%	13.0%

a   Source: WHO, Global Health Observatory, website, a.
b   Source: WHO, Global Health Observatory, website, b.
c   Source: WHO, Global Health Observatory, website, c.
d   Source: World Bank, website.
e   Source: The Hindu, 2021.
f   Source: Sathishkuma K et al., 2022.
g   Source: Anjana R et al., 2023.

tobacco, which is yet another risk factor for chronic diseases. The prevalence of both hypertension and obesity are increasing over time, diabetes has remained more or less constant, but tobacco use is on the decline, even though absolute levels remain high (The Hindu, 2021).

Unsurprisingly, heart disease (ischemic) is the top cause of death in India, causing 111 deaths per 100,000 population in 2019. This is followed by chronic obstructive pulmonary disease and stroke and diarrheal diseases being the highest causes of death in India (World Health Organization, Global Health Observatory, website, d). As is evident from Figure 9, although there were significant changes in the top 10 causes of death in India during the 10 years before 2019, noncommunicable diseases (NCDs) still constituted a major proportion (IHME, website). India has seen an epidemiological shift in disease burden to NCDs, with a rise from 30 to 55% of total disease burden, and 37 to 61% of deaths due to NCDs from 1990 to 2016, respectively (ICMR, PHFI, IHME, 2017). The Ministry of Health and Family Welfare has implemented the 'National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke' to raise awareness of risks and to set up

Figure 9: Causes of deaths in 2009 and 2019, and percentage change 2009–2019 (all ages combined)

	RANKING 2009		RANKING 2019		% change 2009–2019
Ischaemic heart disease	1		1	Ischaemic heart disease	40.8%
Diarrhoeal diseases	2		2	COPD	35.4%
Neonatal disorders	3		3	Stroke	28.4%
COPD	4		4	Diarrhoeal diseases	−21.2%
Stroke	5		5	Neonatal disorders	−34.0%
Lower respiratory tract infections	6		6	Lower respiratory tract infections	−13.4%
Tuberculosis	7		7	Tuberculosis	−10.9%
Cirrhosis	8		8	Diabetes	54.2%
Road injuries	9		9	Cirrhosis	14.3%
Self-harm	10		10	Falls	35.1%
Diabetes	11		12	Road injuries	4.9%
Falls	13		14	Self-harm	2.5%

= non-communicable diseases

= communicable, maternal, neonatal and nutritional diseases

= injuries

Source: IHME, website.

units for screening at Primary Health Centres (Ministry of Health & Family Welfare, 2013). India has been the first country to adopt WHO's 'Global Action Plan for the Prevention and Control of NCDs 2013–2020', setting a target of reducing NCDs by 25% by 2025 (Ministry of Health & Family Welfare , 2017c).

Determinants of population health inequalities

Of crucial importance to a comprehensive understanding of population health in India is the examination of data to determine whether disparities exist in health outcomes across gender, socioeconomic status, caste and other social markers. Only since the 2015/16 round of NFHS reports have district-level data for several indicators been provided (Kurian OC, 2016).

For gender disparities in particular, even though the National Family Health Survey and the Sample Registration System provide solid data on infant and maternal health, there is a stark absence of data on adolescent girls. Similarly, education-related data (a crucial factor affecting health outcomes) on girls who experience multiple forms of marginalisation due to religion, ethnicity or disability are also absent (Raman S, 2020). Even during the COVID-19 pandemic, there was a dearth of sex-disaggregated data on deaths caused by the virus (Khan F, 2021).

Given how disparate health outcomes are in India, such disaggregation in health determinants is especially important. To illustrate, research suggests that Muslims, Adivasi (tribal communities categorised as Scheduled Tribes for enumeration) and Dalits (Scheduled Castes for enumeration) experience substantial disadvantages with respect to life expectancy at birth compared to 'upper-caste' Hindus (Vyas S et al, 2022). For example, the Adivasi, Dalit and Muslim communities have life expectancies that are 4.3 and 1.0 years lower than that of 'upper-caste' Hindus, respectively. Similarly, in terms of nutrition outcomes, Dalit and Adivasi children show malnutrition levels significantly higher than other children, and more Dalit and Adivasi women are anaemic than women belonging to other social groups (Saigal N & Shrivastava S, 2020). States like Bihar and Uttar Pradesh, which are part of the eight socioeconomically lagging states termed the Empowered Action Group, generally have higher levels of childhood stunting, anaemia and more underweight children than the rest of the country (Salve P, 2022). India's position on the Global Gender Gap index in 2021 was 140, a fall by 28 places from the previous year. It is thus evident that health inequity is a glaring reality in the country, with individuals belonging to marginalised genders, ethnicities, religions, regions and communities experiencing an especially acute burden of poor health .

Strategies to address population health inequalities

The WHO's Commission on Social Determinants of Health (SDH) defines SDH as "the conditions in which people are born, grow, live, work and age, including the health system." (World Health Organization, Health Topics, website). However, it was not until 2011 that the Indian Government recognised the importance of SDH when a High-Level Expert Group, set up by the Planning Commission, highlighted the role of SDH in differential interstate health outcomes in India. The Group recommended that a Social Determinants Committee be set up at various levels and that SDH be incorporated into the mandate of the National Health Promotion and Protection Trust. Although this has not yet materialised, the National Health Policy 2015 mentions the same as a policy recommendation (Sarkar S, 2016).

A range of health initiatives and policies address SDH:

- **The Swachh Bharat Mission** is aimed at eliminating open defecation and improving solid waste management. It has helped avert diarrhoeal diseases and malnutrition among children, improve the safety and well-being of women who no longer have to defecate in the open, enhance hygiene and sanitation conditions by mitigating water food contamination and ultimately, ease the burden of disease.

- **Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB-PMJAY)** aims to reduce the cost of healthcare among the poor and vulnerable populations.

- **The Pradhan Mantri Ujjwal Yojana** provides clean fuel for cooking, particularly to the poor and vulnerable populations, helps reduce the prevalence of asthma and the overall mortality burden.

- **The Pradhan Mantri Kisan Samman Nidhi** (an income support scheme) improves food security and the livelihoods of small and marginal farmers, as do other irrigation schemes and initiatives like the soil health card, agricultural credit card, crop insurance and so on (Saraswathy SY, 2021).

- **The Food Safety and Standards Authority of India** has launched the 'Eat Right India' movement to ensure safe, healthy and sustainable food through an integrative approach. Eat Right India is aligned with the National Health Policy 2017 with its focus on preventive and promotive healthcare and flagship programmes such as Ayushman Bharat, POSHAN Abhiyaan, Anemia Mukt Bharat and Swachh Bharat Mission (Eat Right India, website).

The government has also instituted programmes for children, particularly girls, to leverage the strong and positive links between education, child development and health outcomes:

- **The Integrated Child Development Services (ICDS) scheme** benefits children from birth to enhance their cognitive development, nutrition and health (Ministry of Women and Child Development, website).

- **Beti Bachao Beti Padhao** is another pertinent initiative aimed at preventing sex-selective elimination and ensuring the survival, protection and empowerment of girl children, all of which can go a long way toward improving their health (Beti Bachao Beti Padhao, website).

Although policies and programmes exist that address the social determinants of health, India does not yet have an explicit strategy or framework to address this issue. Such a framework would take a strategic view on key priority areas for public policy connected to SDH, including child undernutrition, inadequate sanitation, employment conditions and gender inequality.

Low health literacy is also known to be associated with poor health outcomes, exacerbated burdens and higher costs (Kumar R, 2014):

- **The 'National Health Portal'** was launched by Central Government in late 2014. This is an online platform to improve health literacy and create a single point of access for consolidated health information and resources for citizens, students and academics, among others.

- **The 'New India Literacy Programme'** was announced in February 2022 as part of Adult Education for 2022–2027. Through online workshops conducted by volunteers, illiterate people above the age of 15 will be acquainted with healthcare and awareness, basic education and financial literacy, among other topics (Ministry of Education, 2022).

Health literacy rates, however, continue to remain low and the COVID-19 pandemic has further exposed the inadequate health knowledge and communication in India (Nankani M, 2022) A study of adult patients seeking dental care in a private facility in Bengaluru revealed that roughly 65% of patients lacked adequate health literacy regarding preventative dental care and oral hygiene services (D'Cruz AM & Aradhya MR, 2013). About half the respondents in a study on disease-specific literacy on tuberculosis among the Saharia tribe in Central India had never heard of the disease (Muniyandi M et al., 2015).

Integrating health programmes into schools can go a long way towards improving health outcomes. Through its Global Health Initiative, launched in 1995, WHO has emphasised the need to promote health in schools (Jain YK et al., 2019). India has the largest number of adolescents (ages 10–19 years) in the world at 253 million, and empowering them supports the country's development.

- **The Rashtriya Kishor Swasthya Karyakram (RKSK)** was started by the Ministry of Health and Family Welfare in 2014. Its aim is to ensure the holistic development of the adolescent population through a health promotion approach (National Health Mission, website).

- **The Ayushman Bharat Yojana** scheme was launched by the Central Government in 2018. This includes a School Health Programme in which age-appropriate health education is provided to students (e.g., on sexual and reproductive health among high school students and puberty among middle schoolers) through schoolteachers or ambassadors It also carries out screening of children for the detection, treatment and management of 30 identified health conditions and maintains electronic health records for each of them. Additionally, age-appropriate vaccination, sanitary napkins and certain tablets are provided, and teachers are trained in basic first aid (Ministry of Health & Family Welfare and Ministry of Human Resource & Development, 2018).

India has been a pioneer in introducing the ancient practice of Yoga to the world. The government has started various initiatives, such as 'The Central Council for Research in Yoga and Naturopathy (CCRYN)' under the Ministry of Ayush, to promote Yoga for health benefits (MyGov, 2018).

The recently formulated New Education Policy 2020 (NEP 2020) emphasises a holistic school curriculum that includes sports and fitness by incorporating physical activity in teaching methods, having 'bagless' days for students to engage in vocational and sports activities, and promoting the formation of Yoga, health and well-being and sports clubs, etc. To ensure that children receive sufficient nutrition and food, mid-day meals are provided to students in Years one to eight studying in government and government-aided schools. The NEP 2020 further extends this programme to children below five years of age in primary schools in addition to the provision of early childhood care. To encourage health education among children, the NEP advances integrating health training – in preventive health, mental health, hygiene, nutrition, harmful effects of tobacco, alcohol, disaster response – into school curricula (Gupta R, 2020). While these reforms are commendable, it is their implementation that will determine their effectiveness and it remains too early for systematic evaluations to be available.

Key findings

- Social Determinants of Health are receiving increased attention in the policy realm with flagship initiatives across multiple sectors.

- The increasing burden of noncommunicable diseases is linked with lifestyle changes and the emergence of new pathogens.

- Health inequalities result in acute health burdens, with pockets of ill health contributing disproportionally.

- Limited health education and awareness contribute to adverse outcomes in health and social well-being.

Recommendations

Adopting these approaches would improve India's performance in common health indicators and, ultimately, make for a more sustainable and resilient health environment that can help improve the citizens' well-being and address crises more effectively.

RECOMMENDATION 6A

Building a sustainable health system necessitates acknowledging and accounting for the differences in the health needs of different sections of the population. Changes in the disease burden must be quantified regularly using simple, replicable methods to comprehend the scale, direction and seriousness of health issues before attempting to address them. Using the National Burden Estimates of healthy lives lost in India to quantify the country's disease burden at national and subnational levels can aid policy makers in prioritising initiatives (Menon GR et al., 2019).

RECOMMENDATION 6B

The social determinants approach to health requires explicit acknowledgement and should be reflected in health communication. At the level of policy articulation and implementation, programmes must be made more targeted to address the various social determinants of health. A more robust approach would enable the sustainability of the health system, create awareness about rights and promote community mobilisation and self-sufficiency, strengthening local political structures and grassroots-level initiatives.

RECOMMENDATION 6C

Adopting a systematic social determinants of health approach would enable the sustainability of the health system, promote a healthy lifestyle, create awareness about rights and promote community mobilisation and self-sufficiency as well as strengthen local political structures and grassroots-level initiatives.

RECOMMENDATION 6D

There is a need to have better health communication strategies around noncommunicable disease risks, physical activity, healthy food habits, etc.

Environmental sustainability

Introduction

The Indian healthcare system is one of the largest in the world, providing essential health services to its population of over 1.4 billion people. However, the increasing demand for healthcare services, coupled with the country's rapid economic growth, has led to significant environmental impacts. The healthcare sector generates a substantial amount of waste, consumes vast amounts of energy and resources and contributes to air and water pollution. Therefore, it is essential to promote environmental sustainability in the Indian healthcare system to ensure its resilience and long-term viability.

Environmental costs and benefits of health system activities

The Indian healthcare system has witnessed tremendous growth in the past few decades, with an increase in the number of healthcare facilities and medical procedures. However, this growth has come at a cost to the environment, with the healthcare sector being one of the largest contributors to environmental pollution and degradation (Lenzen M et al., 2020). In recent years, the Indian Government has recognised the need to address the environmental impact of the healthcare sector and has taken several initiatives to promote sustainability.

The Ministry of Environment, Forest and Climate Change has played a crucial role in promoting environmental sustainability in the healthcare sector by issuing guidelines and regulations for managing healthcare waste. The Biomedical Waste Management Rules, 2016, aim to improve the management of healthcare waste and reduce the environmental and public health risks associated with improper waste disposal (Ministry of Environment, Forest and Climate Change, 2016). The National Health Mission (NHM) has also set targets for reducing the carbon footprint of the health system, thereby encouraging healthcare facilities to adopt sustainable practices (National Centre for Disease Control, 2022).

Despite these initiatives, more needs to be done to address the environmental impact of the healthcare sector comprehensively. Available studies suggest that healthcare facilities generate a significant amount of hazardous waste and the management of this waste is often inadequate, leading to environmental and public health risks (Manzoor J & Sharma M, 2019). In addition, healthcare facilities consume large amounts of energy, contributing to greenhouse gas emissions. More research is required to assess the environmental costs and benefits of health system activities to promote sustainable healthcare practices. By identifying the areas that require improvement and implementing evidence-based policies and guidelines, the healthcare sector can reduce its impact on the environment and promote sustainable development.

Reducing environmental impact of health system

In addition to regulations and guidelines, there are other measures that can be taken to reduce the environmental impact of the health system. For example, healthcare facilities can implement waste reduction strategies, such as reducing unnecessary packaging and single-use items. They can also promote sustainable procurement practices by sourcing environmentally friendly products and services. Additionally, healthcare providers can adopt telemedicine and other digital health technologies, which can reduce the need for in-person visits and travel, thereby reducing greenhouse gas emissions.

Education and awareness among healthcare providers and patients are also critical for promoting sustainable healthcare practices. Healthcare providers can be trained to reduce their environmental impact by incorporating environmental sustainability into their clinical practices. For example, they can reduce the use of energy-intensive diagnostic tests and procedures and promote more sustainable modes of transportation. Patients can also be educated about the importance of waste segregation and the proper disposal of pharmaceuticals and other hazardous waste.

Finally, partnerships between the health sector and other industries, such as the renewable energy sector, can also help promote sustainable healthcare practices. By collaborating with renewable energy providers, healthcare facilities can reduce their reliance on fossil fuels and transition to renewable energy sources. These partnerships can also provide opportunities for research and development of innovative solutions to reduce the environmental impact of the health system.

Carbon footprint of health system

India's health system's carbon footprint has been a growing concern, as it contributes significantly to the country's greenhouse gas emissions. Healthcare facilities require significant amounts of energy for lighting, air conditioning, medical equipment and other operations. As a result, the healthcare sector is growing to be a significant contributor to carbon emissions, which can have adverse effects on the environment and public health. Therefore, it is crucial to promote sustainable practices in the healthcare sector to reduce its carbon footprint.

To address this issue, the Indian Government has set targets to reduce the carbon footprint of the health system under the National Programme on Climate Change and Human Health (NPCCHH) (Kumar A et al., 2020). The NHM has initiated policies and guidelines to promote the use of renewable energy, energy efficiency and green buildings. The NHM has identified energy efficiency as one of the primary areas for reducing the carbon footprint of the health system. By implementing energy-saving measures in healthcare facilities, the energy consumption and greenhouse gas emissions can be significantly reduced. For example, replacing traditional lighting systems with energy-efficient LED bulbs can help save energy and reduce costs (National Centre for Disease Control, 2022).

Despite the government's efforts to reduce the carbon footprint of the health system, the implementation of these policies and regulations needs to be strengthened to ensure their effectiveness. Healthcare facilities need to invest in green technologies, such as renewable energy systems and energy-efficient equipment, to reduce their carbon footprint. The healthcare sector needs to adopt a more sustainable approach to waste management, such as recycling, reuse and reduction of waste. Moreover, healthcare professionals and staff need to be trained in sustainable practices to promote awareness and understanding of the importance of reducing the carbon footprint of the health system. By adopting sustainable practices and technologies, the healthcare sector can contribute to reducing the country's greenhouse gas emissions and promote environmental sustainability.

Waste management in healthcare facilities

Waste management in healthcare facilities is a complex process that requires significant attention and resources. Apart from biomedical waste, other types of waste, such as general waste and e-waste, are generated in healthcare facilities, which need to be managed effectively. Improper disposal of healthcare waste can lead to the spread of infections, pollution and adverse health outcomes (Devi A et al., 2019). Therefore, there is a need to create awareness among healthcare workers and the public regarding the importance of proper waste management practices and to ensure the availability of necessary resources.

In addition to regulations and policies, it is essential to create a culture of sustainability in healthcare facilities. Promoting the three Rs – Reduce, Reuse and Recycle – can help minimise the generation of waste and promote sustainable waste management practices. Healthcare facilities can also explore the possibility of using sustainable materials and products, such as recyclable and biodegradable products, to reduce the impact on the environment. Moreover, promoting sustainable transportation practices, such as carpooling and the use of public transportation, among healthcare workers can help to reduce greenhouse gas emissions.

Finally, the involvement of all stakeholders, including the government, healthcare facilities, healthcare workers and the public, is crucial for effective waste management in healthcare facilities. The government should create an enabling environment by providing the necessary resources, policies and regulations, while healthcare facilities should implement good waste management practices. Healthcare workers and the public should also be aware of the importance of proper waste management practices and play their part in ensuring a sustainable healthcare system.

Improving air quality and protecting respiratory health

India's air pollution has been a significant public health issue, with studies suggesting that it is responsible for a range of respiratory and cardiovascular diseases. In response, the government has introduced policies and regulations to improve air quality and protect respiratory health. The National Clean Air Programme aims to reduce particulate matter pollution by 20–30% by 2024 and the Graded Response Action Plan aims to curb air pollution levels during high-pollution episodes (Ganguly T et al., 2020).

However, the implementation of these regulations needs to be strengthened to ensure their effectiveness. Studies have found that the enforcement of regulations to control air pollution has been insufficient to prevent poor air quality in many cities. This can have a significant impact on the health of individuals, especially those with preexisting respiratory or cardiovascular diseases. Therefore, there is a need for better enforcement and monitoring of regulations to promote sustainable healthcare practices and protect respiratory health.

In addition to regulations, healthcare facilities can play a role in improving air quality and protecting respiratory health. For example, healthcare facilities can promote the use of clean energy sources and energy-efficient practices to reduce their carbon footprint and decrease air pollution levels. Moreover, healthcare providers can also educate patients and the public on the importance of reducing air pollution and protecting respiratory health. By adopting sustainable healthcare practices, healthcare facilities can play an important role in promoting environmental sustainability and protecting public health.

Identifying environmental risks and mitigation plans

India is particularly vulnerable to the effects of climate change and environmental risks due to its geography, high population density and reliance on natural resources. The country has experienced a range of environmental challenges, including increased frequency and intensity of extreme weather events, degradation of natural resources and deterioration of air and water quality. In response to these challenges, the Indian Government has developed various plans and policies to address environmental risks to health.

The National Action Plan on Climate Change outlines India's strategy to mitigate the effects of climate change, such as promoting energy efficiency and renewable energy and increasing afforestation. The plan has eight core missions covering various sectors, such as solar power, enhanced energy efficiency, sustainable habitat and water conservation. However, the implementation of these missions has been uneven across the country and there is a need for better monitoring and enforcement.

The National Adaptation Fund for Climate Change aims to provide support to vulnerable communities to adapt to the impacts of climate change, such as droughts, floods and sea-level rise. The fund finances climate-resilient infrastructure, such as drought-resistant crops, rainwater harvesting structures and embankments to protect against floods and sea-level rise (Prasad RS & Sud R, 2019). However, the fund's effectiveness is limited due to inadequate resources and limited awareness among vulnerable communities. Therefore, there is a need for more targeted support and community engagement to ensure the effectiveness of the fund.

Policy initiatives to improve environmental sustainability

Several major policy initiatives are currently being planned to improve the environmental sustainability of the health system. The National Health Stack, an initiative by the Government of India, aims to create a digital infrastructure for the healthcare sector that can integrate and streamline health data management, improve access to healthcare services and enhance the quality of care. The NHS could promote environmental sustainability by reducing the use of paper-based systems, improving energy efficiency and reducing waste. The Government of India is also promoting the adoption of electric vehicles, which could reduce air pollution levels and promote environmental sustainability.

Another major policy initiative to improve environmental sustainability in the health system is the promotion of green buildings. The Government of India has launched the Green Rating for Integrated Habitat Assessment initiative, which is a national rating system for green buildings that includes healthcare facilities. (Chandel SS et al., 2016). Green buildings incorporate energy-efficient features and use renewable energy sources, leading to reduced energy consumption and greenhouse gas emissions. They also use materials that are sustainable and nontoxic, promoting a healthier environment for patients and healthcare workers.

In addition to the above initiatives, the Government is also promoting the use of telemedicine, which could reduce the carbon footprint of the health system. Telemedicine allows patients to access healthcare services remotely, reducing the need for travel and physical visits to healthcare facilities. This could reduce air pollution levels and traffic congestion, leading to improved air quality and reduced greenhouse gas emissions. However, there are concerns regarding the accessibility of telemedicine services for all segments of the population, particularly those in rural and remote areas.

Overall, the implementation of these policy initiatives can lead to a more sustainable health system, promoting environmental sustainability while also improving the quality of care for patients. However, the successful implementation of these initiatives requires a coordinated effort between the government, healthcare providers and other stakeholders, as well as sustained investment and monitoring to ensure their effectiveness.

Conclusion

While the Government of India has taken several initiatives to promote sustainable healthcare practices and encourage environmental adaptation, the implementation and enforcement of policies and regulations need to be strengthened to ensure their effectiveness. Therefore, there is a need for better research, monitoring and enforcement to promote sustainable healthcare practices and protect public health and the environment.

Based on the issues discussed, the following policy recommendations can be made to improve the environmental sustainability of the Indian health system. By implementing these recommendations, the Indian health system can promote environmental sustainability, reduce environmental impacts and protect public health and the environment.

Recommendations

RECOMMENDATION 7A
Strengthen data collection and research to assess the environmental costs and benefits of health system activities to inform policy and decision-making.

RECOMMENDATION 7B

Develop and implement a comprehensive strategy with incentives to reduce the environmental impact of the health system, including waste, emissions and resource consumption.

RECOMMENDATION 7C

Conduct a thorough assessment of the health system's carbon footprint and develop policies to reduce it, such as promoting energy efficiency, investing in renewable energy and promoting sustainable transportation.

RECOMMENDATION 7D

Improve waste management practices in healthcare facilities, including the development of policies to reduce waste and promote good practices in hospital and health facility waste disposal.

RECOMMENDATION 7E

Strengthen regulations and enforcement to improve air quality and protect respiratory health, such as implementing measures to reduce vehicular emissions, promoting the use of clean energy sources and reducing the use of fossil fuels.

RECOMMENDATION 7F

Develop and implement mitigation plans to address country-specific environmental risks to health, such as climate change, including promoting energy efficiency and renewable energy and supporting vulnerable communities to adapt to the impacts of climate change.

RECOMMENDATION 7G

Integrate environmental sustainability into the design and implementation of major policy initiatives, such as the National Health Stack, to promote sustainable healthcare practices and reduce environmental impacts.

AB-PMJAY: India's march towards Health for All

Pradhan Mantri Jan Arogya Yojana's role in India's march towards Health for All

Context

The Government launched the flagship Ayushman Bharat Yojana in 2018 with the broad aim of enhancing financial and health security for the population. The National Health Policy 2017 had set a target of government health expenditures reaching 2.5% of GDP by 2025, with the specific goal of reducing catastrophic household spending on health, which often has a disastrous impact on household spending on other necessities. These goals were developed in the broad context of high levels of private, out-of-pocket spending on health in India.

Ayushman Bharat Yojana had two components – delivering comprehensive primary health care by establishing 150,000 Ayushman Bharat Health and Wellness Centres (AB-HWCs) by 2022 (achieved) and providing financial protection for secondary- and tertiary-level hospitalisation through what was then called the National Health Protection Scheme, now named Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB-PMJAY). Through these two components, the government aimed to offer a continuum of services across the primary, secondary and tertiary levels of care and bring renewed attention to the delivery of an entire range of preventive, promotive, curative, diagnostic, rehabilitative and palliative care services (Lahariya C, 2018).

AB-PMJAY enhances health system resilience and sustainability in India by:

- Providing financial protection to vulnerable sections of society – reducing out-of-pocket health expenses and preventing catastrophic health expenditures that can push people into poverty.
- Promoting the use of public and private hospitals – incentivising investments in the health care sector, creating jobs and driving economic growth.
- Improving access to quality health care – contributes to reducing morbidity and mortality rates, leading to a healthier and more productive workforce.
- Promoting digital technologies and data-driven decision-making – supports the development of a robust health information system, which can help policy-makers design evidence-based health interventions and monitor progress towards achieving universal health coverage.

What has been achieved so far

In August 2018, Prime Minister Narendra Modi announced the rollout of the health insurance scheme under its new name – Ayushman Bharat Pradhan Mantri Jan Arogya Yojana – beginning in September 2018. The AB-PMJAY, the insurance arm of Ayushman Bharat Yojana, marked a step forward for India towards financing the delivery of health care for the poor. The objective of the scheme was to provide health coverage of ₹500,000 for secondary and tertiary care to 100 million poor and vulnerable households or around 500 million individuals, thus, making it one of the most ambitious public health care initiatives in the world (Chikermane G & Kurian OC, 2018). AB-PMJAY was part of the government's wider agenda of achieving universal health coverage (UHC) by improving access to and affordability of quality secondary and tertiary care services through a combination of public hospitals and private care providers.

By hugely increasing the existing annual financial protection by a multiple of 17 (from ₹30,000 to ₹5,00,000), doing away with the five-member limit for family members and freeing the scheme from the deeply restrictive Below Poverty Line list, AB-PMJAY addressed the core weaknesses of the existing health insurance scheme at a stroke. Although the stated objective of AB-PMJAY was to cover 500 million Indians – the poorest 40% of the population – the scheme has already managed

to cover many more people, with most of the states and union territories offering "top-up" coverage above and beyond what was intended in the original plan. As of March 2022, over 146 million households, or more than 700 million individuals, were part of AB-PMJAY and allied state-level schemes (National Health Authority, website). Since 2018, AB-PMJAY has financed a staggering 32.8 million hospital admissions worth ₹376 billion and has 27,291 hospitals across the country (Ministry of Health & Family Welfare, 2022j).

To enhance the scheme's acceptability at the state level, generate a sense of ownership and increase the probability of the state allocating funds to expand coverage, AB-PMJAY enables states to choose the mode of implementation. Currently, there are three models – trust, hybrid and insurance (see Box).

Box: AB–PMJAY – modes of implementation

AB-PMJAY has three models of health care delivery – a trust-based model, a hybrid model, and an insurance model. These models differ in the way the health care services are delivered to the beneficiaries.

Trust-based model
The government forms a trust or society to implement AB-PMJAY. The trust or society empanels health care service providers such as hospitals, clinics and diagnostic centers. The beneficiaries can access health care services from the empaneled providers without any payment. The trust or society reimburses the health care providers for the services provided to beneficiaries. The trust-based model is a completely government-funded model, and the trust/society is responsible for the overall management of AB-PMJAY.

Hybrid model
Combines both the trust-based and insurance-based models. Under the hybrid model, the government forms a trust or society to implement AB-PMJAY. The trust or society empanels health care service providers and contracts with insurance companies to provide insurance coverage to beneficiaries. The insurance companies pay the health care providers for the services provided to beneficiaries. The government funds the trust or society, and the insurance companies reimburse the trust or society for the health care services provided to beneficiaries.

Insurance model
The government contracts with insurance companies to provide insurance coverage to the beneficiaries. The insurance companies empanel health care service providers and pay them for the services provided to beneficiaries. The insurance companies receive a premium from the government for providing insurance coverage. The insurance model is a completely insurance-based model, and the insurance companies are responsible for reimbursing the hospitals.

Most states have opted for the trust model (see Figure 10). With Telangana joining AB-PMJAY in 2021, West Bengal, Odisha, and Delhi are the only states and union territory not to have implemented the scheme (EH News Bureau, 2021).

Figure 10: AB–PMJAY implementation across India: different models

| Implementation mode	Number of states/union territories	Beneficiaries covered (%)
Trust	22	59.7%
Hybrid	3	21.4%
Insurance	8	18.9%
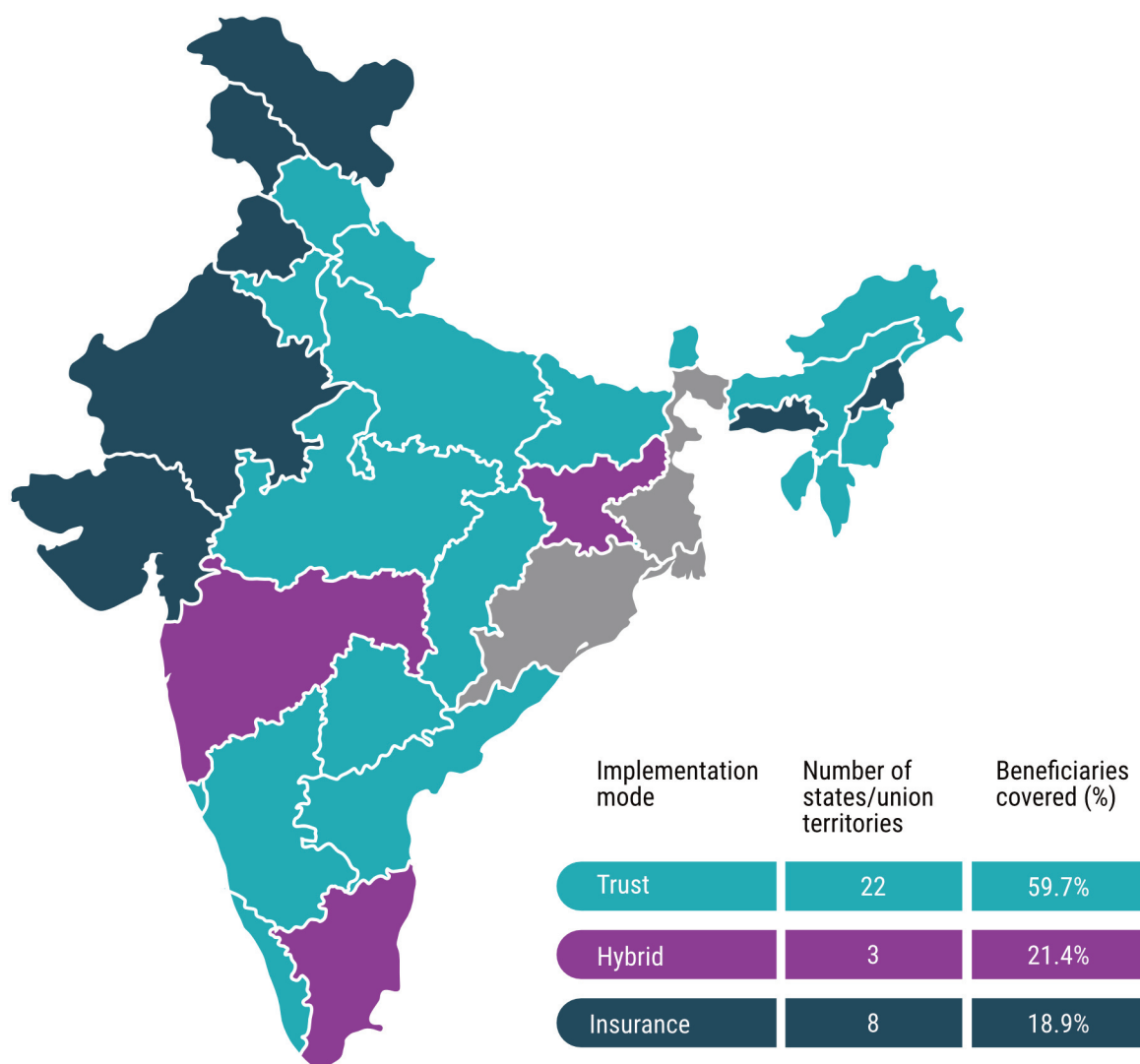
Source: National Health Authority, 2021.

Between 2018 and 2022, AB-PMJAY supported many millions of hospitalisations across the country, a number that has increased every year despite the disruptions caused by the COVID-19 pandemic (Figure 11). In April 2022, a new, expanded version of the AB-PMJAY Health Benefit Package was introduced, which included 365 new procedures, taking the total number of procedures covered under the scheme to an impressive 1,949 (Ministry of Health & Family Welfare, 2022k).

The scheme is still in its early phase, so systematic evaluations of its impacts on health outcomes are not yet available; however, the government has reported that the AB-PMJAY has successfully contributed to curbing out-of-pocket expenditures. (The Economic Times, 2022). An early review of the scheme found wider population coverage, better services and benefits packages, and improved financial risk protection (Vitsupakorn S at al., 2021).

Researchers have suggested that the reduced uptake of AB-PMJAY hospitalisations during the pandemic could be because medical procedures for COVID-19 treatment under the scheme were only accessible in government hospitals (Trivedi M, 2022). A study conducted by the National Health

Figure 11: Annual hospital admissions under AB-PMJAY (millions)
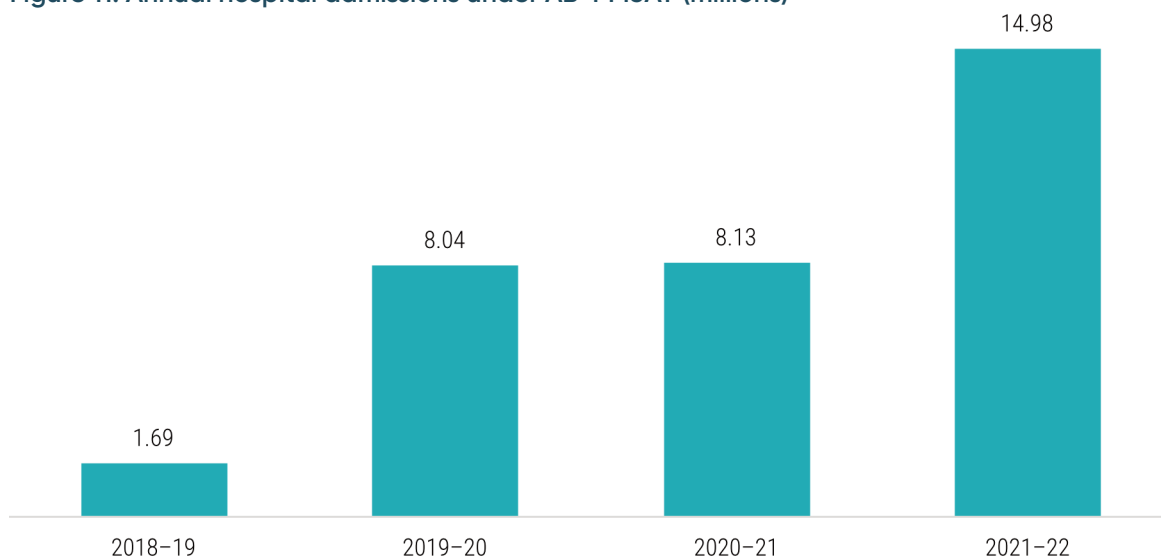
Source: Ministry of Health & Family Welfare, 2022j.

Authority (NHA) to assess the impact of COVID-19 on AB-PMJAY concluded that service use under the scheme had dropped by 61% in the early lockdown period compared to pre-pandemic levels. This decrease eventually improved to 46% during the late lockdown phase, and patient visits now seem to have improved significantly, with overall hospital admissions in 2021–2022 at nine times the 2018–2019 levels.

Ambitious expansion: including the 'missing middle' in the risk pool

Since 2018, the year AB-PMJAY was launched, researchers have been recommending that the scheme should become the core vehicle for India's progress towards UHC. Moving towards a larger risk pool will expand its scope by including non-poor households, using a voluntary approach and offering a non-subsidised premium (Chikermane G & Kurian OC, 2018). In April 2022, a plan was unveiled to expand coverage to 400 million individuals in the 'non-poor' population, thus potentially taking overall coverage beyond a billion people. The government reportedly aims to extend AB-PMJAY coverage for a small premium to those who cannot afford health insurance at the full price, making it affordable for the 'missing middle' who have only limited public financial protection for healthcare (Dey S, 2022). According to reports, the decision to expand AB-PMJAY coverage to the middle class has been made in principle, and NHA is now planning to start pilot projects in selected states over the next few months, after which coverage will be expanded across India (Dey S, 2022).

The proposed expansion of AB-PMJAY will have profound implications for the country's health system. It will contribute to the penetration of health insurance into relatively lower income groups and to the funds available to public health care facilities across the country. AB-PMJAY was carefully designed to prevent it from becoming merely a private sector subsidy scheme. A study by the NHA explored data from existing state-level health insurance schemes that preceded AB-PMJAY in Tamil Nadu, Chhattisgarh, Meghalaya and Kerala and examined the policies and implementation experience with respect to mobilisation, management and utilisation of resources by government hospitals. The study found that insurance revenues offer enormous potential to improve service delivery in government hospitals by introducing fundamental changes in both financing and management. Although small compared to overall budgets, the authors noted that insurance revenues account for a large share of flexible funding at the hospital level (Jha R, Chhabra S & Smith O, 2020).

The way forward

AB-PMJAY, supported by the AB-HWCs and the broader National Health Mission, is a major component of India's strategy towards UHC, which aims to ensure that all citizens have access to quality health services – across prevention-, promotion-, treatment- and rehabilitation-related services – without having to face financial shocks. According to senior government officials, India is committed and on track to achieving UHC by 2030 (Sarwal R & Kumar A, 2020). The plans to expand AB-PMJAY to the non-poor population with the aim of taking coverage beyond a billion is the latest step towards India's UHC objective. While the Ayushman Bharat Yojana ecosystem is still evolving and is far from perfect, AB-PMJAY continues to protect millions of families from financial shock.

A study based on a pan-India survey from 2021 found that over 70% of households across India reported that they were aware of the AB-PMJAY scheme. However, scheme awareness was lowest among households in the bottom two quintiles – precisely the population of most importance (Figure 12) (Bhatnagar A et al., 2022). Awareness among the target population remains a major bottleneck, despite major information, education and communication campaigns, which necessitates starting innovative operations in low-awareness states.

Figure 12: Awareness of AB–PMJAY by socioeconomic quintile

Percentage of respondents having knowledge of AB-PMJAY
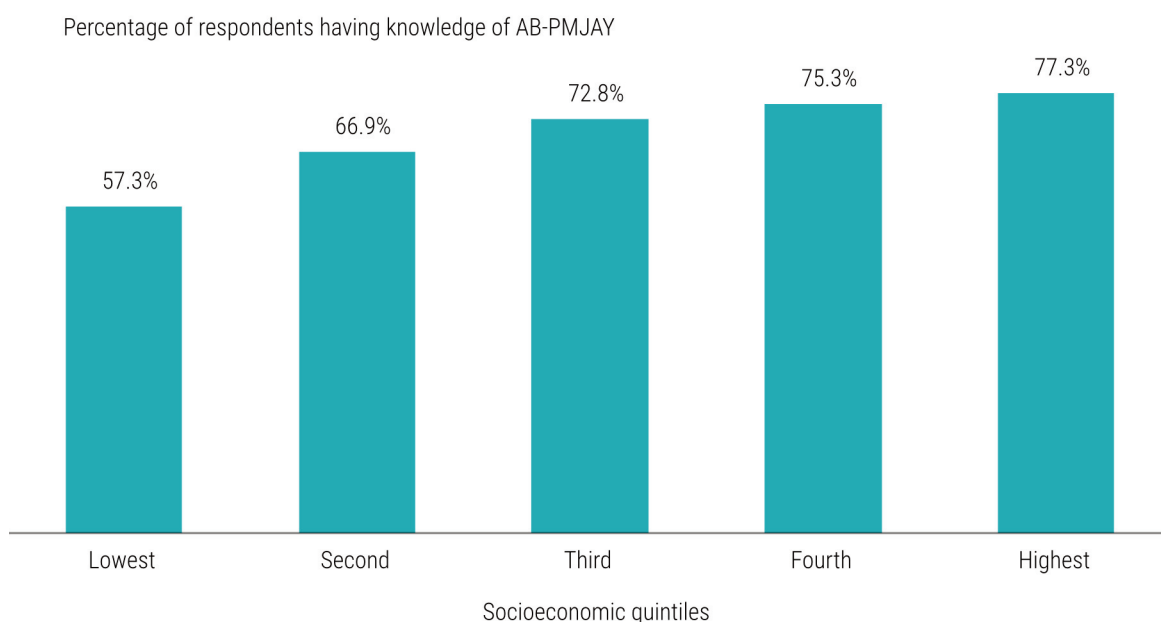
Notes: Excludes households from Delhi, Odisha, West Bengal and Telengana where AB-PMJAY is not applicable.
n = 116,098

Source: National Health Authority, 2022.

India is in the 'decade of action', which calls for accelerated efforts to develop solutions and to broad-base existing ones. India's performance on the Sustainable Development Goals (SDGs), especially SDG-3 that ensures healthy lives and promotes wellbeing for all at all ages, is critical for the world at large to achieve the goals. AB-PMJAY is part of an 'India model' in the health system, which has successfully transcended the 'provisioning versus insurance' debate within health policy and opted to strengthen both public provisioning and democratise health insurance solutions at the same time. Many parts of the world, particularly in the low and lower-middle income settings, can adopt India's model that leverages the strengths of the public and private sectors. AB-PMJAY is a key component in India's strategy to achieve its national health goals, and externalities from this ambitious initiative have enormous potential to contribute to India's sustained economic growth in the coming decades.

PMBJP: affordable, quality medicines for Indians

Affordable, quality medicines for Indians: PMBJP and the unfinished agenda

Context

The Government of India's assessment is that despite India being one of the leading exporters of generic medicines to the world, a majority of its citizens lack sufficient access to affordable medicines (Department of Pharmaceuticals, 2021).

The Janaushadhi Scheme – or people's medicine scheme – was launched by the Department of Pharmaceuticals, Ministry of Chemicals & Fertilizers in November 2008, responding to the high out-of-pocket expenditures on medicines. This scheme is one of the very few key health initiatives outside the purview of the Ministry of Health and Family Welfare. Under the scheme, dedicated outlets known as 'Janaushadhi Kendras' (medicine shops) were opened to provide quality generic medicines at affordable prices. The scheme initially got off to a slow start, and in the first six years of operation until 2015, only 80 Janaushadhi Kendras had been established in selected states. However, the pace of expansion accelerated tremendously in later years.

The scheme helps enhance health system resilience and sustainability by promoting low-cost, high-quality generic drugs. Reducing the cost of medicines both enables patients to save money and reduces the financial burden on the health care system. Moreover, by promoting generic medicines, it reduces the dependence on expensive branded medicines, making health care more affordable and so accessible to a larger section of society. The scheme also helps to improve the availability and accessibility of essential medicines, which is crucial for building a resilient health system.

The aims of the scheme

The scheme has the following three objectives: (Pharmaceuticals & Medical Devices Bureau of India, website).

1. Ensure access to quality medicines and surgical equipment for all sections of the population, especially the poor and the deprived.

2. Create awareness of generic medicines through education and publicity to counter the perception that quality is synonymous with high price.

3. Generate employment by engaging individual entrepreneurs in opening of Janaushadhi Kendras.

The government revamped the Janaushadhi Scheme in September 2015 as 'Pradhan Mantri Jan Aushadhi Yojana' (PMJAY). In 2016, to avoid creating confusion with Pradhan Mantri Jan Arogya Yojana (also PMJAY), it was again renamed Pradhan Mantri Bhartiya Janaushadhi Pariyojana (PMBJP).

Despite the sluggish start, the last six years have seen a rapid expansion of Janaushadhi Kendras across India (Figure 13). By the end of July 2022, a total of 8,787 had been set up with the annual targets in both 2020/2021 and 2021/2022 being exceeded – a remarkable feat for a government initiative. PMBJP has maintained the targets of 9,300 by March 2023 and 10,500 by March 2025. Currently, all 739 districts of India have at least one Janaushadhi Kendra.

Figure 13: Increase in number of PMBJP Kendras since 2016/2017
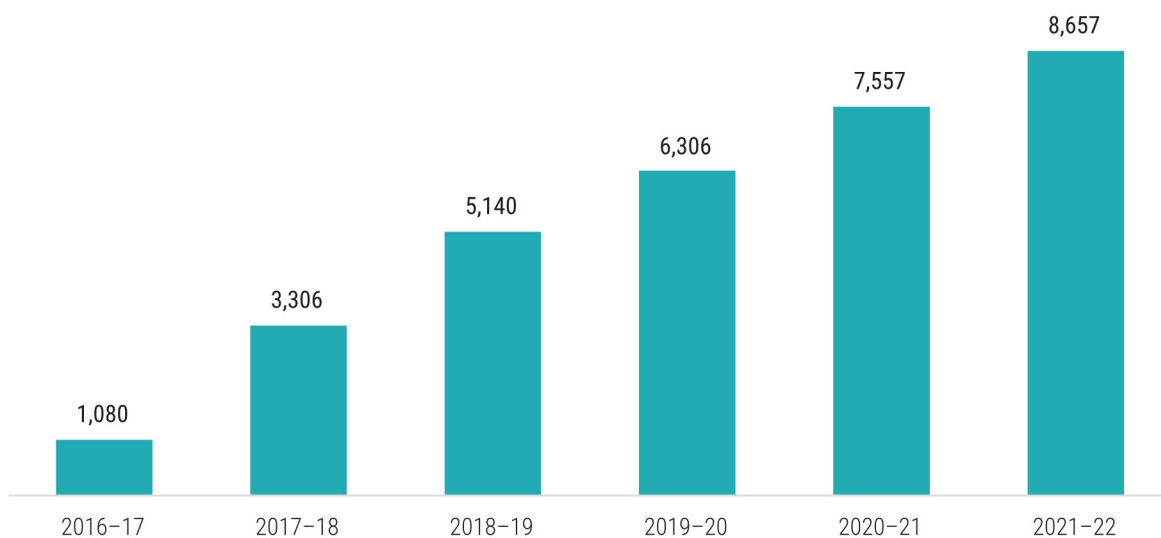
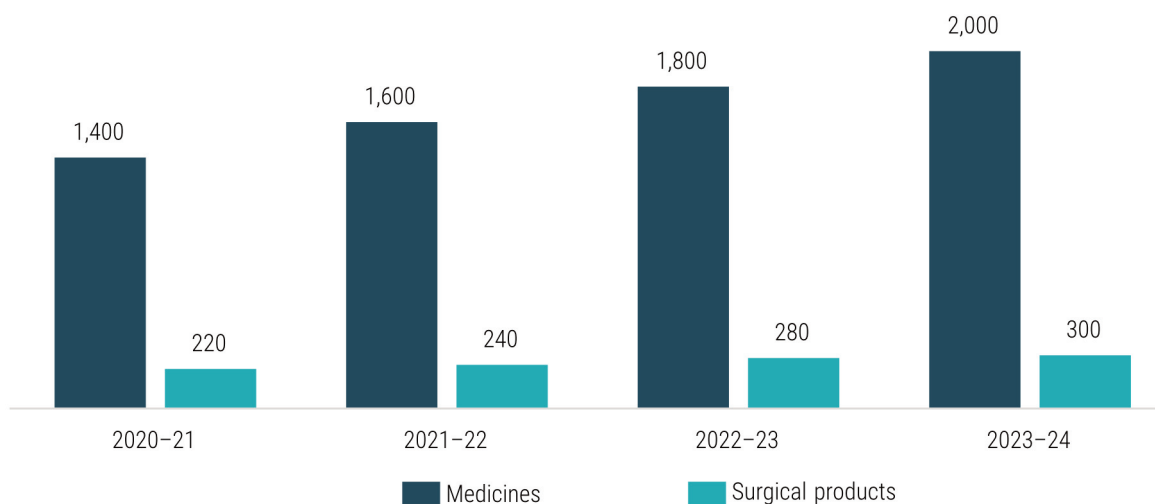Source: Department of Pharmaceuticals, 2022b.

PMBJP offers incentives to entrepreneurs, particularly those opening Kendras in the Northeastern states, in hard-to-reach areas like the Himalayan region and island territories, and in 'inspirational' districts – a set of districts with relatively lower socioeconomic development which the Government has selected for enhanced social sector interventions. In addition, women entrepreneurs, the differently abled, and entrepreneurs from Dalit and Aivasi communities – historically marginalised communities in India – receive a one-time incentive.

Prices of generic medicines offered at Janaushadhi Kendras are up to 90% below the prices of branded medicines in the open market, according to PMBJP documentation (Department of Pharmaceuticals & Bureau of Pharma PSUs of India, 2017). Generic medicines sold at Janaushadhi Kendras are procured only from World Health Organization – Good Manufacturing Practices (WHO–GMP) certified suppliers, so that quality is ensured. In addition, samples from each batch of drugs are regularly tested at laboratories accredited by the 'National Accreditation Board for Testing and Calibration Laboratories' (NABL) to ensure the best quality (Pharmaceuticals & Medical Devices Bureau of India, website). It is estimated that on average, about 1.2 million people visit Janaushadhi Kendras daily (Press Information Bureau, 2023).

In 2019, an additional objective of 'ensuring easy availability of menstrual health services to all women across India' was added to the list of three objectives. As an important step in ensuring health security for Indian women, Janaushadhi Suvidha Oxo-biodegradable sanitary napkins were launched in 2019 across India at a nominal price of ₹1 ($0.013) per pad. (Pharmaceuticals & Medical Devices Bureau of India, website). By 2022, more than 190 million sanitary napkins had been sold through Janaushadhi Kendras.

The product basket offered is being aggressively expanded. From a meagre 300 medicines and surgical products in 2014/2015, PMBJP expanded to offer 1,616 drugs and 250 surgical products by 2021/2022 (Department of Pharmaceuticals, 2022a). Figure 14 demonstrates an ambitious plan of reaching 2,000 medicines and 200 surgical products by 2023/2024. Here, too, the scheme is not only on track but performing beyond the set objectives.

**Figure 14: Planned expansion of the PMBJP product basket**

Source: Department of Pharmaceuticals, 2022b.

The impact

The resulting savings to the public has been very substantial. Figure 15 shows that, in the last three years alone, the savings have amounted to ₹118.6 billion (US$1.5 billion). From inception, PMBJP is said to have facilitated savings of ₹150 billion (US$1.89 billion) (Department of Pharmaceuticals, 2022a). During the pandemic, in nine months of 2021 alone, Janaushadhi Kendras across India sold about 5.5 million face masks, 165,000 units of sanitisers, 6.4 million Azithromycin tablets and 38.7 million Paracetamol tablets (Department of Pharmaceuticals, 2022c).

Figure 15: PMBJP annual savings 2019/20 – 2021/22 (₹ billion), and total savings since start of scheme

Total savings to the public of ₹150 billion
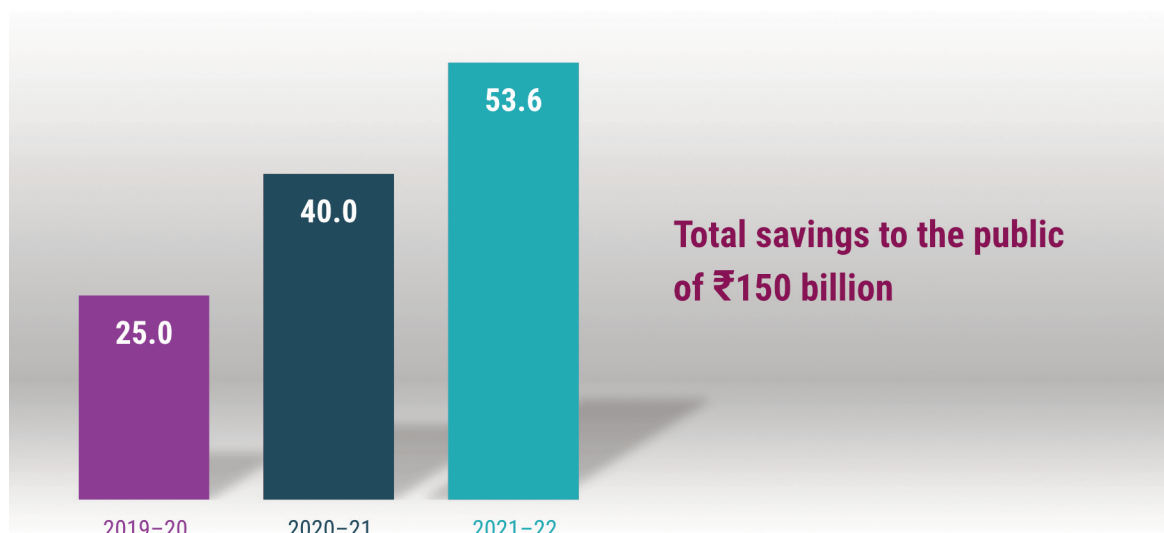
Adapted from: Department of Pharmaceuticals, 2022a.

The price difference between PMBJP generics and the market alternatives can be quite dramatic (see Figure 16). To enhance consumer awareness, a mobile application named 'Janaushadhi Sugam' was launched by PMBJP in 2019. The app helps to locate nearby Janaushadhi Kendras on Google maps, browse the database of available medicines and surgical products, and even allows the customer to compare prices of generic drugs with their branded alternatives and calculate the overall savings. The app has had over half a million downloads on Google Play alone (Google Play, website). During the COVID-19- lockdown across the country, the Janaushadhi Sugam mobile app provided people with significant help in locating the nearest Janaushadhi Kendra and checking availability of affordable generic medicines (Press Information Bureau, 2020).

Figure 16: Price differences between branded and PMBJP generic drugs

Saving	93%	92%	90%	88%	40%
Medicine	Atorvastin tablets IP 20mg	Glimepiride tablets IP 2mg	Diclofenac gastro-resistant tablets IP 50mg	Pantoproazole gastro-resistant tablets IP 40mg	Paracetamol tablets IP 500mg
Average market price	₹ 147.00	₹ 62.00	₹ 49.00	₹ 90.00	₹ 10.00
PMBJP price	₹ 11.00	₹ 5.00	₹ 5.00	₹ 11.00	₹ 6.00

Adapted from: Department of Pharmaceuticals, 2022a.

The way forward

However, PMBJP is not without its challenges. A perception of low quality persists, both with providers and patients. NITI Aayog (2019) points to stock-outs of essential medicines and evidence of expired and substandard medicines being available in public hospital pharmacies, creating a general perception of low quality in government initiatives (NITI Aayog, 2019). A 2022 study in the state of Maharashtra found that although PMBJP offers enormous scope for cost savings, up to 50% of medicines were out of stock for months. The study found that concerns about quality among doctors and patients are hindering the uptake of unbranded generics and recommended a strong regulatory framework for quality control (Lavtepatil S & Ghosh S, 2022). However, negative perceptions of generic medicines is by no means a uniquely Indian policy challenge, as multi-country reviews have shown (Hassali, MA et al., 2014).

To counter this, PMBJP has made quality requirements even more stringent. According to government sources, since August 2021, additional tests such as a hardness test and leak test[1] have been added to the tenders as mandatory conditions. Stability tests are now compulsory for vendors supplying PMBJP. To facilitate seamless testing, 16 NABL-accredited labs are currently empaneled with PMBJP (Department of Pharmaceuticals, 2022b). In parallel, the government has launched a Pharmaceuticals Technology Upgradation Assistance Scheme (PTUAS). This focuses

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[1] Hardness testing and leak testing are two important quality control tests in the manufacturing of pharmaceutical tablets and capsules. Hardness testing ensures that the tablet or capsule is hard enough to withstand handling and transportation without breaking or crumbling. Leak testing ensures that there are no defects in the tablet or capsule that would allow moisture or air to enter, which could affect the stability and potency of the medication.

on assisting producers to upgrade their standards to the level of WHO – Good Manufacturing Practices compatibility so they are able to produce high-quality drugs (Standing Committee on Chemicals and Fertilizers, 2022).

Finally, the 2022/2023 Union budget allocated ₹725 million against the request of ₹1 billion for PMBJP. The Parliament Standing Committee on the Department of Pharmaceuticals in March 2022 concluded that funds were insufficient and that a lower allocation of funds would hamper effective implementation of the scheme (Standing Committee on Chemicals and Fertilizers, 2022). However, it is expected that additional funds will be allocated by the Ministry of Finance according to need, and the current budgetary allocation will be revised upwards later if necessary.

10. Acknowledgements

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